

**2 minute presentation at wind sighting hearing in Brattleboro
1/23/2012 by Charles McKenna, Wilder, Vt., [REDACTED]**

My name is Charles McKenna, and I'm an Executive Committee member of Sierra Club's Vermont Chapter.

Our greatest economic and environmental challenge today is climate change, caused primarily by carbon dioxide emissions. And although it's a global issue, corrective action must be taken locally. And Vermont is in the process of doing just that.

Vermont pumps approximately 8 million metric tons of green house gas into its atmosphere every year. So to do its part in fighting climate change, it is urgent that Vermont displaces fossil fuels with carbon free energy – primarily wind and solar – in all sectors and as soon as possible.

Cost effective wind energy requires two major ingredients – maximum available wind speeds and large efficient wind turbines. In Vermont, because the best wind speeds exist primarily on our ridgelines, that is where most must be located.

Proceeding as rapidly as possible with wind turbine installations is an urgent matter, both to avert the damage of increased climate change, and to develop the energy independence and economic opportunity an advanced carbon-free energy network will offer – with new business opportunities and more good jobs for Vermonters.

The relatively minor and limited short-term disruption caused during large wind turbine installation on our ridgelines will pale in comparison to the very long-term, severe, and costly damage unchecked climate change will cause to those same ridgelines – and our entire state.

Vermont contributes only a small portion of global green house gas. But the responsibility is ours for dealing with the pollution we ourselves cause. And doing it – proactively and early – will open our economy to exceptional growth as others seek to replicate our success and use our technology.

(Save the next paragraph for discussion if it comes up in questions.)

The Sierra Club does not support the use of nuclear power. Although carbon free, its true costs are high and lingering - because it produces toxic radioactive waste which must be kept out of the environment for over 240,000 years, requiring about 8,000 generations to be taxed without representation - as they will have no choice but to fund its security.



John Lewndowski

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Feedback

Vermont

State Profile and Energy Estimates

Rankings: Carbon Dioxide Emissions, 2010 (Metric Tons)

[Download Table Data as CSV](#)

| Rank | State | Carbon Dioxide Emissions (Metric Tons) | |
|------|--------------------------------------|---|---------------------------|
| 1 | Texas | 251,409,188 | <i>~ 31,348 TIMES VT.</i> |
| 2 | Florida | 123,811,228 | |
| 3 | Pennsylvania | 122,829,611 | |
| 4 | Ohio | 121,963,840 | |
| 5 | Indiana | 116,282,506 | |
| 6 | Illinois | 103,127,834 | |
| 7 | Kentucky | 93,159,570 | |
| 8 | Georgia | 82,591,913 | |
| 9 | Alabama | 79,374,763 | |
| 10 | Missouri | 78,814,666 | |
| 11 | Michigan | 74,479,744 | |
| 12 | West Virginia | 74,283,350 | |
| 13 | North Carolina | 73,240,828 | |
| 14 | Louisiana | 58,706,086 | |
| 15 | Arizona | 55,683,398 | |
| 16 | California | 55,405,832 | |
| 17 | Oklahoma | 49,535,558 | |
| 18 | Tennessee | 48,196,067 | |
| 19 | Wisconsin | 47,238,443 | |
| 20 | Iowa | 47,211,320 | |
| 21 | Wyoming <i>LEAST POPULATED STATE</i> | 45,702,951 | <i>5,701.47 TIMES VT.</i> |
| 22 | New York | 41,583,758 | |
| 23 | South Carolina | 41,364,022 | |
| 24 | Colorado | 40,498,764 | |
| 25 | Virginia | 39,719,081 | |
| 26 | Kansas | 36,320,932 | |

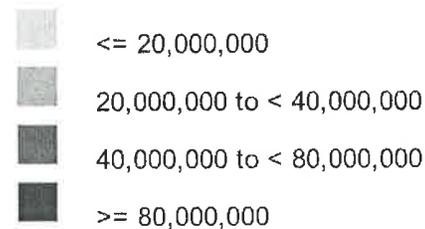
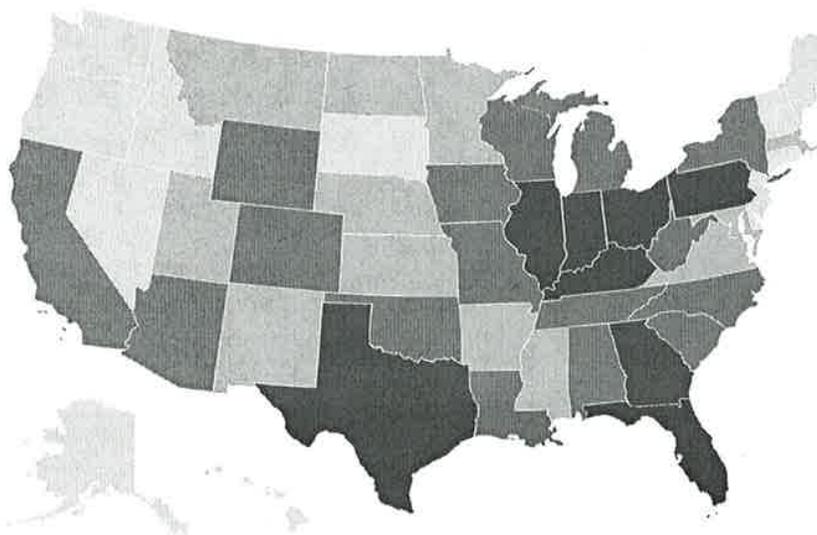
| | | | |
|----|----------------------|------------|-------------------|
| 27 | Utah | 35,519,267 | |
| 28 | Arkansas | 34,018,317 | |
| 29 | Minnesota | 32,946,107 | |
| 30 | North Dakota | 31,063,899 | |
| 31 | New Mexico | 29,378,703 | |
| 32 | Mississippi | 26,845,306 | |
| 33 | Maryland | 26,369,386 | |
| 34 | Nebraska | 24,460,746 | |
| 35 | Montana | 20,369,529 | |
| 36 | Massachusetts | 20,291,010 | |
| 37 | New Jersey | 19,160,136 | |
| 38 | Nevada | 17,020,408 | |
| 39 | Washington | 13,983,610 | |
| 40 | Oregon | 10,093,990 | |
| 41 | Connecticut | 9,201,364 | |
| 42 | Hawaii | 8,286,666 | |
| 43 | New Hampshire | 5,551,486 | |
| 44 | Maine | 4,948,153 | |
| 45 | Delaware | 4,187,304 | |
| 46 | Alaska | 4,125,052 | |
| 47 | South Dakota | 3,611,180 | |
| 48 | Rhode Island | 3,217,071 | |
| 49 | Idaho | 1,213,214 | .151.35 TIMES VT. |
| 50 | District of Columbia | 190,742 | 23.8 TIMES VT. |
| 51 | Vermont | 8,016 | |

NA = Not available. W = Withheld to avoid disclosure of individual company data.
 Note: Rankings are based on the full source data values.

VT. IS ALREADY THE UNDISPUTED LEADER

ELECTRIC GENERATION IS 4% OF EMISSIONS

8016 x 4% = 320.64 METRIC TONS



HOW MUCH WILL ALL THE WIND TURBINES SAVE WHILE DESTROYING THE STATE?

Notes & Sources

Consumption

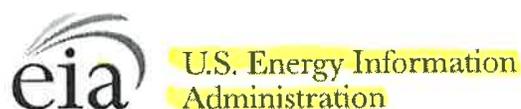
- Total Energy per Capita: EIA, State Energy Data System, Total Consumption Per Capita

Production

- Total Energy: EIA, State Energy Data System, Total Energy Production
- Crude Oil: EIA, Petroleum Supply Annual, Crude Oil Production
- Natural Gas: EIA, Natural Gas Annual, Natural Gas Gross Withdrawals and Production
- Coal: EIA, Annual Coal Report, Coal Production and Number of Mines by State
- Electricity: EIA, Electric Power Monthly, Net Generation by State
- Carbon Dioxide Emissions: EIA, Electric Power Annual, State Historical Tables

Prices

- Natural Gas: EIA, Natural Gas Monthly, Natural Gas Prices
- Electricity: EIA, Electric Power Monthly, Residential Electricity Prices



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Feedback

Vermont

State Profile and Energy Estimates

Selected States Comparison

Select state(s):

Download as CSV

| | Period | US | VT |
|---|----------|----------|--------|
| Economy | | | |
| Population and Employment | | | |
| Population (million) | 2011 | 311.6 | 0.6 |
| Civilian Labor Force (million) | Oct-2012 | 155.1 | 0.4 |
| Per Capita Personal Income (\$) | 2011 | 41,560 | 41,572 |
| Industry | | | |
| Gross Domestic Product (\$ billion) | 2011 | 14,981.0 | 25.9 |
| Land in Farms (Million Acres) | 2007 | 938.3 | 1.2 |
| Market Value of Agricultural Products Sold (\$ billion) | 2007 | 200.6 | 0.7 |
| Prices | | | |
| Petroleum | | | |
| Domestic Crude Oil First Purchase (\$/barrel) | Sep-2012 | 95.98 | — |
| Natural Gas | | | |
| City Gate (\$/thousand cu ft) | Sep-2012 | 4.76 | 5.10 |
| Residential (\$/thousand cu ft) | Sep-2012 | 14.91 | 23.23 |
| Coal | | | |
| Average Sales Price (\$/Short Ton) | 2011 | 41.01 | — |
| Delivered to Electric Power Sector (\$/Million Btu) | Sep-2012 | 2.38 | — |
| Electricity | | | |
| Residential (cents/kWh) | Sep-2012 | 12.33 | 16.55 |
| Commercial (cents/kWh) | Sep-2012 | 10.55 | 14.26 |
| Industrial (cents/kWh) | Sep-2012 | 7.01 | 9.83 |

□ = No data reported.

□ = Number less than 0.5 rounded to zero.

NA = Not available.

NM = Not meaningful due to large relative standard error or excessive percentage change.

W = Withheld to avoid disclosure of individual company data.

Note: Small differences between source data and values displayed here may be due to independent rounding.



Electricity

Electricity Monthly Update

With Data for October 2012 | Release Date: Dec. 21, 2012 | Next Release Date: Jan. 25, 2013

End Use: October 2012

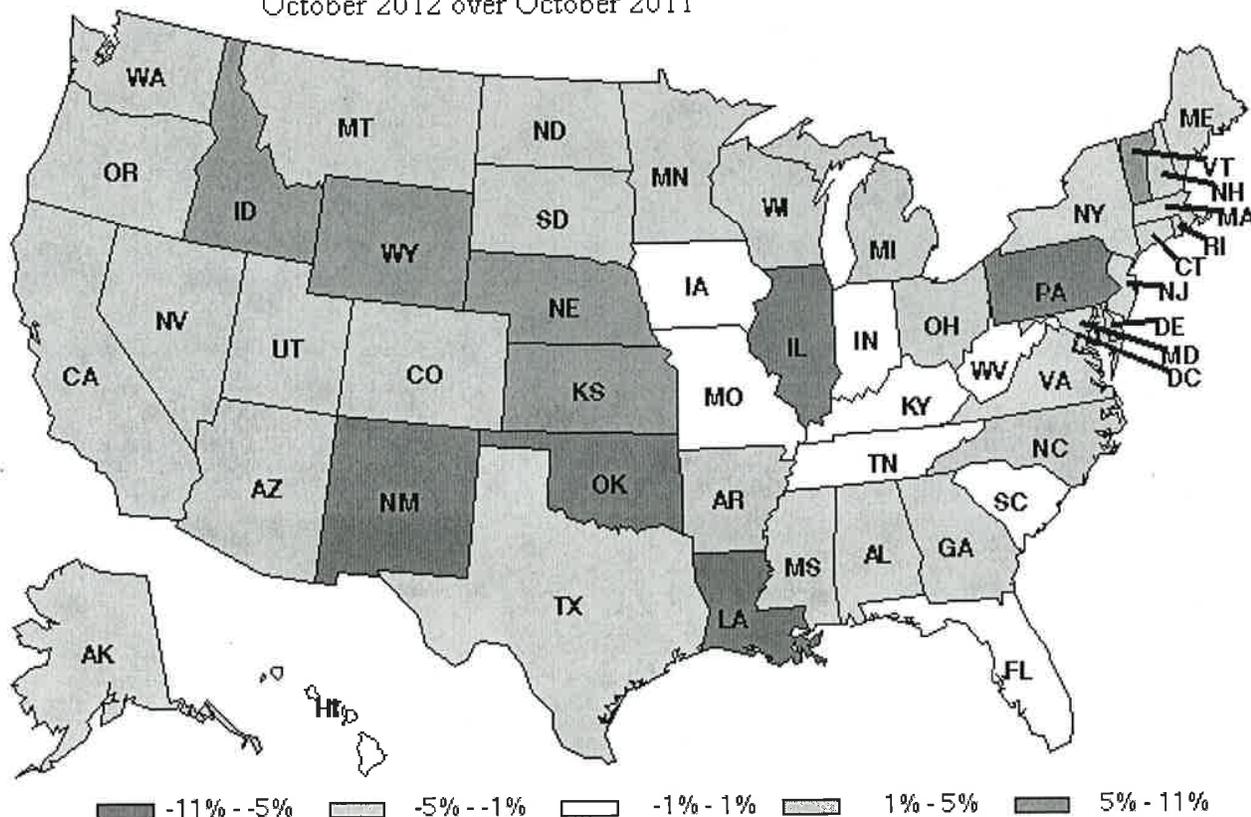
Retail Rates/Prices and Consumption

In this section, we look at what electricity costs and how much is purchased. Charges for retail electric service are based primarily on rates approved by state regulators. However, a number of states have allowed retail marketers to compete to serve customers and these competitive retail suppliers offer electricity at a market-based price.

EIA does not directly collect retail electricity rates or prices. However, using data collected on retail sales revenues and volumes, we calculate average retail revenues per kWh as a proxy for retail rates and prices. Retail sales volumes are presented as a proxy for end-use electricity consumption.

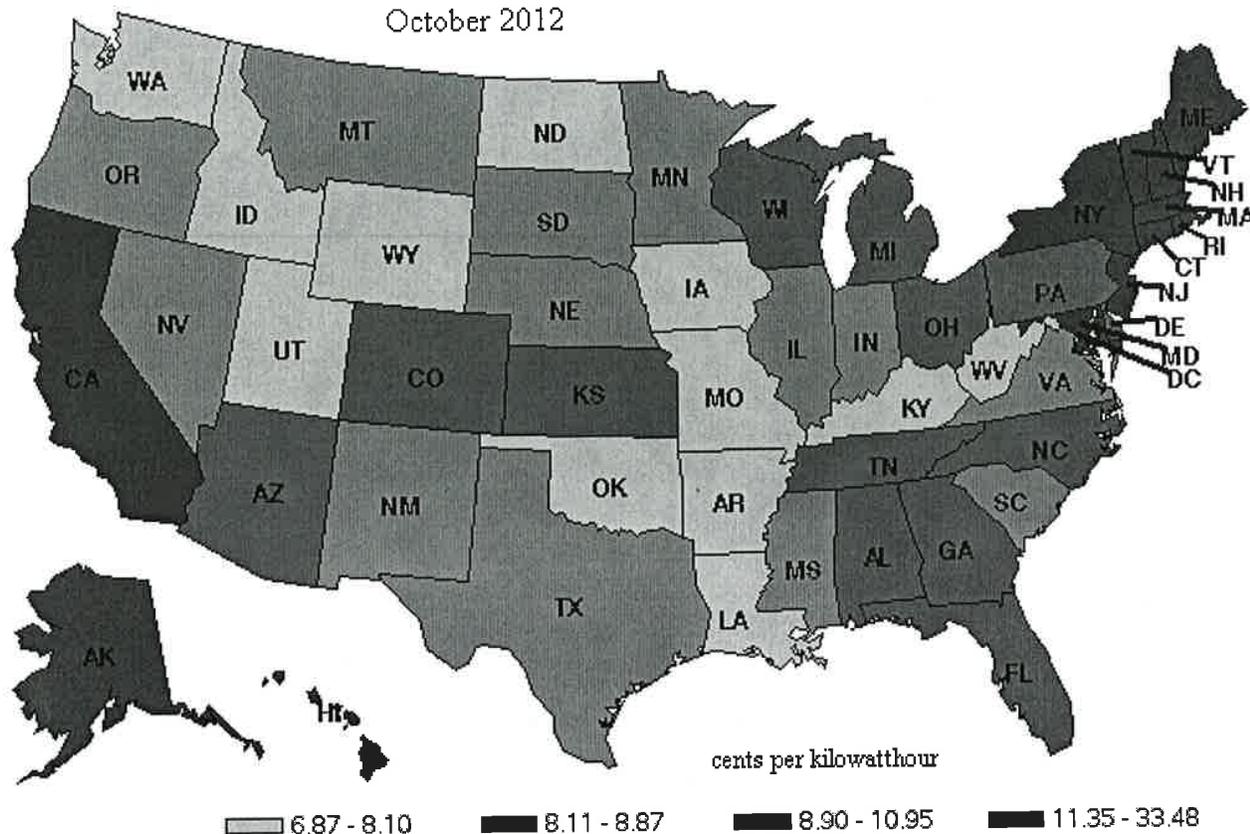
Average Revenue per kWh by state

U.S. Electric Industry Percent Change in Average Revenue per Kilowatthour, October 2012 over October 2011



Source: U.S. Energy Information Administration

U.S. Electric Industry Average Revenue per Kilowatthour,
October 2012



Source: U. S. Energy Information Administration

Compared to October 2011, the average cost of electricity largely fell or stayed the same in most States located east of the Mississippi. The notable exceptions were Rhode Island, Michigan, and Vermont, where the average cost of electricity increased by 3.5 percent, 4.3 percent, and 6.8 percent, respectively. The largest decline occurred in Louisiana, where average cost decreased 10.2 percent from October 2011. Revenues per kilowatthour increased across a large area of the continental United States north and west of New Mexico and Oklahoma. The largest year-over-year increases in average revenue occurred in Wyoming and Idaho, where revenues per kilowatthour increased 7.7 percent and 10.1 percent, respectively.

Retail Service by Customer Sector

| End-use sector | Average Revenues/Sales (¢/kWh) | | Retail Sales (1000s MWh) | | |
|----------------|--------------------------------|--------------------------|--------------------------|--------------------------|------------------|
| | October 2012 | Change from October 2011 | October 2012 | Change from October 2011 | Year to Date |
| Residential | 12.03 | -0.4% | 96,707 | 2.2% | 1,163,630 |
| Commercial | 10.11 | -1.4% | 110,111 | 1.3% | 1,117,747 |
| Industrial | 6.65 | -1.8% | 82,600 | -2.0% | 824,262 |
| Transportation | 9.88 | -3.6% | 619 | 0.4% | 6,291 |
| Total | 9.76 | -0.7% | 290,037 | 0.7% | 3,111,929 |

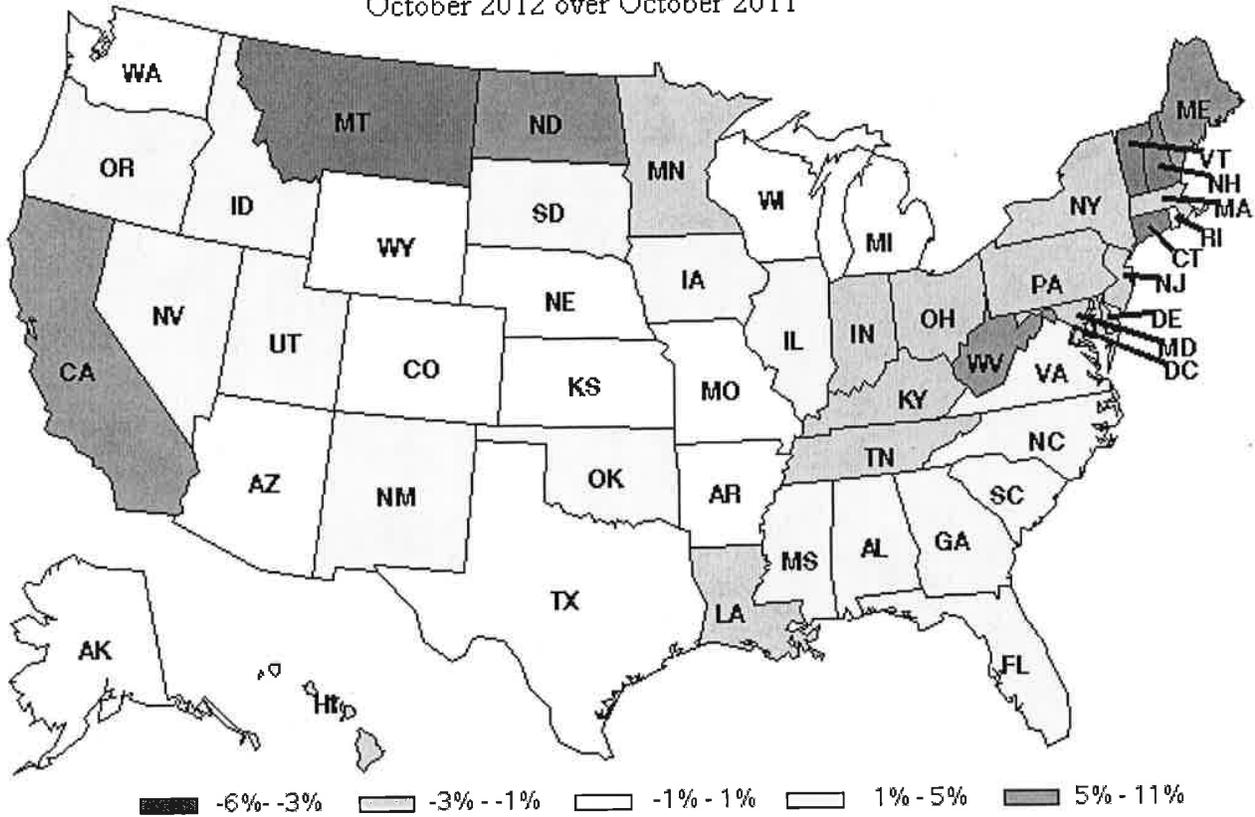
Source: U.S. Energy Information Administration

The average cost of electricity fell slightly in all sectors compared to October 2011, with total average revenues decreasing just 0.7 percent from the previous year. The volume of retail sales of electricity increased slightly in most sectors, but decreased 2 percent in the industrial sector. While retail sales in the residential sector increased 2.2 percent from last year, average

revenues in that sector decreased slightly by 0.4 percent.

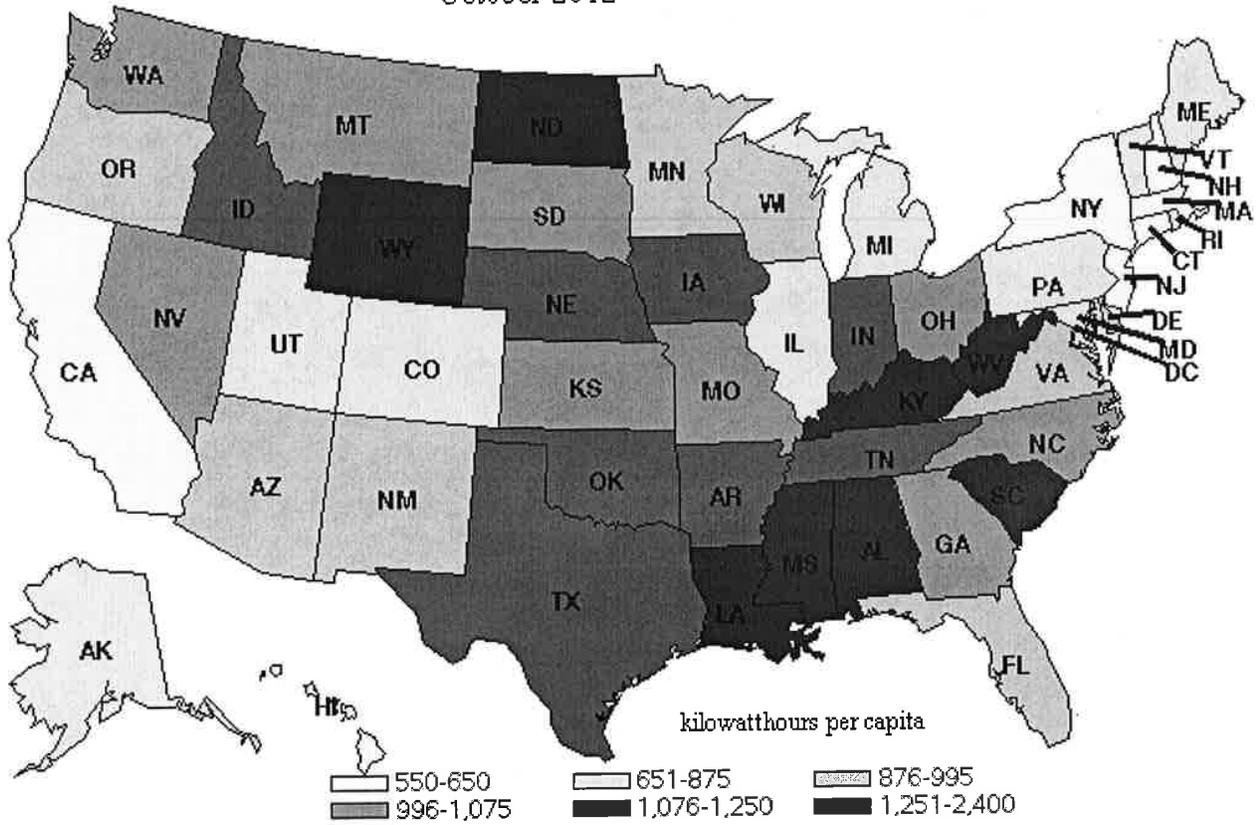
Retail Sales

U.S. Electric Industry Percent Change in Retail Sales,
October 2012 over October 2011



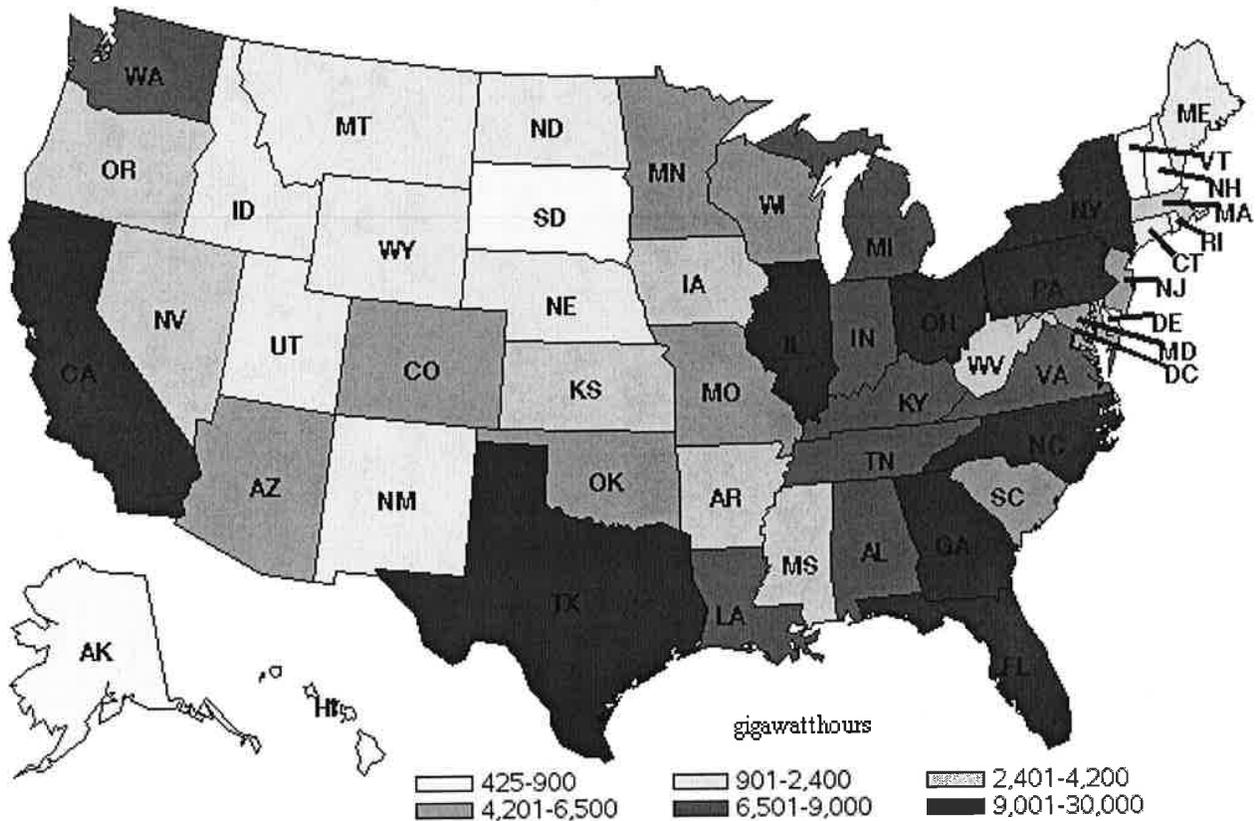
Source: U.S. Energy Information Administration

U.S. Electric Industry Retail Sales per Capita,
October 2012



Source: U. S. Energy Information Administration

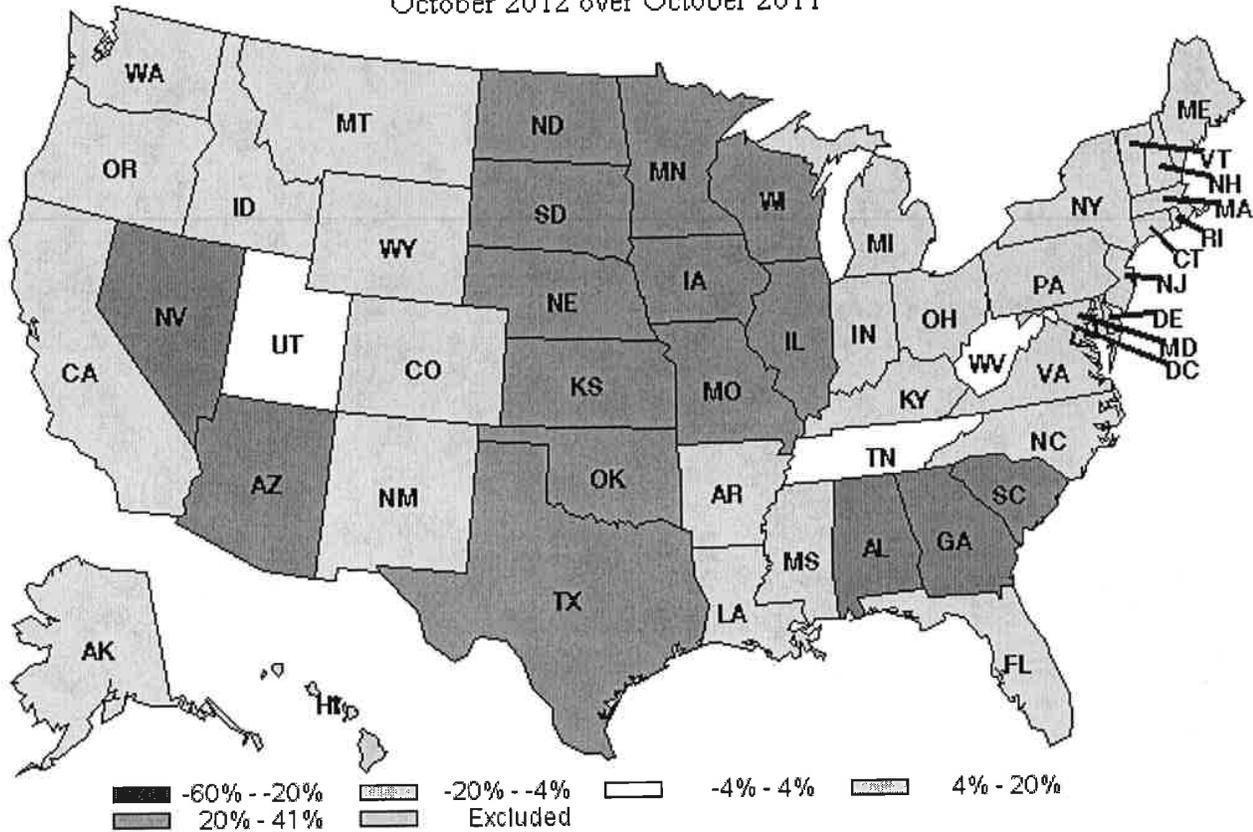
U.S. Electric Industry Retail Sales, October 2012



Source: U.S. Energy Information Administration

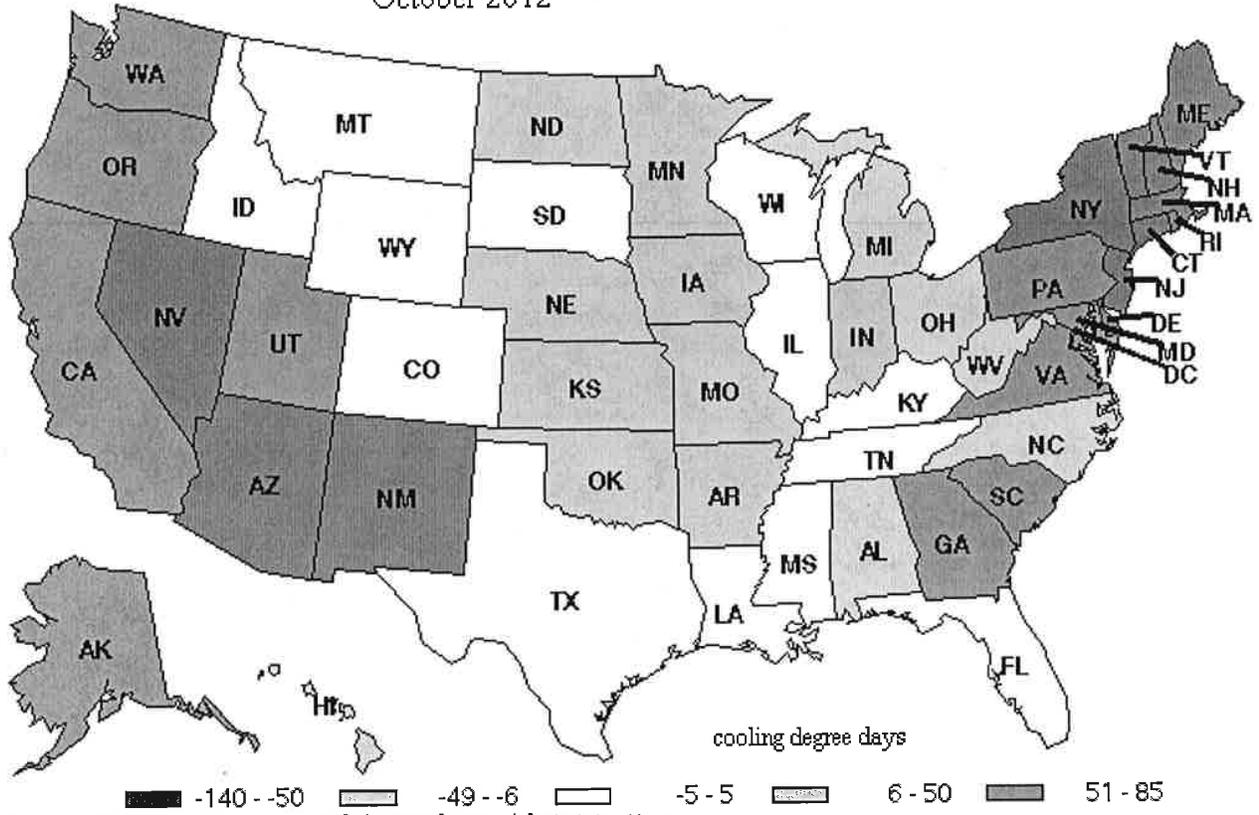
As shown by the map below of percent change in heating degree days (HDDs), October 2012 was warmer for much of the middle of the country than October 2011. There was also not that much deviation from the 30-year normal for most states. Since temperatures are mild and electricity demand is relatively low in October, there was little discernible impact on retail sales from weather. Sales generally decreased in New England and the Ohio River Valley, except for Maine and West Virginia, which had increases in sales of 5.6 percent and 8.3 percent, respectively. The largest increase in sales for the month occurred in North Dakota, where sales increased 10.6 percent, and the largest decrease was in Montana, where sales dropped 5.2 percent. Most of the rest of the country had very little change in retail sales compared to October 2011.

U.S. Heating Degree Days Percentage Change,
 October 2012 over October 2011



Source: National Oceanic and Atmospheric Administration

U.S. Heating Degree Days Deviation from Normal,
October 2012



Source: National Oceanic and Atmospheric Administration

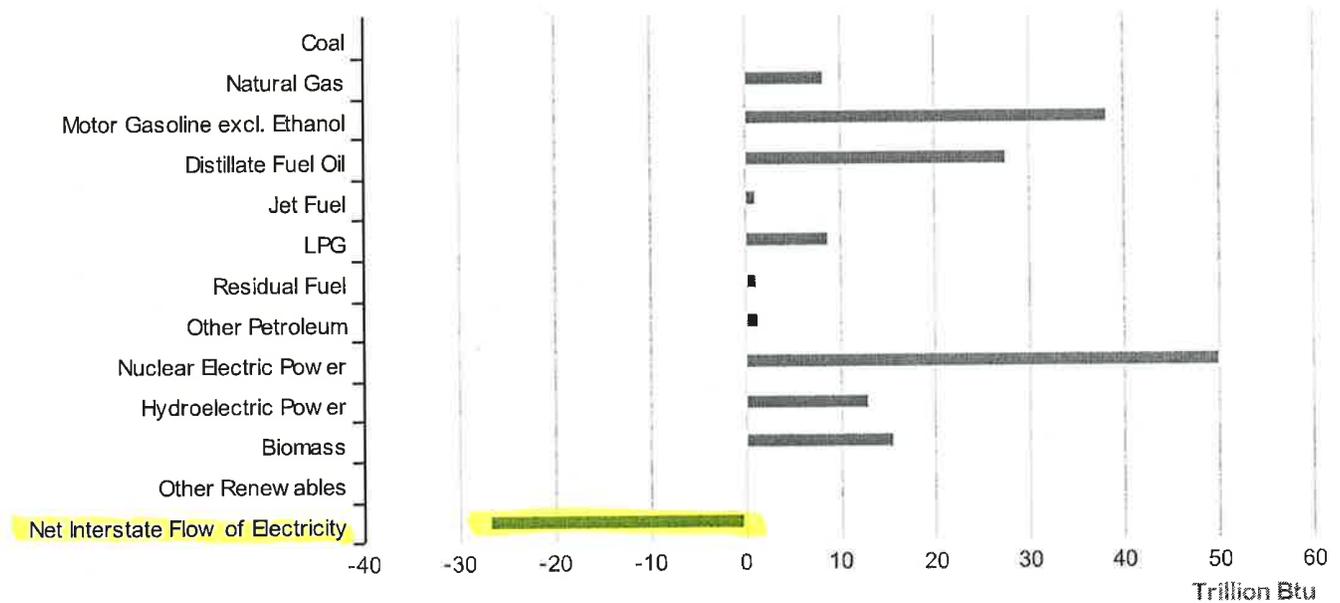


Vermont State Energy Profile

Vermont Quick Facts

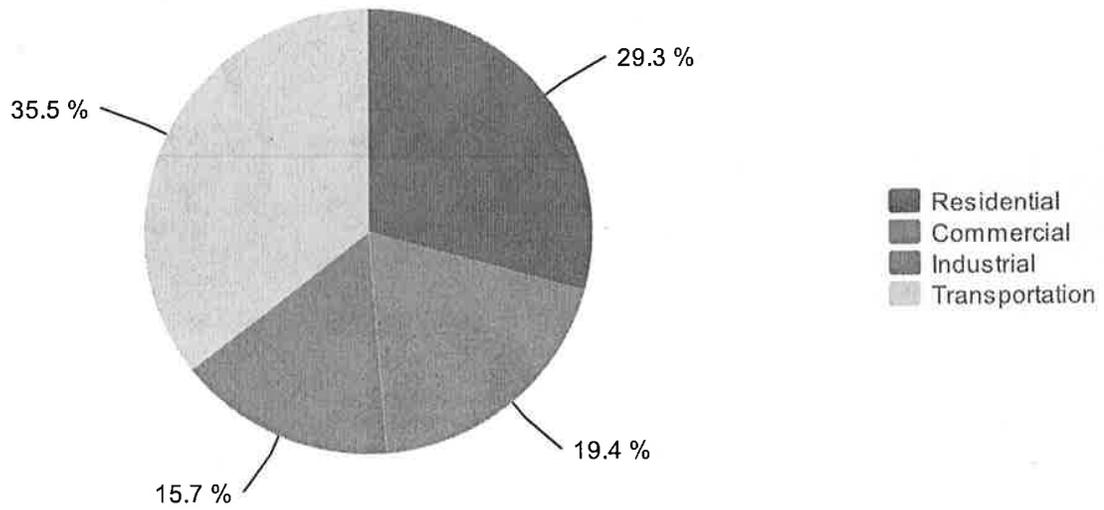
- Vermont had the second-lowest per capita natural gas consumption of all States in 2010.
- Nuclear power accounted for about three-fourths of the electricity generated within Vermont in 2011, a higher share than any other State.
- Twenty-one percent of Vermont's net electricity generation in 2011 was from conventional hydroelectric power.
- Vermont has a voluntary goal of generating 25 percent of electricity consumed in the state from renewable energy resources by 2025.
- In 2010, Vermont had the Nation's lowest carbon dioxide emissions from electricity generation.

Vermont Energy Consumption Estimates, 2010



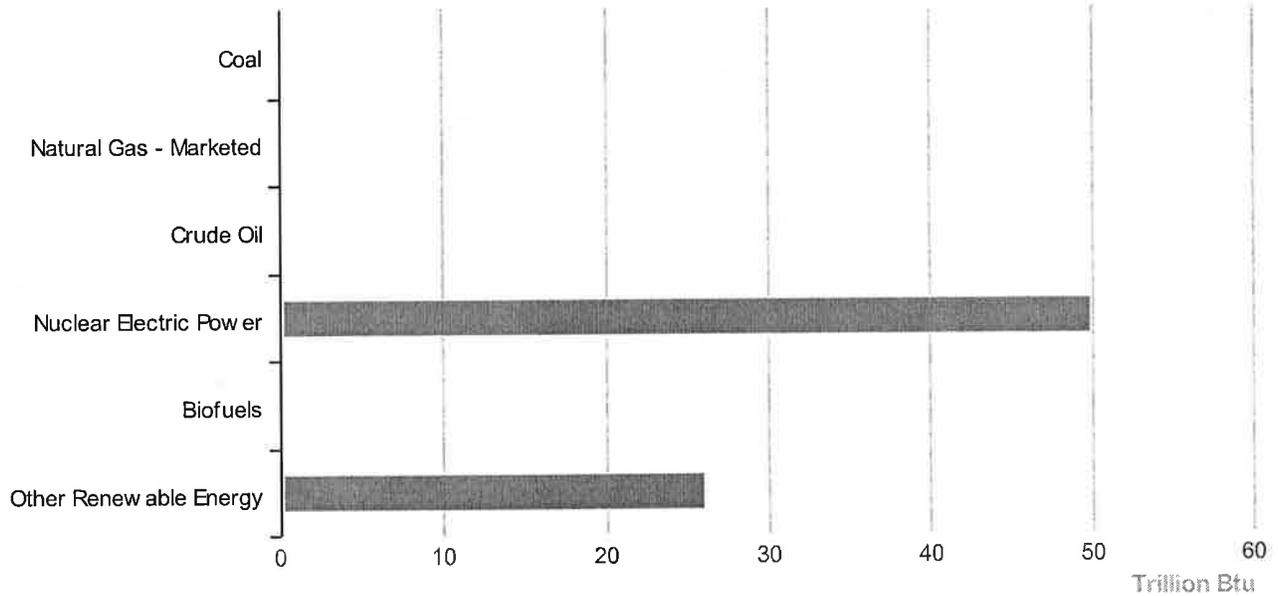
Source: Energy Information Administration, State Energy Data System

Vermont Energy Consumption by End-Use Sector, 2010



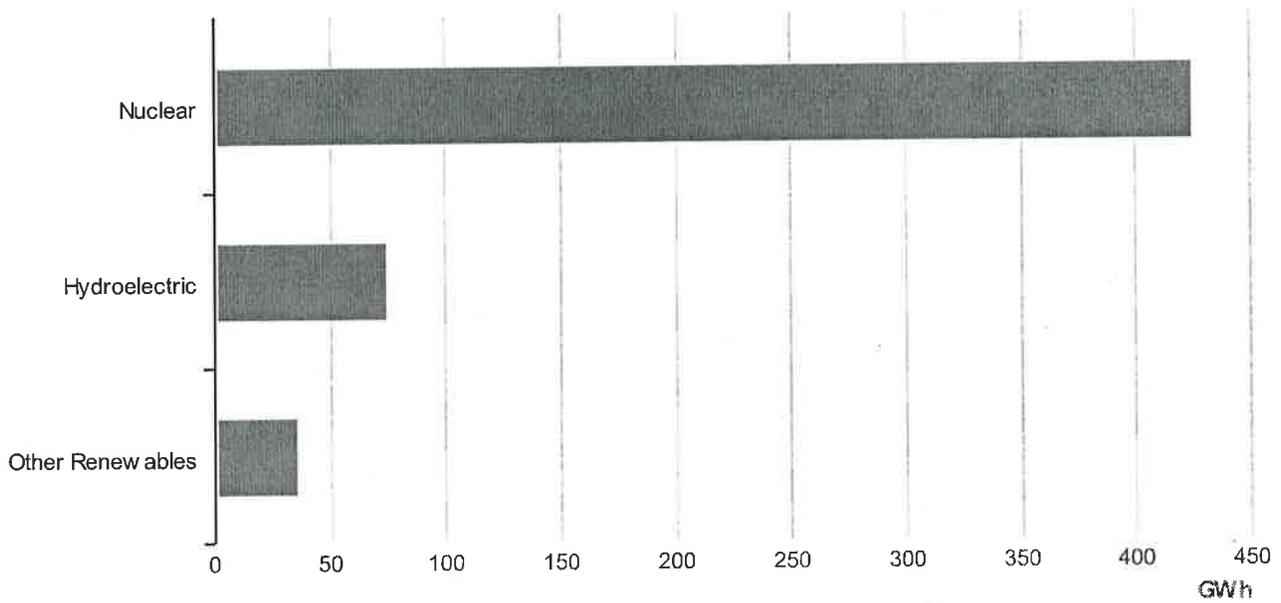
 Source: Energy Information Administration, State Energy Data System

Vermont Energy Production Estimates, 2010



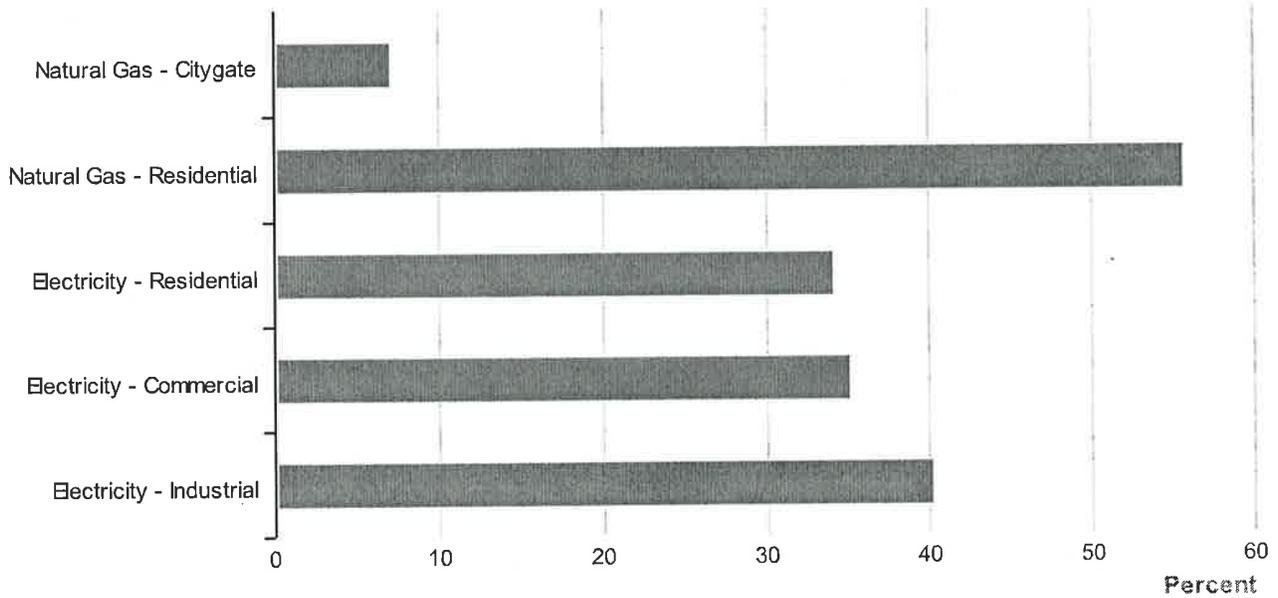
 Source: Energy Information Administration, State Energy Data System

Vermont Net Electricity Generation by Source, Sep. 2012



 Source: Energy Information Administration, Electric Power Monthly

Vermont Price Differences from U.S. Average, Most Recent Monthly



 Source: Energy Information Administration, Petroleum Marketing Monthly ; Natural Gas Monthly ;
Electric Power Monthly

Data

Economy

| Population and Employment | Vermont | U.S. Rank | Period |
|--|-------------------|------------------|---------------|
| Population | 0.6 million | 49 | 2011 |
| Civilian Labor Force | 0.4 million | 50 | Oct-12 |
| Per Capita Personal Income | \$ 41,572 | 22 | 2011 |
| Industry | Vermont | U.S. Rank | Period |
| Gross Domestic Product | \$ 25.9 billion | 34 | 2011 |
| Land in Farms | 1.2 Million Acres | 42 | 2007 |
| Market Value of Agricultural Products Sold | \$ 0.7 billion | 42 | 2007 |

Prices

| Petroleum | Vermont | U.S. Average | Period | find more |
|------------------------------------|--------------------------|--------------------------|---------------|------------------|
| Domestic Crude Oil First Purchase | -- | \$ 95.98 /barrel | Sep-12 | |
| Natural Gas | Vermont | U.S. Average | Period | find more |
| City Gate | \$ 5.10 /thousand cu ft | \$ 4.76 /thousand cu ft | Sep-12 | find more |
| Residential | \$ 23.23 /thousand cu ft | \$ 14.91 /thousand cu ft | Sep-12 | find more |
| Coal | Vermont | U.S. Average | Period | find more |
| Average Sales Price | -- | \$ 41.01 /Short Ton | 2011 | |
| Delivered to Electric Power Sector | -- | \$ 2.38 /Million Btu | Sep-12 | |
| Electricity | Vermont | U.S. Average | Period | find more |
| Residential | 16.55 cents/kWh | 12.33 cents/kWh | Sep-12 | find more |
| Commercial | 14.26 cents/kWh | 10.55 cents/kWh | Sep-12 | find more |
| Industrial | 9.83 cents/kWh | 7.01 cents/kWh | Sep-12 | find more |

Reserves & Supply

| Reserves | Vermont | Share of U.S. | Period | find more |
|---|------------------|----------------------|---------------|---------------------------|
| Crude Oil | -- | -- | 2010 | find more |
| Dry Natural Gas | -- | -- | 2010 | find more |
| Natural Gas Plant Liquids | -- | -- | 2010 | find more |
| Recoverable Coal at Producing Mines | -- | -- | 2011 | find more |
| Rotary Rigs & Wells | Vermont | Share of U.S. | Period | find more |
| Rotary Rigs in Operation | 0 Rigs | 0.0% | 2011 | |
| Crude Oil Producing Wells | 0 Wells | 0.0% | 2009 | find more |
| Natural Gas Producing Wells | -- | -- | 2010 | find more |
| Production | Vermont | Share of U.S. | Period | find more |
| Total Energy | 76 Trillion Btu | 0.1% | 2010 | find more |
| Crude Oil | -- | -- | Sep-12 | find more |
| Natural Gas - Marketed | -- | -- | 2010 | find more |
| Coal | -- | -- | 2011 | find more |
| Capacity | Vermont | Share of U.S. | Period | |
| Crude Oil Refinery Capacity (as of Jan. 1) | -- | -- | 2012 | |
| Electric Power Industry Net Summer Capability | 1,128 MW | 0.1% | 2010 | |
| Net Electricity Generation | Vermont | Share of U.S. | Period | find more |
| Total Net Electricity Generation | 537 thousand MWh | 0.2% | Sep-12 | |
| Petroleum-Fired | NM | NM | Sep-12 | find more |
| Natural Gas- | * | * | Sep-12 | find more |

Fired

| | | | | |
|------------------|------------------|------|--------|-----------|
| Coal-Fired | -- | -- | Sep-12 | find more |
| Nuclear | 425 thousand MWh | 0.7% | Sep-12 | find more |
| Hydroelectric | 75 thousand MWh | 0.4% | Sep-12 | find more |
| Other Renewables | 36 thousand MWh | 0.2% | Sep-12 | |

Stocks Vermont Share of U.S. Period find more

| | | | | |
|--|---------------------|------|--------|-----------|
| Motor Gasoline (Excludes Pipelines) | -- | -- | Sep-12 | |
| Distillate Fuel Oil (Excludes Pipelines) | 30 thousand barrels | * | Sep-12 | find more |
| Natural Gas in Underground Storage | -- | -- | Sep-12 | find more |
| Petroleum Stocks at Electric Power Producers | 48 thousand barrels | 0.2% | Sep-12 | find more |
| Coal Stocks at Electric Power Producers | -- | -- | Sep-12 | find more |

Production Facilities Vermont

| | | | | |
|---|--|--|--|-----------|
| Major Coal Mines | None | | | find more |
| Petroleum Refineries | None | | | find more |
| Major Non-Nuclear Electricity Generating Plants | J C McNeil (City of Burlington-Electric) ; Berlin 5 (Green Mountain Power Corp) ; Bellows Falls (TransCanada Hydro Northeast Inc.,) ; Sheffield Wind (Vermont Wind LLC) ; Wilder (TransCanada Hydro Northeast Inc.,) | | | |
| Nuclear Power Plants | Vermont Yankee (Entergy Nuclear Vermont Yankee) | | | find more |

Distribution & Marketing

Distribution Centers Vermont

| | | | | |
|-------------------------------|------|--|--|-----------|
| Oil Seaports/Oil Import Sites | None | | | find more |
| Natural Gas Market Centers | None | | | |

[find more](#)

Major Pipelines **Vermont**

Crude Oil Portland

Petroleum Product None

Liquefied Petroleum Gases None

Interstate Natural Gas Pipelines None

Fueling Stations **Vermont** **Share of U.S.** **Period**

Motor Gasoline 616 Stations 0.4% 2008

Liquefied Petroleum Gases 4 Stations 0.2% 2010

Compressed Natural Gas 2 Stations 0.2% 2010

Ethanol 0 Stations 0.0% 2010

Other Alternative Fuels 5 Stations 0.4% 2010

Consumption

per Capita **Vermont** **U.S. Rank** **Period**

Total Energy 236 million Btu 42 2010

by Source **Vermont** **Share of U.S.** **Period**

Total Energy 148 trillion Btu 0.2% 2010 [find more](#)

Total Petroleum 15.7 million barrels 0.2% 2010 [find more](#)

 » Motor Gasoline 7.9 million barrels 0.2% 2010 [find more](#)

 » Distillate Fuel 4.7 million barrels 0.3% 2010 [find more](#)

 » Liquefied Petroleum Gases 2.4 million barrels 0.3% 2010 [find more](#)

 » Jet Fuel 0.2 million barrels * 2011 [find more](#)

Natural Gas 8,443 million cu ft * 2010 [find more](#)

Coal -- -- 2011 [find more](#)

| by End-Use Sector | Vermont | Share of U.S. | Period | |
|---|----------------------|----------------------|---------------|-----------|
| Residential | 43,267 billion Btu | 0.2% | 2010 | find more |
| Commercial | 28,749 billion Btu | 0.2% | 2010 | find more |
| Industrial | 23,249 billion Btu | 0.1% | 2010 | find more |
| Transportation | 52,364 billion Btu | 0.2% | 2010 | find more |
| for Electricity Generation | Vermont | Share of U.S. | Period | find more |
| Petroleum | NM | NM | Sep-12 | find more |
| Natural Gas | 2 million cu ft | * | Sep-12 | find more |
| Coal | -- | -- | Sep-12 | find more |
| for Home Heating (share of households) | Vermont | U.S. Average | Period | |
| Natural Gas | 15.2 % | 49.5 % | 2011 | |
| Fuel Oil | 47.7 % | 6.5 % | 2011 | |
| Electricity | 4.2 % | 35.4 % | 2011 | |
| Liquefied Petroleum Gases | 15.4 % | 5.0 % | 2011 | |
| Other/None | 17.4 % | 3.6 % | 2011 | |
| Environment | | | | |
| Special Programs | Vermont | | | find more |
| Clean Cities Coalitions | State of Vermont | | | |
| Alternative Fuels | Vermont | Share of U.S. | Period | find more |
| Alternative Fueled Vehicles in Use | 2,551 Vehicles | 0.3% | 2010 | find more |
| Ethanol Plants (as of Feb. 13) | 0 Plants | 0.0% | 2012 | find more |
| Ethanol Plant Capacity (as of Jan. 1) | 0 Million Gal/Year | 0.0% | 2011 | find more |
| Ethanol Consumption | 851 Thousand Barrels | 0.3% | 2010 | find more |
| Electric | Vermont | Share of U.S. | Period | find more |

State's farms and forests, by 2025.

Vermont's per capita residential electricity use is low compared with the rest of the Nation, in part because demand for air-conditioning is minimal during the mild summer months and only a small share of households use electricity for home heating.

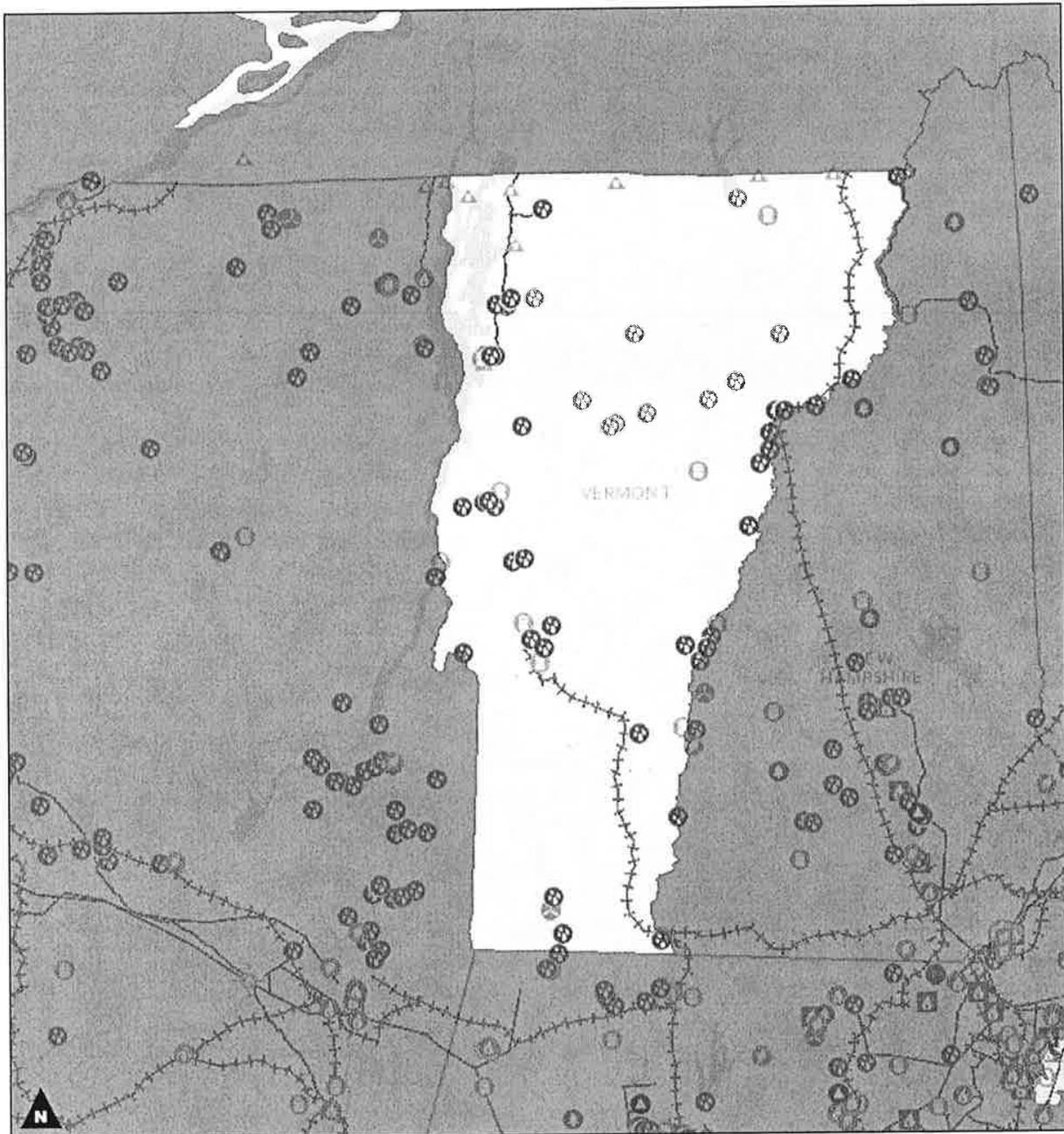
Other Resources

Energy-Related Regions and Organizations

- Regional Transmission Organization (RTO): ISO New England (ISO-NE)
- Petroleum Administration for Defense District (PADD): 1A
- North American Electric Reliability Corporation (NERC) Region: Northeast Power Coordinating Council (NPCC)

Other Websites

- Vermont Public Service Board
- Vermont Department of Public Service, Energy Efficiency Division
- Vermont Department for Children and Families, Agency of Human Services, Fuel Assistance in Vermont
- Vermont Department for Children and Families, Agency of Human Services, Vermont's Weatherization Program
- Vermont Business Energy Conservation Loan Program, Vermont Economic Development Authority
- Alternative Fuels and Advanced Vehicle Data Center - Federal and State Incentives and Laws
- Benefits.Gov Energy Assistance (107)
- DSIRE - Database of State Incentives for Renewables and Efficiency
- National Association of Regulatory Utility Commissioners (NARUC)
- National Association of State Energy Officials (NASEO)
- National Conference of State Legislatures (NCSL)-Issues and Research - News Highlights: Issues and Research - Energy
- National Renewable Energy Laboratory (NREL)-Dynamic Maps, Geographic Information System (GIS) Data and Analysis Tools - Maps
- U.S. Geological Survey (USGS) Maps, Imagery, and Publications - Maps
- Vermont Department of Public Service
- United States Department of Health and Human Services - Administration for Children and Families - Low Income Home Energy Assistance Program



Gray Base: Copyright: ©2012 Esri, DeLorme, NAVTEQ

0 5 10 20 Miles



- | | | |
|-------------|--------------------|--|
| Mask | Nuclear | Petroleum Import Site |
| Surface | Other | Petroleum Refinery |
| Underground | Other Fossil Gases | Natural Gas Processing Facilities |
| Biomass | Petroleum | Liquid Natural Gas Import/Export Terminals |
| Coal | Pumped Storage | Natural Gas Transmission Hubs |
| Geothermal | Solar | Electric Transmission Lines (345kv) |
| Hydro | Wind | Natural Gas Interstate, Intrastate and Gathering Pipelines |
| Natural Gas | Wood | |

Germany's wind power chaos should be a warning to the UK

Germany has gone further down the 'renewables' path than any country in the world, and now it's paying the price



German Chancellor Angela Merkel has made a massive commitment to 'renewable' energy Photo: AP

By Christopher Booker

7:00PM BST 22 Sep 2012

On Friday, September 14, just before 10am, Britain's 3,500 wind turbines broke all records by briefly supplying just over four gigawatts (GW) of electricity to the national grid. Three hours later, in Germany, that country's 23,000 wind turbines and millions of solar panels similarly achieved an unprecedented output of 31GW. But the responses to these events in the two countries could not have been in starker contrast.

In Britain, the wind industry proclaimed a triumph. Maria McCaffery, the CEO of RenewableUK, crowed that "this record high shows that wind energy is providing a reliable, secure supply of electricity to an ever-growing number of British homes and businesses" and that "this bountiful free resource will help drive down energy bills". But in Germany, the news was greeted with dismay, for reasons which merit serious attention here in Britain.

Germany is way ahead of us on the very path our politicians want us to follow – and the problems it has encountered as a result are big news there. In fact, Germany is being horribly caught out by precisely the same delusion about renewable energy that our own politicians have fallen for. Like all enthusiasts for “free, clean, renewable electricity”, they overlook the fatal implications of the fact that wind speeds and sunlight constantly vary. They are taken in by the wind industry’s trick of vastly exaggerating the usefulness of wind farms by talking in terms of their “capacity”, hiding the fact that their actual output will waver between 100 per cent of capacity and zero. In Britain it averages around 25 per cent; in Germany it is lower, just 17 per cent.

The more a country depends on such sources of energy, the more there will arise – as Germany is discovering – two massive technical problems. One is that it becomes incredibly difficult to maintain a consistent supply of power to the grid, when that wildly fluctuating renewable output has to be balanced by input from conventional power stations. The other is that, to keep that back-up constantly available can require fossil-fuel power plants to run much of the time very inefficiently and expensively (incidentally chucking out so much more “carbon” than normal that it negates any supposed CO₂ savings from the wind).

Both these problems have come home to roost in Germany in a big way, because it has gone more aggressively down the renewables route than any other country in the world. Having poured hundreds of billions of euros in subsidies into wind and solar power, making its electricity bills almost the highest in Europe, the picture that Germany presents is, on paper, almost everything the most rabid greenie could want. Last year, its wind turbines already had 29GW of capacity, equivalent to a quarter of Germany’s average electricity demand. But because these turbines are even less efficient than our own, their actual output averaged only 5GW, and most of the rest had to come from grown-up power stations, ready to supply up to 29GW at any time and then switch off as the wind picked up again.

Now the problem for the German grid has become even worse. Thanks to a flood of subsidies unleashed by Angela Merkel’s government, renewable capacity has risen still further (solar, for instance, by 43 per cent). This makes it so difficult to keep the grid balanced that it is permanently at risk of power failures. (When the power to one Hamburg aluminium factory failed recently, for only a fraction of a second, it shut down the plant, causing serious damage.) Energy-intensive industries are having to install their own generators, or are looking to leave Germany altogether.

In fact, a mighty battle is now developing in Germany between green fantasists and practical realists. Because renewable energy must by law have priority in supplying the grid, the owners of conventional power stations, finding they have to run plants unprofitably, are so angry that they are threatening to

close many of them down. The government response, astonishingly, has been to propose a new law forcing them to continue running their plants at a loss.

Meanwhile, firms such as RWE and E.on are going flat out to build 16 new coal-fired and 15 new gas-fired power stations by 2020, with a combined output equivalent to some 38 per cent of Germany's electricity needs. None of these will be required to have "carbon capture and storage" (CCS), which is just an empty pipedream. This makes nonsense of any pretence that Germany will meet its EU target for reducing CO2 emissions (and Mrs Merkel's equally fanciful goal of producing 35 per cent of electricity from renewables).

In brief, Germany's renewables drive is turning out to be a disaster. This should particularly concern us because our Government, with its plan to build 30,000 turbines, to meet our EU target of sourcing 32 per cent of our electricity from renewables by 2020, is hell-bent on the same path. But our own "big six" electricity companies, including RWE and E.on, are told that they cannot build any replacements for our coal-fired stations (many soon to be closed under EU rules) which last week were supplying more than 40 per cent of our power – unless they are fitted with that make-believe CCS. A similar threat hangs over plans to build new gas-fired plants of the type that will be essential to provide up to 100 per cent back-up for those useless windmills.

Everything about the battle now raging in Germany applies equally to us here in Britain – except that we have only fantasists such as Ed Davey in charge of our energy policy. Unless the realists stage a counter-coup very fast, we are in deep trouble.

Only warmists could pass this A-level

While Michael Gove tries valiantly to remedy our dysfunctional exam system he might take a look at some recent papers, such as that set last June for A-level General Studies students by our leading exam body, AQA. Candidates were asked to discuss 11 pages of "source material" on the subject of climate change. Sources ranged from a report of the UN's Intergovernmental Panel on Climate Change to The Guardian, all shamelessly promoting global warming alarmism. One document from the Met Office solemnly predicted that "even if global temperatures only rise by 2 degrees C, 30-40 per cent of species could face extinction". A graph from the US Environmental Protection Agency showed temperatures having soared in the past 100 years by 1.4 degrees – exactly twice the generally accepted figure.

The only hint that anyone might question such beliefs was an article by Louise Gray from The Daily Telegraph, which quoted that tireless campaigner for the warmist cause, Bob Ward of the Grantham

Institute, dismissing all sceptics as “a remnant group of dinosaurs” who “misunderstood the point of science”.

If it were still a purpose of education to teach people to examine evidence and think rationally, any bright A-level candidate might have had a field day, showing how all this “source material” was no more than vacuous, one-sided propaganda. But today one fears they would have been marked down so severely for not coming up with the desired answers that they would have been among the tiny handful of candidates given an unequivocal “fail”.

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German Energy Revolution

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10/10/2012

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FROM DER SPIEGEL

Merkel's Blackout

German Energy Plan Plagued by Lack of Progress

By SPIEGEL Staff



The article you are reading originally appeared in German in issue 41/2012 (October 8, 2012) of DER SPIEGEL.

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Berg Oberbunte / DER SPIEGEL

Germany plans to abandon nuclear power by 2022, but its government hasn't been doing enough to ensure that the project succeeds. Needed infrastructure and technology is lacking, and coordination is a mess. Meanwhile, weary consumers are paying more for electricity, and the supply is in jeopardy.

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German Economics Minister Philipp Rösler is standing in the boiler room of a row house in the town of Hönow, near Berlin. He doesn't look at all pleased with what he's seeing: an un-insulated heating pipe. What a waste of money and energy!

The owner of the building, Petra Röfke, 54, and her partner Hartmut, 58, look embarrassed. But the minister has some good advice for them. Wrapping a little foam insulation around the pipe would help save a lot of energy, he says, adding: "I have the same kind of pipe in my house."

In fact, says Rösler, he has a good mind to drive to the local hardware store and take care of the matter himself, along with replacing the old, inefficient light bulbs he saw while touring the house. He also didn't fail to notice the antiquated tube television set in the living room. "A lot can be done here," says the minister, giving the couple his final verdict.

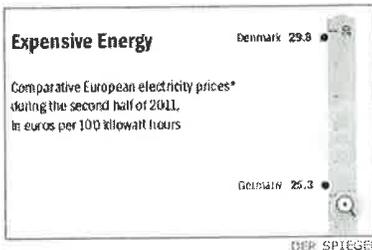
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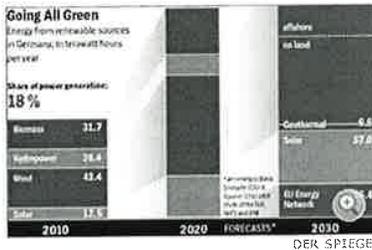
Photo Gallery: Into the Future without a Plan

3 Photos

With the government driving up the price of electricity, Rösler seems to feel an urge to make himself useful by dispensing advice on how to save money and



Graphic: A Comparison of EU Electricity Prices



Germany's Green Revolution



PHOTO GALLERY



Photo Gallery: Germany's Troubled Offshore Wind Offensive

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energy. On Monday, grid operators announced a significant increase in electricity prices in Germany, prices that are already the second-highest in Europe.

The price hike is the result of an assessment under the Renewable Energy Act (EEG), a sort of green-energy solidarity surcharge that is automatically added to every consumer's electricity bill. Under the agreement reached in the last round of negotiations, the assessment will increase from 3.6 cents to 5.4 cents per kilowatt hour.

With the new rates, German citizens will be paying a total of more than €20 billion (\$25.7 billion) next year to promote renewable energy. This is more than €175 for an average three-person household, a 50 percent increase over current figures. And then there are the additional charges a consumer pays for the electricity tax, the cogeneration assessment, the concession fee and value-added tax.

The development is an embarrassment to Germany's coalition government, made up of Chancellor Angela Merkel's center-right Christian Democratic Union (CDU), its Bavarian sister party, the Christian Social Union (CSU), and the pro-business Free Democratic Party (FDP). In recent months, the government has denied claims that the gradual transition to green energy could cost German citizens a load of money.

Broken Promises

In a government statement issued in June 2011, Chancellor Angela Merkel promised that prices would remain stable. "The EEG assessment should not increase above its current level," she told the German parliament, the Bundestag. Economics Minister Rösler said that there could even be "room for decreases." The environment ministers, first Norbert Röttgen and then Peter Altmaier, behaved as if Germany's phase-out of nuclear energy was not going to cost anything, even as they handed out billions in subsidies to owners of homes with solar panels and wind-farm operators.

Merkel must now deal with the consequences of her statement that the energy turnaround was to be the most important domestic project in the legislative period. Within a few hours after the nuclear reactor disaster in Fukushima in March 2011, she had transformed herself from a proponent into an opponent of nuclear energy. At the time, most Germans supported the chancellor. But now, more than a year later, they are losing confidence in her ability to get it right. German politician and EU Energy Commissioner Günther Oettinger says that he doubts "whether German consumers will accept rising electricity prices resulting from the energy turnaround in the long term."

The rising cost of electricity is also a burden on businesses. According to Oettinger, energy costs now represent the biggest liability for Germany as a place to do business, especially in light of the marked increase in the number of blackouts and voltage fluctuations in the grid.

Consumer advocates view the electricity price as a social issue, not unlike the price of bread in ancient Rome. The Paritätischer Gesamtverband, an umbrella association for social-welfare groups, estimates that about 200,000 recipients of benefits under the Hartz IV welfare reform program for the long-term unemployed saw their power shut off last year because of unpaid bills. The VdK, Germany's largest welfare organization, uses the term "electricity poverty" and is sharply critical of what it sees as a "glaring violation of basic social rights." According to the VdK, it is unfair that citizens are being asked to bear much of the burden of costs and risks associated with the energy turnaround.

Wasted Time and Money

This Wednesday, Environment Minister Altmaier plans to unveil a proposal on how to move forward with legislation designed to promote green energy. Members of the Bundestag from the ruling coalition want to exempt a growing number of companies from the green energy assessment. FDP parliamentary floor leader Rainer Brüderle is calling for a moratorium on new roof-based solar modules and wind turbines. Meanwhile, the center-left Social Democratic Party (SPD) and the Green Party are discussing whether energy providers should be compelled to offer special rates for low-income customers. Economics Minister Rösler, whose visit to a boiler room in Hönnow marked the beginning of a new promotional campaign, wants to encourage citizens to conserve energy.

The central question in all of this is whether the money coming from electricity consumers is being spent wisely. If the federal government wants to have all of Germany's nuclear power plants phased out by 2022, why is it doing so little to ensure that the project will succeed?

Billions are currently being spent on the unchecked expansion of solar energy -- a technology that contributes the least to a reliable power supply in Germany, which isn't exactly famous for abundant sunshine. The comparatively efficient building renovation programs, on the other, have come to a standstill because the federal and state governments have been quarreling over funding for more than a year now. There is far too little storage capacity to serve as a buffer against the fluctuating supply of wind and solar energy. In addition, there are no conventional replacement power plants in the works. In fact, energy utilities are thinking about shutting down existing plants.



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A Massive Mess

Instead of agreeing on a concept for the energy turnaround, the parties in the ruling coalition are arguing over who is responsible for the program. Economics Minister Rösler, of the FDP, is laying claim to the expansion of the grid. Environment Minister Altmair, of the CDU, sees himself as being in charge of renewable energy projects -- as if the two things could function without each other. And then there are Transportation Minister Peter Ramsauer (CSU) in charge of site planning, Research Minister Annette Schavan (CDU) heading up storage-technology efforts, and Agriculture Minister Ilse Aigner (CSU) looking after biofuel issues. Vanity and proportional representation are also factors in the mix.

Meanwhile, Germany's 16 federal states are developing their own concepts, some of which are at odds with each other. Bavarian Governor Horst Seehofer says that his state plans to develop a self-sufficient energy supply. But David McAllister, the governor of the northern state of Lower Saxony, has a plan based on supplying Bavaria with large amounts of electricity from wind farms off the North Sea coast.

What some grid operators, power plant owners and scientists are doing today is nothing short of flabbergasting. There are power plants that are not connected to the grid, power masts without lines, and power lines leading to nowhere.

"There is still quite a lot to do here," Rösler said when he emerged from the boiler room in Hönnow. Petra Rofke, the owner, nodded. Rösler added that he couldn't have imagined so much waste. "It's crazy, isn't it?"

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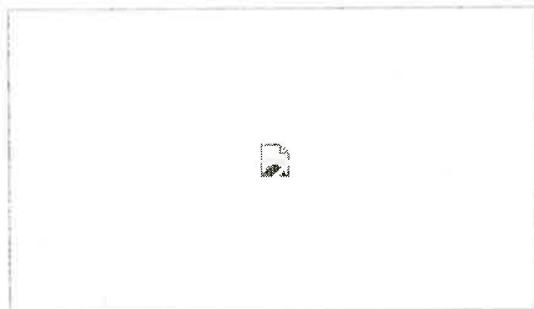


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Poland, Czech Republic To Block Out Germany's Unstable Green Electricity – “Coal To Play A Major Role A Lot Longer”

By [P Gosselin](#) on 30. Dezember 2012



Some big energy developments in Germany lately.

Several readers pointed out an [article appearing in the online daily Die Welt here](#). It seems that Eastern Europe has said “no” to hugely subsidized, unstable German green electricity flowing across the border into their power grids.

One reason is because Germany still has not installed the huge power transmission lines needed to deliver the sometimes massive wind and solar electricity directly to heavy industry in Central and Southern Germany. And it'll be years before it can, if ever. Therefore Germany reroutes its intermittently massive amounts of wind and solar energy through the power grids of its Eastern European neighbors (mainly Poland and the Czech Republic) and then to its industry to the south.

The problem with this rerouting is that Poland and the Czech Republic now often find their power grids critically and unpredictably overloaded, and thus have decided to install equipment to keep German electricity out when certain levels are reached.

Die Welt writes:

Polish grid operator PSE has agreed to build together with grid operator 50 Hertz so-called phase shifters, with which excessive current flows can be blocked. Their use is planned to be 'very soon'."

So what happens if all the windparks and solar farms in Northeastern Germany cannot deliver their power to the industry in the south via Poland? Stephan Kohler, Chief of semi-state-owned German Energy Agency (Dena) says.

The use of phase shifters will have the consequence that windparks in Eastern Germany will have to be shut down more often in the future because the power will have no way of being delivered to the markets."

So the windpark operators in Eastern Germany will be getting the shaft, right? Wrong!

Germany's Feed-In Act stipulates that windparks get paid whether or not their power gets bought. The costs for the electricity that never gets bought is simply gets passed on to the poor consumers.

Such is the world of the government centrally-controlled energy market. Is it any wonder that in just a few short years Germany's electricity prices have risen to levels that are among the highest in the world?

Germans becoming fed up with green costs

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Meanwhile *Die Welt* reports today that German consumers are fed up with the high prices of electricity, and are now loudly demanding a course correction with renewable energy.

The solutions to the problem now being proposed, however, are almost as lunatic as the idea of trying to power the country with renewable energy in the first place. Germany's communist PDS party for example is calling for giving consumers incentives to purchase new, energy-efficient appliances. You see, consumers can solve their problem of not having enough money by simply forking out lots of money for new white goods. Make sense?

Another brilliant solution proposed by Greens and leftists is to force industry to pay more for electricity, and thus allow lower rates for little consumers. Of course the masterminds behind that idea still have not thought about what industry will do with the higher prices they'll have to pay for their power. You don't suppose they'd get the idea to pass the extra costs along to the consumers, do you?

Clearly we see in Europe that there is a creativity contest to see who can come up with the most lunatic ideas to keep the subsidized renewable scam going.

Amazingly, there are a couple of politicians who recognize the root of the problem, like CSU politician Gerda Hasselfeldt, who says "the SPD socialists and Greens are responsible for the rapidly rising energy prices. We have to try to control the transformation to renewable energy, and not do what Red-Green did: promote an uncontrolled expansion of renewable energy," she said.

Well, at least she's on the right track. The solution of course is to do away with the senseless, destructive subsidies altogether.

German coal will be around longer than you think

EU Energy Commissar Günther Oettinger told *Die Welt* that coal will have to continue playing a major role in Germany's energy supply and to do so for "a lot longer than what some are prepared to accept."

Wind turbine lifetime is only 10 – 15 years!

Finally, there's another bit of bad news indicating that wind power is going to cost consumers a lot more. The Renewable Energy Foundation has published a new study, *The Performance of Wind Farms in the United Kingdom and Denmark*, showing that the economic life of onshore wind turbines is between 10 and 15 years, not the 20 to 25 years projected by the wind industry itself, and used for government projections. [Read more here.](#)

Tough times ahead for the renewable energy pipe-dream.

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8 responses to "Poland, Czech Republic To Block Out Germany's Unstable Green Electricity – "Coal To Play A Major Role A Lot Longer""

1.



P Gosselin

30. Dezember 2012 at 18:10 | [Permalink](#) | [Reply](#)

Actually it's a clever tactic. Now industrial southern Germany will have to purchase Czech nuke power, and not the rerouted German power.

1.



DirkH

30. Dezember 2012 at 18:37 | [Permalink](#) | [Reply](#)

The grid operators intentionally delay the building of new North-South transmission lines. They use

NIMBY protest initiatives for that. They have no economic interest in building the things. Basically using Greens protesting Green goals. Rumpelstiltskin like; tearing themselves apart. Being used is what they're good at.



2.

Nonoy Oplas

2. Januar 2013 at 01:29 | [Permalink](#) | [Reply](#)

It's a good trick then Pierre, Dirk, at least for the energy consumers in southern Germany. But the doubling of energy costs (FIT with the renewables + power from Poland or Czech Rep.) will make German goods and services become more expensive.



1.

DirkH

2. Januar 2013 at 13:34 | [Permalink](#) | [Reply](#)

No; industry gets exemption from FIT contributions when they can prove they need to compete against international competitors. And consumers above 60 MWh a year get a cheaper "industry" tariff, half of the base tariff for households. (Some fees and taxes must be reduced in that lower tariff; but I don't know which.)

With the FIT exemption and the lower tariff they pay about 10 Eurocents a kWh ; private citizens pay about 25.

And buying power from Czechia / Poland is probably not more expensive than buying from a German power plant.



2.

Graeme No.3

30. Dezember 2012 at 18:20 | [Permalink](#) | [Reply](#)

It being well known that surges in supply can cause inefficiencies in their power stations i.e. more CO2 output per unit of electricity.

So Poland and the Czech Republic could claim that they are trying to reduce their CO2 emissions.



3.

DirkH

30. Dezember 2012 at 18:33 | [Permalink](#) | [Reply](#)

I fear that most Germans are incapable of figuring out the consequences of a rigged market. and so might fall for the “solutions” the Greens and die Linke are proposing.

Germans get a rather good school education, but next to no economic education in normal school curricula.



4.

Edward.

30. Dezember 2012 at 21:33 | [Permalink](#) | [Reply](#)

What a farce, how so very EU – EU energy policy highlighted and in a perfect synopsis.



5.

Poland, Czech Republic to Block out Germany's Unstable Green Electricity | Quixotes Last Stand

31. Dezember 2012 at 03:28 | [Permalink](#)

[...] equipment to keep German electricity out when certain levels are reached. (To continue reading, click here) Share this: [Twitter](#) [Facebook](#) [Email](#) [Print](#) Like this: [Like](#) Be the first to like this. Tags: [Block](#), [Czech](#) [...]

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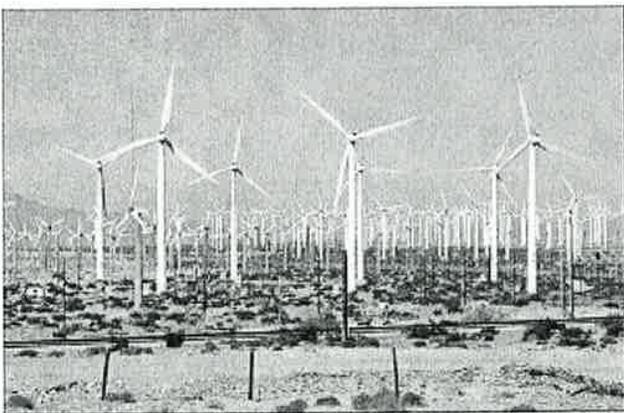
Why Can't We Get All Our Electricity from Wind?

by [Marlo Lewis](#) on October 4, 2012

in [Features](#)

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Wind energy advocates often point out that a State, the U.S., or the entire world has enough wind energy to supply all of its electricity needs many times over. Writing in *Scientific American*, for example, [Mark Jacobson](#) and [Mark Delucchi](#) note that the world in 2030 is projected to consume 16.9 trillion watts (terawatts, or TW) of power, with about 2.8 TW consumed in the U.S. Total wind flows worldwide generate about 1,700 TW, and accessible wind resources total an estimated 40-85 TW.

Based on such math, the [American Wind Energy Association](#) (AWEA) argues, for instance, that Arizona has enough wind to meet 40% of its electricity needs, Michigan wind resources could meet 160% of the State's electricity needs, and wind in Oklahoma could provide nearly 31 times the State's electricity needs. Yet despite ratepayer subsidies, special tax breaks, and renewable energy mandates and goals in [37 States](#), wind supplied [2.2%](#) of total U.S. electric generation in 2010. Why don't we get lots more of our electricity from this 'free,'

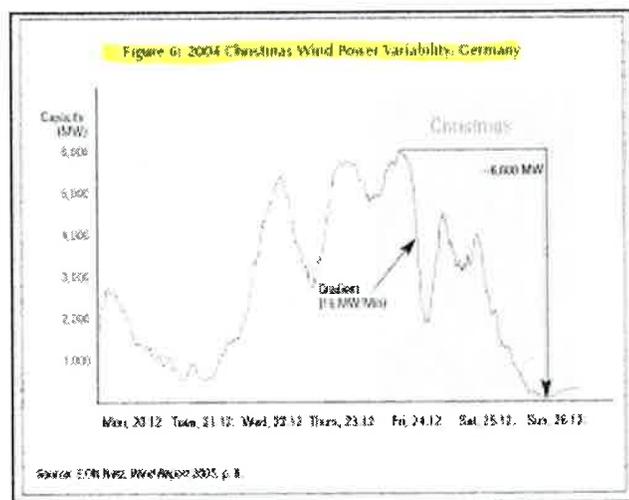
'non-polluting' 'renewable' source?

The chief impediments are wind energy's inherent drawbacks. First, wind energy is intermittent — at any given time the wind may blow too hard or too soft or not blow at all. Second, wind is non-dispatchable. When Shakespeare's Owen Glendower boasted, "I can call spirits from the vasty deep," Henry Hotspur replied: "Why, so can I, or so can any man; but will they come when you do call for them?" Like Glendower's spirits, the winds answer to no man. The wind is not ours to 'dispatch' as electricity demand rises or falls.

There are three main ways of compensating for wind's intermittency and non-dispatchability — pumped storage (pump water uphill when there's too much wind relative to demand; let it run downhill and drive turbines when there's too little wind), natural gas backup generation, and wind dumping (idle the turbines when demand is low). Incorporating those techniques to keep supply in balance with demand adds to the cost of wind electricity, which is typically more costly than coal- and gas-generated electricity even without storage and backup.

What's more, according to a new Reason Foundation/Independence Institute report, the storage, backup, and idling costs become prohibitive as wind's share of total generation increases beyond 10-20%.

The report, *The Limits of Wind Power* by William Korchinski, contains several sobering graphics. Figure 6 from the study shows how variable (intermittent) the wind can be, reducing output as much as 16 MW per minute.

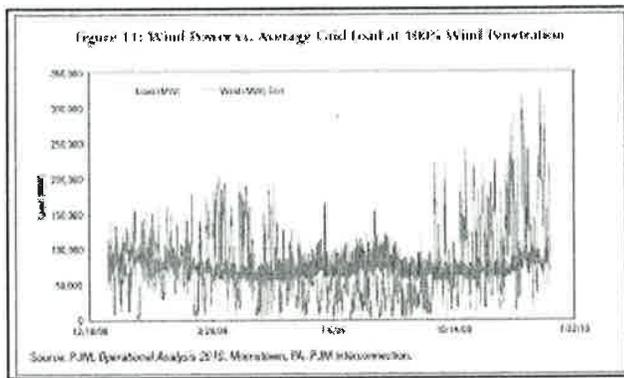


The report quotes E.ON, the German power producer that experienced this sudden decline in wind energy during Christmas in 2004:

Whilst wind power feed-in at 9.15 am on Christmas Eve reached its maximum for the year at 6,024MW, it fell to below 2,000MW within only 10 hours, a difference of over 4,000MW. This corresponds to the capacity of 8 x 500MW coal fired power station blocks. On Boxing Day, wind power feed-in in the E.ON grid fell to below 40MW. Handling such significant differences in feed-in levels poses a major challenge to grid operators.

Let's suppose that some States actually take AWEA's message to heart and build enough wind capacity to meet 100% of their power needs. To what extent would actual wind generation match electric demand throughout the year? Figure 11 of the study illustrates the results for the PMJ Interconnection region comprising all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania,

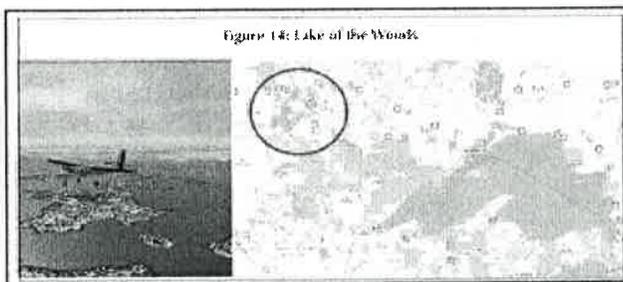
Tennessee, Virginia, West Virginia and the District of Columbia.



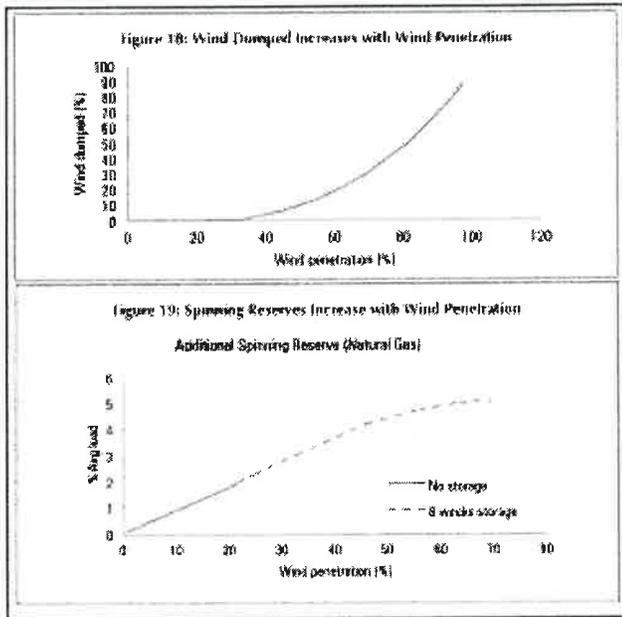
As the figure shows, on hundreds of days the PJM region's turbines would produce either significantly more or significantly less power than customers consume.

As noted above, there are three main ways of dealing with wind's intermittency and non-dispatchability. One technique is pumped storage: "pumping water uphill when there is excess wind energy, and then running the water downhill through a turbine when wind energy is limited." The PJM pumped storage capacity for 2010 was about 5,000 MW, compared to the area's average hourly electric demand of 77,800 MW. In other words, PJM currently has about two hours worth of stored power. That's okay because the overwhelming lion's share of the region's electricity does not come from wind.

But suppose PJM got all of its electricity from wind — what would it take to have enough pumped storage in case the wind doesn't blow? Korchinski calculates that PJM would need to be able to pump uphill "a body of water that is about 2,000 square miles by 100 feet deep" — the dimensions of Lake of the Woods in Canada.



Since constructing artificial lakes of that size is impractical (and would have significant ecological impacts as well), pumped storage is typically combined with natural gas backup generation and wind dumping. Turbines left idle (dumping) do not generate income. Gas backup means running gas turbines inefficiently, in "spinning reserve" mode, so they are "ready to increase or decrease power on short notice." The greater the penetration of wind in the electricity fuel mix, the greater the reliance on wind dumping and gas backup.



Korchinski comments:

As wind penetrations increase, the grid requires increasing amounts of spinning reserves to maintain reliability. At high wind penetrations, even large amounts of power storage cannot prevent significant (and expensive) wind dumping. The already high cost of wind power increases with the construction of storage facilities, and the cost to construct extra wind turbines, which will be dormant during periods of wind dumping.

The takeaway message for policymakers and a public bombarded with propaganda about obtaining 40%, 160%, or even 3100% of a State's electricity from wind?

Very high wind penetrations are not achievable in practice due to the increased need for power storage, the decrease in grid reliability, and the increased operating costs. Given these constraints, this study concludes that a more practical upper limit for wind penetration is 10%.

Tagged as: [american wind energy association](#), [Henry Hotspur](#), [Mark Delucchi](#), [Mark Jacobson](#), [Owen Glendower](#), [production tax credit](#), [Shakespeare](#), [William Korchinski](#)



Alan White [October 5, 2012 at 2:19 pm](#)

For wind to be effective the platform, thus there siting needs to change. There is a true wind turbine that just recieved its patent 8,269,368 call windshine. Scalable so true residential along with utility and commercial will be available. With a much greater wind profile very low cut in and no real cut out speed, plus gust utilization will make for more reliable power output and over wider landscape. Even a model for the antarctic where no windmill would dare to go.

Windshine Electric Generators the new future in wind.



archaeopteryx [October 5, 2012 at 3:08 pm](#)

This is excellent and to the point. The problem with too many wind generators is also highlighted in <http://www.welt.de/dieweltbewegen/article13798376/Oesterreich-rettet-deutsche-Stromversorgung.html>. Germany has 25,000 wind MW and claims having covered 7.6% of electricity demand in 2011. But, most probably, that does not correspond to 7.6% fuel substitution, as stand-by backup consumes fuel, and revving up or cutting back increases inefficiency. The Dutch reported an annual fuel substitution equal to 4% of installed rated capacity. The Falklanders measured 4 to 8% fuel savings as a result of “12% or 14% of electricity supply from wind”.



James Rust [October 5, 2012 at 7:06 pm](#)

The problems of large-scale wind energy reminds me of a long ago remark by the first head of the Nuclear Regulatory Commission—Dixie Lee Ray. Dr. Ray said, “A viral American male has enough semen to impregnate all the women in the world. The problem is with the delivery system.” I think Dr. Ray was referring to prospects of solar energy which was always mentioned by anti-nuclear activists as a replacement for nuclear power.

Power from the sun is vastly greater than wind power and it is too costly for use on a large scale.

James Rust



Kirby Palm [October 7, 2012 at 3:43 am](#)

Excellent. The one thing I would have added would have been to point out that you don't just need a lake for pumped storage, you need TWO lakes at different elevations. This means that you have the added technical challenge that one of these large lakes needs to be on top of a mountain. And when utilized, the levels of both lakes are going to change dramatically in a very short period of time. You're not looking at construction of a peaceful, serene fishing spot like you are for damming up rivers to power hydroelectric plants.

For typos, you say PJM several times instead of PMJ. I don't even know which one is correct at this point.



Michael Goggin, AWEA [October 11, 2012 at 10:39 am](#)

If you read the Reason Foundation's report, it actually says that wind energy can provide a large share of our electricity (at least 50%) and that wind's benefits are roughly as large as expected (9% reductions in pollution when we get 10% of our electricity from wind, 18% reductions at 20% wind, and 54% reductions at 50% wind). That's even after the report uses a seriously flawed methodology that overstates the challenges of integrating wind onto the grid and understates wind's benefits. For more, read the explanation here:

http://www.awea.org/blog/index.cfm?customel_dataPageID_1699=18996

Michael Goggin,

American Wind Energy Association



Steve October 14, 2012 at 11:41 am

First off William Korchinski is a former oil industry chemical engineer — a smart guy no doubt — but suspect as an unbiased expert on wind and energy in general. Secondly Reason Foundation that paid for the report has a bias against alternative energy since its funders are mainly in the oil industry ie the Koch brothers and Exxon.

Korchinski conclusions are accordingly suspect for a number of reasons. He fails to acknowledge that the fossil fuel industry gets at least \$10 billion in annual subsidies <http://priceofoil.org/fossil-fuel-subsidies/> He fails to account for the pollution costs of fossil fuel energy including carbon pollution.



Marlo Lewis October 23, 2012 at 3:26 pm

Steve,

Nearly all policy studies are undertaken by researchers with a bias or agenda. After all, few people do policy-relevant research just to satisfy intellectual curiosity. Plus, rigorous quantitative analysis is expensive and somebody has to pay for it. That “somebody” is almost always not an honest broker but a stakeholder — an organization with a material stake in the outcome of the policy battle.

Consider the American Wind Energy Association (AWEA), which also sponsors studies. AWEA members benefit directly from market-rigging interventions like renewable electricity mandates and the wind energy production tax credit (PTC). Those policies transfer wealth from ratepayers and taxpayers to wind energy producers. So what are the odds AWEA would ever pay for a study critical of mandates and the PTC?

Nor should we look to “the government” for an unbiased assessment. The Department of Energy’s National Renewable Energy Laboratory (NREL) produces lots of studies and reports on wind energy. It too is a dog in the fight. The agency’s budget and very existence ultimately depend on persuading policymakers and the public that renewable energy and the policies supporting it are a great bargain. Don’t expect to find a bias-free zone there.

In short, policymaking, like litigation, is an adversarial process. We know in advance that the lawyer is an advocate, not an honest broker, and argues in the interest of his client. That, however, does not excuse the jury from listening to both sides of a controversy and attempting to reach a judgment based on the evidence presented.

Whether the Reason Foundation study makes a contribution to the debate or is deceptive garbage depends entirely on the validity of its assumptions, methods, data, and conclusions. You have not offered any evidence rebutting it. Dismissing the study out of hand because Reason gets funding from Koch is to argue ad hominem. It’s an argument not based on facts or logic but your particular bias!

Some quick additional points. Wind energy is one of the least cost-effective ways to improve air quality. It

is much more efficient to attack air pollution directly via emission controls than to impose renewable energy quota. Nor is wind energy a cost-effective carbon mitigation policy. That's why the Waxman-Markey bill included a national renewable electricity mandate in addition to a cap-and-trade program. Waxman and Markey are big boosters of wind, but they knew that simply putting a price on carbon to penalize fossil-fuel electric generation isn't enough to make wind energy competitive.

As for \$10 billion in oil subsidies, oil is a bit player in U.S. electric supply and has been since the 1970s. So even if oil gets all the subsidies you claim, that's not a good reason to subsidize wind.

Moreover, most of the tax breaks often condemned as subsidies to "Big Oil" are in fact broadly available to many industries, as William O'Keefe explains (<http://energy.nationaljournal.com/2012/10/should-oil-and-naturalgas-tax.php#2253278>). For example, the Sec. 199 manufacturing tax credit is available to all domestic U.S. manufacturers. Similarly, the protection against double taxation for U.S. oil companies with operations overseas applies to all U.S. firms. The tax break for "intangible drilling costs" applies to drilling operations a basic principle of the tax code, namely, expenses are deducted from revenues to determine taxable income. The depletion allowance tax may or may not be a good idea, but it applies to all forms of mining, not just oil and gas.

O'Keefe used to be an executive of the American Petroleum Institute, so his bias may offend your bias. To repeat, that does not tell us whether his argument is valid or not, because identifying bias is not refutation.

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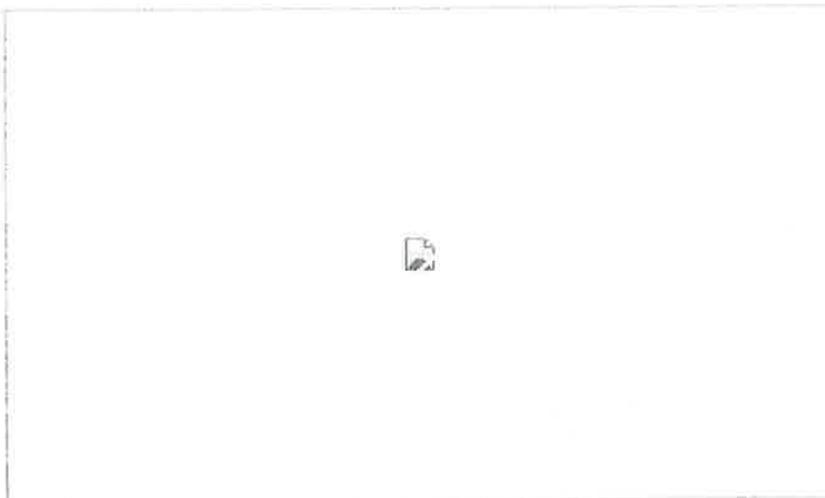
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German Windpark Operator Rakes In \$3 Million For Power That Was Never Produced

By [P Gosselin](#) on 22. Oktober 2012

Germany's energy feed-in act forces power companies to buy up green electricity from wind and solar producers at exorbitant prices and guarantees the green energy producers fat profits.



Windparks are paid even power that doesn't get delivered. (Photo by: Philip May. GNU-Lizenz für freie Dokumentation,)

But what happens when the sun shines and the wind blows too much, and the power companies don't need the power?

Answer: the power companies ask the green producers to stop production. But now comes the hitch: If the power companies don't need the power, German law still requires the power companies to pay green producers

for the energy that they would have produced had they not been asked to shut down. Therefore solar panel and windfarm operators get money whether they produce or not. No risks!

One example, according to leading German daily Bild here, is a windfarm operated by **Green Party activist Reinhard Christiansen** (58). The “Bürgerwindpark” (People’s Windpark), which was built 12 years ago for €8.5 million, at times produces more energy than E.ON power company actually needs, and thus often gets asked to shut down. However, E.ON must pay for the ungenerated power.

The result? Consumers have to pay for the electricity that never gets delivered, let alone consumed! So far Christiansen has hauled in 2.5 million euros (\$3 million) for “phantom electric power”.

Bild quotes Christiansen:

We can sell a lot more power than what the power company is able to accept.“

Adding:

**Siemens E
Efficien**

siemens.com/ene

Integrated Energy

by Siemens: R

Here!



The ‘People’s Windpark’ pulled in 2.5 million euros for compensation for power that could have been generated but could not be used because of a lack of grid capacity.”

Bild writes that this is no isolated incident and that Germany’s Feed-In Act has led to a flurry of bizarre incidences where millions get paid out for “phantom electric power”.

In 2010, 10.2 million euros were paid out, and the trend is exploding upwards. Bild quotes a confidential internal government document:

For a midsize windpark, amounts in the neighborhood of well over 100 million euros can be reached quickly.“

Bild concludes:

In the end the crazy thing is that it’s again the consumers who wind up paying for power that never gets used.”

In Germany, it is not uncommon for the mayor and city officials to get in on the profiteering, often pushing windfarm projects through against the stiff resistance of local citizens. It’s a business fraught with corruption and shady deals. Welcome to Germany’s *Energiewende* (energy transformation) where a few are laughing their way to the bank, and the rest are being taken to the cleaners.

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Posted in Alternative Energy, Misc. | 18 Responses

18 responses to “German Windpark Operator Rakes In \$3 Million For Power That Was Never Produced”



1.

Ike

22. Oktober 2012 at 13:51 | [Permalink](#) | [Reply](#)

Siemens announced today, that they step out of the solar energy sector.

<http://www.welt.de/wirtschaft/energie/article110102050/Siemens-Konzern-beerdigt-sein-Solargeschaef.html>



1.

P Gosselin

22. Oktober 2012 at 15:29 | [Permalink](#) | [Reply](#)

I can't believe it. Solar is the technology of ther future, I'm told time and again.



2.

[How much more “proof” do people need that “Wind Power is an absolute SCAM”? « The Big Green Lie](#)

22. Oktober 2012 at 16:17 | [Permalink](#)

[...] German Windpark Operator Rakes In \$3 Million For Delivering Power That Was Never Produced
[...]



3.

[thebiggreenlie](#)

22. Oktober 2012 at 16:20 | [Permalink](#) | [Reply](#)

How much longer can this SCAM be tolerated? The evidence is overwhelming that this is nothing more than a giant Ponzi scheme!



1.

DirkH

22. Oktober 2012 at 16:29 | [Permalink](#) | [Reply](#)

Noteworthy: a lot of the commenters under the Bild article blame the evil energy providers and privatization for rising energy prices.

Demonstrating total incapability of understanding political price-fixing. The continent of the blind and stupid.



4.

Walter Schneider

22. Oktober 2012 at 16:40 | [Permalink](#) | [Reply](#)

Germany is not the only country where windfarm operators get paid for not producing electric energy:

“The first successful test shut down of wind farms took place three weeks ago. Scottish Power received £13,000 for closing down two farms for a little over an hour on 30 May at about five in the morning.”

More: <http://wattsupwiththat.com/2010/06/20/firms-paid-to-shut-down-wind-farms-when-the-wind-is-blowing/>



5.

grayman

22. Oktober 2012 at 23:46 | [Permalink](#) | [Reply](#)

What would be wrong with the major power companies winding down their generators to half speed and letting the wind and solar go thru so the people can see what a waste it is? Not trying to be a malcontent but if the people get a taste of the future the greens have planned for them then maybe the people will rise up against them



6.

John F. Hultquist

23. Oktober 2012 at 04:27 | [Permalink](#) | [Reply](#)

Is the payment based on the installed capacity, an average output, or on the amount that likely could have been produced during the pause calculated from actual wind speeds during that time? Sorry, I can't answer the question for our local situation either.

In Washington State much power comes from hydro via the Bonneville Power Administration and there is plenty of power when river flows are high. In spring of 2011 they told wind farms to shut down and got sued. Story here:

http://o.seattletimes.nwsourc.com/html/localnews/2016961290_windpower08m.html

All these issues should have been settled before contracts were signed and towers went up. It doesn't instill confidence in the people responsible. Note, many lawyers and bureaucrats get paid either way – before or after.



1.

DirkH

23. Oktober 2012 at 11:10 | [Permalink](#) | [Reply](#)

The German FIT law mandates that all Wind power and PV power kWh that are produced must be accepted by the grid operator. If, for technical reasons, an overload looms – which is usually the case through wind power spikes, as that has a far more violent characteristic than solar power – the grid operator can reject the power but compensation for the power that COULD have been produced must be paid. I don't know whether they meter that amount of power somehow or whether they estimate it by measuring wind speeds.

This provision makes the German FIT law worse than a planned economy. At least in Soviet style planned economies you don't have to pay for goods that have never been produced. Sounds like a devious plan to wreck the economy but I don't think the Greens who invented the idea are smart enough for that.



7.

tckev

23. Oktober 2012 at 09:30 | [Permalink](#) | [Reply](#)

I may have a better, greener fix -

Government mandate all consumers to install 'smart' meters in all homes (at the consumers expense). When all these green generators make excess capacity then the 'smart' meters alarm, and the consumers (or automated home systems) are alerted to consume the excess power (at the consumers' expense). Failure to comply within 1 minute of the alarm immediately adds twice the required consumption to the smart meter's reading (and so the consumers' bills). Green job done!

Alternatively, get real and stop this extravagant waste of public money by abandoning this folly now.



8.

Bob in Castlemaine

23. Oktober 2012 at 12:08 | [Permalink](#) | [Reply](#)

Time for the green zealots to recognize that windmills are an artifact of the past that should remain a quaint part of history, certainly as far as participation in power network power generation.

These anachronistic machines produce very limited amounts of expensive, inherently unreliable power.

Not only that but as the percentage penetration of windmills increases in the generation mix, the CO2 emissions avoided as a percentage of fossil fuel generation displaced falls significantly.

If there was some relevance to the current cult of CO2 emissions reduction the obvious way to achieve it would be (in the absence of plentiful hydro resources) a combination of nuclear and combined cycle gas turbines.



9.

slimething

24. Oktober 2012 at 18:41 | [Permalink](#) | [Reply](#)

<http://cidtdt.org/>

Go down to Negative prices and the high price of windpower (Posted October 8, 2012) WindAction Editorial

“negative profits”



1.

DirkH

24. Oktober 2012 at 19:38 | [Permalink](#) | [Reply](#)

The market distortions get stranger and stranger.



2.

P Gosselin

25. Oktober 2012 at 11:13 | [Permalink](#) | [Reply](#)

The same negative prices occur here in Europe as well. The problem is that adjacent countries refuse to accept the “free energy” because it makes it impossible for them to recoup on their multi-billion euro investments made in their own power plants.



10.

DirkH

24. Oktober 2012 at 19:16 | [Permalink](#) | [Reply](#)

Today I drove 400 km from North to South and 400 km back through Germany. I saw many wind turbines along the A7. Not one was turning; not in the morning and not in the evening. Foggy weather across all of Germany. No sun for the Solar Panels.



1.

P Gosselin

25. Oktober 2012 at 11:09 | [Permalink](#) | [Reply](#)

I think i know the stretch you mean – near Paderborn? My daughter is studying near Kassel and I see all those eyesores driving over and back.



1.

DirkH

25. Oktober 2012 at 17:29 | [Permalink](#) | [Reply](#)

No, Paderborn is A2, I was driving down to Frankfurt via A7 and A5. Lots of wind turbines on hills there. They look so peaceful when they are not turning and everything is foggy.



11.

slimething

24. Oktober 2012 at 22:08 | [Permalink](#) | [Reply](#)

Good article here:

<http://www.masterresource.org/2012/10/20-bad-things-wind-3-reasons-why/>

Leave a Reply

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Not here to worship what is known, but to question it. Climate news from Germany in English - by P Gosselin

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Germany's Massive Renewable Energy System Puts Out Only 7% Of It's Rated Capacity in November!

By [P Gosselin](#) on 17. November 2012

Germany has spent money on renewable energy, like wind and solar power, like few others in the world. So far the country has invested hundreds of billions. How's the return on investment? Pretty lousy, especially this November.

The European Institute for Climate and Energy (EIKE) today has a story on how wind parks and solar panels are performing: [Germany's renewable energy in November! Only 7 % of the installed feed-in capacity was fed in.](#)

When Germany exports some energy to France, the media hypes it up everywhere in the evening news...proof that Germany's energy transition to renewable energy is paying off!

But that, it turns out, is a rare event. Ralf Schuster, for example, took the October data from the EEX in Leipzig and plotted the following chart, which depicts wind and solar feed-in, import from France, and export to France. I'm not going to get to much in the details here. The chart below shows that the exports (green shaded area) are rare and import from France (red shaded area) is the normal situation.

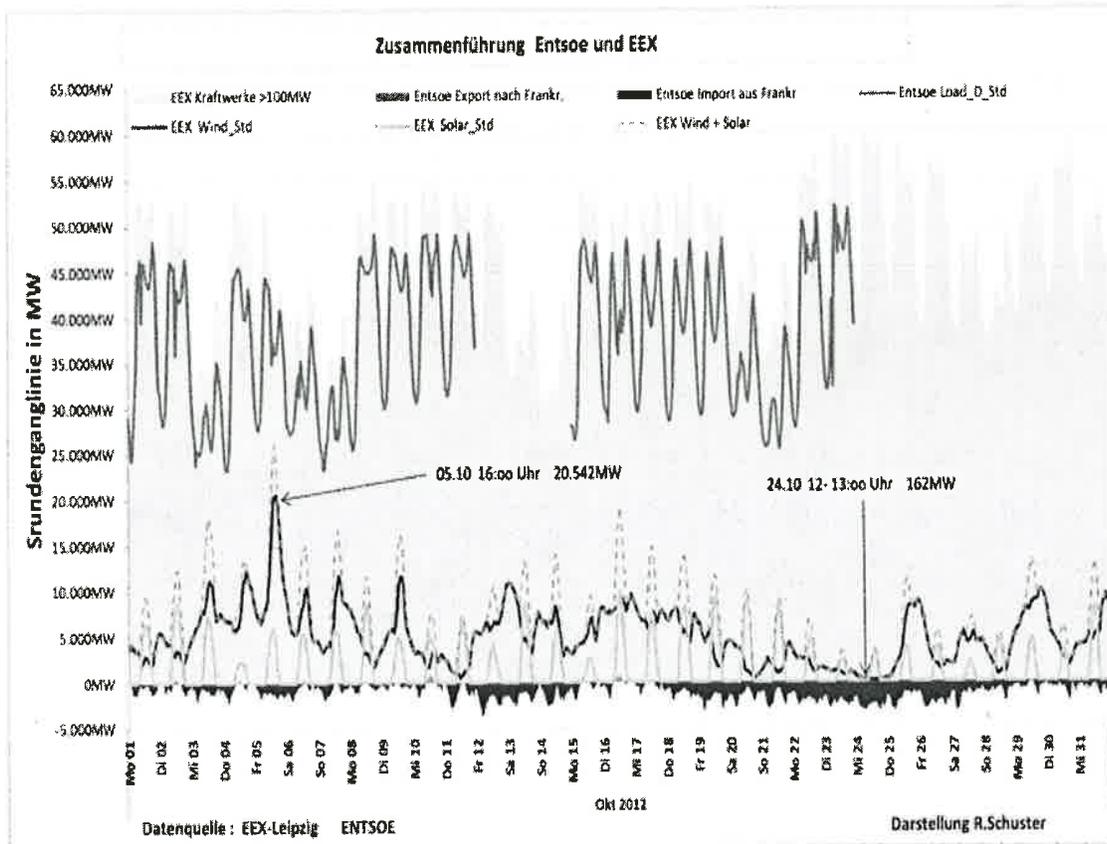


Chart by Ralf

Schuster

The New Chromet

play.google.

Boots in second:
apps built-in. F

Schuster then took a look at how much solar and wind power was fed in last week from 9 November to 15 November, 2012. He found that of the 64,000 MW of installed wind + solar capacity in Germany, less than 5000 MW was fed in. That comes out to just over a whopping whole 7%!

Now imagine paying 100 employees and seeing only 7 of them working, and that for an entire week. It wouldn't be long before you went bankrupt.



This kind of performance should be considered before any country, state or community allow itself to be duped into investing in green energy sources.

It's not for nothing old societies back in history abandoned windmills. They weren't effective back then, and they certainly are not efficient today.

Hat-tip to Winfried Klein Chairman of the IG-LAHN e.V. in Runkel, Germany Tel.: (+49) 6482 4994.



Posted in [Alternative Energy](#) | [12 Responses](#)

12 responses to “Germany’s Massive Renewable Energy System Puts Out Only 712 Of It’s Rated Capacity in November!”



1.

Doug Proctor

17. November 2012 at 22:01 | [Permalink](#) | [Reply](#)

The difference between rhetoric and reality is so great that it defies reason to believe that those who push the “green” revolution of energy really think solar, wind is either economically justified or effective at any scale.

Presidents and coaches tell the nation and team that they are the best on the planet, believing that greatness is only achieved by those who believe they are great. Which is true. But greatness must be to begin with: you cannot make the ineffective effective with propaganda. The Stalinists worldwide learned this the hard way, but their Western cousins, the eco-green haven’t got the latest memo.

I would like to think that reason eventually prevails. Actually it does, but my experience in private industry, where reason is demonstrated on the bottom line of the ledger, shows me that complete disaster often precedes reason.

The green political stance is costing us much lost opportunity as well as financial difficulty. Before it is over, it will cost much, much more.

What a shame.



1.

DirkH

18. November 2012 at 05:37 | [Permalink](#) | [Reply](#)

Our old Greens – the old K-Gruppen nomenclatura – are making a last desperate bid for power in the 2013 elections. That will be their last chance.

They don’t mention energy or the environment or Global Warming at all. They only talk about tax hikes on the rich and especially on industry, and sharing the European debt between all Eurozone

nations.

So, they run an Obama 2.0 campaign. The complete disaster that they left behind by instating the renewables subsidies during their reign with the Social Democrats from 1998 to 2005 is not mentioned by them.

I think they will fail. Obama 2.0 was able to succeed by promising more freebies to the people who already got freebies. Their European debt sharing proposal would only work if the recipients of the aid – Greek and Spaniards etc – were allowed to vote in the German elections. That's where their strategy falls on its face.



2.

George

18. November 2012 at 01:00 | [Permalink](#) | [Reply](#)

Another interesting comparison would have been the cost of the imported electricity versus the cost of the exported electricity.

Here in Ontario, Canada, wind power, when it produces at all, generally produces at times of the day when the energy is least required. This results in the grid operator having to sell the excess power to neighbouring jurisdictions, Quebec, Manitoba or the northern US States, at or below wholesale market price, often Ontario has to pay these jurisdictions to take the power. In other words, under the McGuinty Liberal government's FIT rules not only are we obliged to buy any power produced by wind or solar, whether it is needed or not, we pay the producers 4 times as much for it as for any other source of conventional power, but we also lose money again when we pay our neighbours to take it off our hands.

I am willing to bet that a similar situation pertains in Germany where its neighbours are already trying to protect themselves from the power surges of the German grid...

Thanks for the great articles,



3.

roger

18. November 2012 at 16:13 | [Permalink](#) | [Reply](#)

In a not unrelated conversation I just had with my neighbour, who purchased a Nissan Leaf electric car about 18 months ago and needs to sell before the battery life is gone, the resale value right now is £10,300, a net loss of £18,000.

Can you do the math?



4.

Paul

18. November 2012 at 20:11 | [Permalink](#) | [Reply](#)

Not much better here in the UK. This is a live reading of the UK's electricity power output. Yesterday the wind dropped to barely above zero of it's full capacity:

<http://www.gridwatch.templar.co.uk/>



5.

Christian Wiesner

19. November 2012 at 23:04 | [Permalink](#) | [Reply](#)

Sorry to interrupt the ranting here, but why on earth are you searching the energy from wind parks in Germany at the EEX ? 95% of the renewable energies in Germany are sold via the EEG ('Einspeisevergütung des Erneuerbare Energiengesetz = feed-in compensation of the renewable energy law), they normally don't appear at the EEX at all ?

Leave alone that the EEX is only trading the energy which is not covered by OTC (=Over the counter), being the majority of the energy in Europe.

Where did you get this data ? But yes, the past couple of days have been almost without any wind here, and the sun is also not shining. So, for anybody who would like to start a serious rant against renewable, now is the perfect time to do it, that's for sure



1.

Bruce Williams

25. November 2012 at 17:51 | [Permalink](#) | [Reply](#)

I'm sad to see that anti-renewable forces are using the same tactics in Germany as they did here in the US. Cherry-picking data (selective inclusion) to reach conclusions that support their dogma. And I'm glad to see that someone is smart enough to see through their deception!!
Thanks, Christian!



1.

DirkH

25. November 2012 at 18:07 | [Permalink](#) | [Reply](#)

Renewable energy is a perfectly fine energy source for somebody who is content with its very high price tag and its inherently fluctuating nature.

What I reject is being forced to pay other people for their wind/solar electricity because it is not what I need.

I need a STABLE and CHEAP supply.

Please go ahead and buy yourself ALL the renewable energy sources you want but don't expect me to pay for it.

It might make very good sense on a remote island with a lot of sun. Unfortunately, Germany is situated far in the North and is a very cloudy country.



2.

Brad Blake

7. Januar 2013 at 02:28 | [Permalink](#) | [Reply](#)

Bruce your remark about cherry picking is a ridiculous example of the "pot calling the kettle black". In my more than 60 years, I have never seen such a pack of deception, misrepresentations, and outright lies as spun by the wind industry. The wind industry cannot compete without tax subsidies, mandates, and market manipulations. It is a total failure.



2.

DirkH

25. November 2012 at 18:04 | [Permalink](#) | [Reply](#)

Christian Wiesner

19. November 2012 at 23:04 | [Permalink](#) | [Reply](#)

"Sorry to interrupt the ranting here, but why on earth are you searching the energy from wind parks in Germany at the EEX ? 95% of the renewable energies in Germany are sold via the EEG ('Einspeisevergütung des Erneuerbare Energiengesetz = feed-in compensation of the renewable energy law), they normally don't appear at the EEX at all ?"

“But yes, the past couple of days have been almost without any wind here, and the sun is also not shining. So, for anybody who would like to start a serious rant against renewable, now is the perfect time to do it, that’s for sure

So, Christian, you are saying that

- a) the data is wrong
- b) that indeed, solar and wind didn’t deliver much.

Make up your mind. Do you DISPUTE the finding that only 7% of nameplate capacity have been delivered or do you SUPPORT it?

For me it looks like you support it. FINE. Now PLEASE explain to all of us WHY we are forced to pay nearly the HIGHEST electricity price in the world for the most UNSTABLE supply.

Please, your argument.



6.

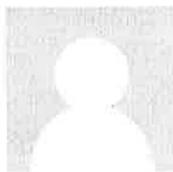
DirkH

25. November 2012 at 18:19 | [Permalink](#) | [Reply](#)

Christian, I suppose you’re German, so I think this explanation from the EEX can help you understand your mistake.

<http://www.regenerative-zukunft.de/grundlagen/energiewirtschaft>

While wind, solar and other EEG-subsidized energy suppliers get the guaranteed price, their output does get traded at the EEX.



1.

DirkH

25. November 2012 at 18:36 | [Permalink](#) | [Reply](#)

I guess I’m too late and Christian’s gone. But what we have witnessed here is an attack by a German Green who insinuates that skeptics use false data – yet cleverly conceals the fact that the renewable energy kWh’s ARE traded at the EEX, which I was able to find out in a minute with google. So obviously Christian must have known it as well – Christian, why did you lie to us? WHY?

Because you can’t win with the truth.

Leave a Reply

Top News

Offshore wind project advances

AUGUSTA, Maine — Norwegian energy giant Statoil gained key approval Thursday in its bid to build one of the nation's first offshore wind power projects off Maine's Boothbay Harbor.

The \$120 million project would put four, three-megawatt wind turbines 12 miles off the coast on floating spar-buoy structures tethered to the seabed in 460 feet of water.

A 2-1 vote by the Public Utilities Commission approved an important contract between Statoil North America and utility companies. The PUC vote was the biggest hurdle the Hywind Maine project faced as it moves forward with the goal of having power flowing by 2016.

The U.S. currently has no offshore wind farms. Other projects are also in development off Massachusetts, Rhode Island, New Jersey and Delaware.

The approval comes with some conditions but Statoil said it considers the PUC vote an important milestone.



M.D. Bright

January 24, 2013

Jan Eastman, Chair, Vermont Energy Generation Siting & Policy Commission
Vermont Department of Public Service
112 State Street
Montpelier, Vermont 05620

In RE: Rule 5.4 & 248 - Lack of **NOTICE** to Property Owners on Wind Farm
Development Projects

Dear Ms. Eastman,

First and foremost we would like to thank you and those copied on this letter for all of your hard work and public service over the years, most especially in view of all the controversies and issues that are before you currently.

We are writing to let you know that we are not in support of the development of wind turbine farms in Vermont. While we hope that efforts being made are genuine in the task being undertaken by the Commission, it is unfortunate the process is taking place *after* the permitting & construction of wind turbine farms in Vermont.

While we understand wind turbine farms can help address energy issues in *other* areas of the country, we do not believe they are efficacious for use in Vermont due to icing, increased decibel levels due to icing, inconsistent wind patterns, the destruction of mountain ridge lines, damage to the environment and wild life and adverse impacts on property owner view sheds. It is time for our country to engage in a dialogue about which renewable energy sources work best for each region.

By profession we are not biologists, conservationists or environmentalists. HOWEVER, as permanent residents, taxpayers and former public servants of Vermont we believe that we have a duty/responsibility to ensure and preserve the integrity of Vermont's environmental base now and for future generations.

HOWEVER WELL-INTENDED motivations might have been to help thwart energy or economic impacts on Vermont, our research shows that there existed a lack of concern and procedure for those citizens residing in nearby towns or in adjacent counties (known as **NON-host towns**). Because we did not 'host' the turbine farm being proposed, we were excluded from the process. See V.S.A. 30 §248

The Vermont Public Service Board (herein PSB) is the regulatory body charged with issuing permits to wind farm developers. Please know that our distress is not about members of the PSB but rather with the rules in which they are required to apply. The rules used are in direct conflict with the PSB's overall mission. **Rules 5.4 and 248** seem to favor wind turbine farm development and are inadequate to guide the process of gathering public input. They are inadequate because they specifically exclude the solicitation of comments from a wide range of property owners that are impacted by the presence of wind turbines.

AT LAST COUNT, there will be approximately **212 wind turbines** planned for construction on top of Vermont's ridge lines, most of which have already been completed. To construct wind turbine farms with each tower in excess of 460 feet, developers need to scalp the tops of the mountains. This is senseless and counter productive to Vermont's financial interests considering that beauty and mountains bring revenue from tourism and second home ownership to the state.

The construction of wind turbines upon mountain ridge lines in Vermont have a unique impact due to their height in that they can be viewed from *near and far* distances. Because of their *distinction and uniqueness*, further analysis is required to properly assess their overall impact. We suggest undergoing a rule change amending applicable rules to include language that would extend the range of **NOTICE** to property owners currently within a 10 mile radius of the wind turbines to one that would include property owners **within each town that can be seen from the top of each wind turbine as far as the eye can see for 360 degrees**. This is a fair and effective way to solicit public comment and to fully assess the impact of the loss of ridge line view shed's on property owners throughout the State. To achieve that end, you must cast a wider net.

We reside in Lamoille County; a county adjacent to one county that recently constructed a wind turbine farm. The Town of Wolcott is about a 30 minute drive from the Town of Lowell on a long and winding road. You *really* can't get there from here. Like other local residents we discovered late summer 2012 that we have a very clear view of the **TWENTY-ONE** towering 460 foot wind turbines (with red night lights) perched on the Lowell ridge line. These can be viewed from our side yard. The size of these monsters is quite disturbing. Some days it looks like "Boot Hill", other days they appear as ominous spooky crucifixes.

Additionally, we are concerned about the construction of the proposed 30 – 40 wind turbines on Seneca Mountain in Brighton/Newark/Ferdinand, located **two** counties away. These turbines will be 490 feet tall and may be viewed from the northeast portion of our property & from the front window of our home, yet as stated, they will be perched upon a ridge line two counties away.

The role of the PSB is to, “make determinations that are within the public good”. After this process they issue a Certificate of Public Good (CPG), which is the Order giving developer’s the green light. Due to existing rules, the Vermont PSB is not required to provide **NOTICE** to property owners unless they are within a 10 mile radius of a proposed wind turbine. Even then, any **NOTICE** that is issued is given to the local or regional Planning Commissions, as required by 30 V.S.A. § 248 (A) (4) (C), who then have 7 days in which to respond. The Planning Commissions are not the “town crier’s” and are not charged with giving **NOTICE** to property owners. They are only required to respond. Other notices that may be issued by local publications or to adjoining landowners are limited to only those county/counties in which the turbine project will be located. So folks who own property *outside* the 10 mile radius and in another county will not receive **NOTICE**.

SOLICITATION OF PUBLIC COMMENT begins when **NOTICE** is given to property owners. Without **NOTICE** the ability for homeowners to avail themselves of the public comment process is diminished. Without being notified of any issues through our local Town Clerk’s office, Vermonters just go about their very busy days working, raising their children, etc., and many commute long distances to work removing them even further from local issues. We rely heavily on our Town Meeting process and Town Clerks. Without **NOTICE** there is no way for a property owner to know if there is going to be an encroachment on their view shed.

LIKE THEIVES IN THE NIGHT, the Lowell wind turbines were constructed and once the humid summer air cleared, their intrusion was discovered. Until one wakes up one summer morning to discover 21 wind turbines in their backyard, one would never have known that their land actually was within the view shed of the mountain that houses the wind turbine farm. We have lived in Lamoille County for 30 years and never once set foot in the Town of Lowell. But, this is the situation that exists here and in other towns throughout Vermont. Without receiving comments from many others who reside within the view shed of the wind turbine farms, the open meeting process becomes one that is not inclusive, has low attendance, much less controversy and poor overall turnout. It also excludes information that the PSB would need in order to make a determination in the interest of public good.

FURTHERMORE, public comment submitted before the PSB is not considered evidentiary and instead is only to be considered for the purposes of knowledge to help the PSB advance discovery. It appears to us that without evidence a quasi-legal process such as this could then only resort to arbitrarily selecting which issues matter and which ones do not. In almost every legal process in this country individual and third party witness statements are included as evidence.

While the Lowell matter is now closed, we believe there was a gross underestimation of the number of property owners within the view shed of the wind turbine farm. We believe that the underestimation and failure to consider the full aesthetic impact of the turbines was without precedent and arbitrary. Unfortunately, without rule changes, the underestimation will have a cascading effect throughout the State of Vermont.

To our knowledge, there has been no consideration given to the ability or inability for any homeowners *outside* of the 10 mile radius to sell their properties. Not only are our land and home values decreased by the mortgage scandal, property values are further diminished by these expansive wind farm projects in which we had no voice. Who will want to buy a home or land in Vermont when there is no guarantee against a utility company or private developer “stealing” their view shed? **The issue of property value and resale was not fully vetted.**

To our knowledge there is no process for compensating property owners residing *outside* the 10 mile radius for a loss of their ridge lines or loss of the aesthetics that add to the beauty, peace of mind, privacy and potential resale of their properties. **The issue of aesthetics was not fully vetted.**

THEREFORE, we would submit that the State of Vermont, through its statutory and regulatory authority, failed in its ability to provide **NOTICE** to all property owners within each town that can be seen from the top of each wind turbine as far as the eye can see for 360 degrees and as a result, diminished their opportunity to submit comments. Therefore, the PSB did not and does not still have enough information to make determinations that are within the public good with regard to the impact of wind turbine farms on property owners.

We are disappointed in what appears to be an over zealousness to expedite wind development in Vermont without engaging in a fully organized and collaborative public comment period normally required & expected for projects of this magnitude and *without* establishing an ordered regulated *public oversight process*. We can only surmise that Vermonter’s remaining silent will make their voices heard when they vote in the next election.

There are many brilliant attorneys residing in Vermont and we would hope that just one would consider filing a **Motion to Set Aside an Order** with the Vermont Supreme Court to address these issues. Until that time and in lieu of such a Motion, we would ask our Vermont leaders to put forth efforts to “make the process whole”, by Executive Order, to rescind each Certificate of Public Good issued for each of the wind turbine farms and ask that these turbines cease operating until a fair and organized citizen comment period and proper vetting of all of the issues is undertaken following a process in which **NOTICE** is issued to each property owner as described.

This **NOTICE** shall be by written correspondence to all property owners with property located within each town that can be seen from the top of each wind turbine as far as the eye can see for 360 degrees and that the **NOTICE** be issued by each Town Clerk within each town and to include all property owners including **those who own second homes** in each town.

That **NOTICE** should also include a public service message to accurately address the following matters being either true or false?

- 1) That the power being generated goes directly back into the New England grid;
- 2) That Vermont homes are not being directly powered by the power generated from this wind;
- 3) That electric rates for Vermonters have not decreased as a result of this wind power generation;
- 4) That the power being generated is being sold to other states and Canada;
- 5) That the power being generated does nothing to reduce Vermont's carbon footprint;
- 6) That the wind turbine developers will receive millions of dollars in federal subsidies;
- 7) That by selling power to other state's this reduces that state's carbon footprint;

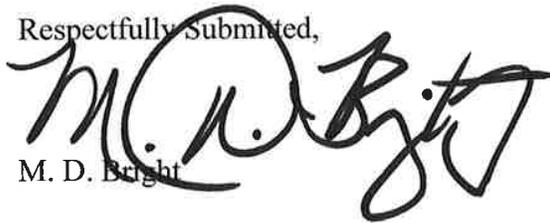
The above public service message would serve to provide accurate information to Vermonters and help to dismiss some of the misinformation currently being televised.

WE WOULD ASK THAT the State of Vermont establish a *Public Oversight Committee* to oversee the operation of these industrial wind turbine farms, to review quarterly reports, monitor promises made for adding economic growth, review applications for federal subsidies, receive and respond to complaints, review environmental, public health and wildlife impact studies and methods used to minimize those effects.

FINALLY, we have a concern about the effect wind turbines have on **public health**, most especially, the impact on those individuals with hearing deficiencies. The demographics for rural areas where wind turbine farms are located in Vermont may be in areas where the population includes those who have been exposed to hunting activities, operating farm machinery, could include former military personnel, volunteer fire & rescue personnel, police personnel and those exposed to loud music. Exposure to loud noise not only causes hearing loss, but also a health condition known as 'hyperacusis', a disorder causing sensitivities to any type of noise. For instance, 45 decibels for a person with normal hearing could cause someone with hyperacusis to suffer severe hardship. Individuals with hyperacusis may suffer a sea sickness type of response to the noise generated by the wind turbine farms when icing conditions cause them to emit irregular decibels. While we do not know if this is the case in Vermont, demographics need to be considered when siting wind turbine farms. This is just another example of what could have been considered in making a determination that was "in the public good" when considering the impact of wind turbine farms in Vermont.

In closing we would like to thank you for taking the time to review our concerns and understanding your time constraints, please do not feel the need to respond.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "M. D. Bright". The signature is stylized and overlaps the printed name below it.

M. D. Bright

MDB/hs

Cc:

The Hon. President, Barack H. Obama

Hon. Senator Patrick Leahy

Hon. Senator Bernie Sanders

Congressman Peter Welch

Joe Benning, Vt. State Senator, Caledonia

Linda Martin, Legislative Representative for Town of Wolcott

From: Annette Smith

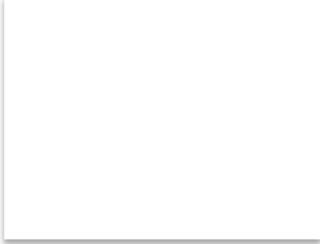
Sent: Thursday, March 21, 2013 9:50 AM

Subject: PSB decision on Lowell stormwater permit appeals

Today the PSB issued its decision on the appeal of the Lowell stormwater permits. As usual, the PSB denied every argument brought by experts for the Towns and citizens group. They accepted none of the arguments brought by Appellants. This decision, as with all the PSB's rulings on the Lowell case, is political, not one based on science. Why would anyone bother to participate in this process? How many cases can you cite where complex issues like this are litigated and not one single issue that is challenged is changed, even if a little?

We must have a process at ANR where qualified experts brought in by parties other than the applicant are able to discuss these issues prior to the issuance of draft permits. ANR's closed-door meetings with the applicants' experts and the permits that ensue are degrading our water resources and not protecting the environment, no matter what the PSB ruling says.

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.



Attachment A - Appearances:

Geoffrey Commons, Esq.
for Vermont Department of Public Service

C. Daniel Hershenson, Esq.
Nathaniel H. Stearns, Esq.
Hershenson, Carter, Scott & McGee, P.C.
for Energize Vermont, Inc., Don & Shirley Nelson, Jim Blair, Kevin McGrath, Robbin
Clark, Nancy Warner and Jack Brooks

Donald J. Rendall, Jr., Esq.
for Green Mountain Power Corporation

Peter H. Zamore, Esq.
Sheehey Furlong & Behm P.C.
for Green Mountain Power Corporation

Geoffrey H. Hand, Esq.
Elizabeth H. Catlin, Esq.
Dunkiel Saunders Elliott Raubvogel & Hand, PLLC
for Green Mountain Power Corporation

Jon Groveman, Esq.
Judith Dillon, Esq.
Donald Einhorn, Esq.
Mary Borg, Esq.
for Vermont Agency of Natural Resources

Robert E. Woolmington, Esq.
Patrick J. Bernal, Esq.
Witten, Woolmington & Campbell, P.C.
for Towns of Albany and Craftsbury

Jared Margolis, Esq.
for Towns of Albany and Craftsbury

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7628-A

In Re: Lowell Mountain Wind Project)
Stormwater Permit #6216-INDC)
(Appeal of Energize Vermont, Inc., et al))

Docket No. 7628-B

In Re: Lowell Mountain Wind Project)
Stormwater Permit #INDC.1)
(Appeal of Energize Vermont, Inc. et al))

Hearings at
Montpelier, Vermont
July 11, 12, 13 and 16, 2012

Docket No. 7628-C

In Re: Lowell Mountain Wind Project)
Stormwater Permit #6216-INDS)
(Appeal of Energize Vermont, Inc., et al))

Docket No. 7628-D

In Re: Lowell Mountain Wind Project)
Water Quality Certification)
(Appeal of Energize Vermont, Inc. et al))

and

Docket No. 7628-E

In Re: Lowell Mountain Wind Project)
Wetland Permit #2008-364)
(Appeal of Energize Vermont, Inc., et al))

Order entered: 3/20/2013

PRESENT: James Volz, Chairman
David C. Coen, Board Member
John D. Burke, Board Member

APPEARANCES: (See Attachment A)

| | |
|---|----|
| I. Introduction. | 4 |
| II. Procedural History. | 4 |
| III. General Project Findings | 6 |
| IV. Standard of Review. | 7 |
| V. The Construction Phase Stormwater Permit. | 10 |
| A. Positions of the Parties. | 10 |
| B. Appellants' Question 1. | 11 |
| C. Appellants' Question 2 | 14 |
| D. Appellants' Question 3. | 14 |
| E. Appellants' Question 4.a.–b. | 15 |
| F. Appellants' Question 4.c.–e.. | 20 |
| G. Appellants' Question 4.f.–g... | 23 |
| H. Appellants' Question 4.h.. | 28 |
| I. Appellants' Question 5.. | 30 |
| J. Appellants' Question 6. | 33 |
| VI. Operational Phase Stormwater Permit. | 35 |
| A. Positions of the Parties. | 35 |
| B. Appellants' Question 7. | 36 |
| C. Appellants' Question 8. | 39 |
| D. Appellants' Question 9. | 41 |
| E. Appellants' Question 10. | 43 |
| F. Appellants' Question 11. | 48 |
| G. Appellants' Question 12.a. | 49 |
| H. Appellants' Question 12.b. | 50 |
| I. Appellants' Question 12.c.. | 52 |
| J. Appellants' Question 12.d.. | 53 |
| K. Appellants' Question 13.a.. | 54 |
| L. Appellants' Question 13.b.. | 63 |
| M. Appellants' Question 13.c.i... | 65 |
| N. Appellants' Question 13.c.ii.. | 66 |
| O. Appellants' Question 13.c.iii.–v.. | 75 |
| P. Appellants' Questions 13.d.–e.. | 77 |
| Q. Appellants' Question 14. | 84 |
| R. Appellants' Question 15. | 87 |
| VII. Section 401 Water Quality Certification. | 89 |
| A. Appellants' Questions 16 and 17. | 89 |

VIII. Conclusion. 92

IX. Order. 93

Glossary of Acronyms

| | |
|-----------------|--|
| ANR | Agency of Natural Resources |
| BMP | Best Management Practice |
| CN | Curve Number |
| CP _v | Channel Protection Volume |
| CWA | Clean Water Act |
| DEC | Department of Environmental Conservation |
| EPSC | Erosion Prevention and Sediment Control |
| GMP | Green Mountain Power Corporation |
| NPDES | National Pollutant Discharge Elimination System |
| OSPC | On-Site Plan Coordinator |
| STP | Stormwater Treatment Practice |
| T _c | Time of Concentration |
| TMDL | Total Maximum Daily Load |
| USACE | United States Army Corps of Engineers |
| VSS | Vermont Standards and Specifications for Erosion Prevention and Sediment Control |
| WHPC | Watershed Hydrology Protection Credit |
| WQC | Water Quality Certification |
| WRA | Water Resource Area |
| VSMM | Vermont Stormwater Management Manual |
| VWQS | Vermont Water Quality Standards |

I. INTRODUCTION

This case involves an appeal pursuant to 10 V.S.A. § 8506 of five environmental permits issued by the Vermont Agency of Natural Resources ("ANR") to Green Mountain Power Corporation ("GMP") for both the Kingdom Community Wind Project ("Project") and associated transmission upgrades. The Project is a 21-turbine wind-powered electric generation facility, with associated access roads, a substation, an operations and maintenance building, and electrical lines located in the Lowell Mountain Range in Lowell, Vermont. Pursuant to a stipulation by all parties, two of the permit appeals—Stormwater Permit #6216-INDC.1 (Docket No. 7628-B) and Wetland Permit #2008-364 (Docket No. 7628-E)—were dismissed at the technical hearing held in this proceeding on July 11, 2012.¹ The appeal dismissed in Docket No. 7628-B related to a construction stormwater permit issued for the transmission upgrade components of the Project itself. Accordingly, in this Order we affirm the issuance of the remaining three permits at issue on appeal: Stormwater Permit #6216-INDC (Docket No. 7628-A); Stormwater Permit #6216-INDS (Docket No. 7628-C); and the Section 401 Water Quality Certification (Docket No. 7628-D).

II. PROCEDURAL HISTORY

On September 19, 2011, Energize Vermont, Inc., Don and Shirley Nelson, Jim Blair, Kevin McGrath, Robbin Clark, Nancy Warner, and Jack Brooks (collectively, the "Appellants") filed with the Vermont Public Service Board ("Board") appeals of five ANR decisions related to the Kingdom Community Wind Project located in Lowell, Vermont.

A prehearing conference was held in this matter on October 14, 2011. In Orders issued on October 19 and October 27, 2011, the Board established a schedule that required the Appellants to file a more specific statement of issues.

On October 24, 2011, the Appellants filed a *Preliminary Statement of Questions*.

On November 14, 2011, GMP filed a motion to strike and dismiss the Appellants' *Preliminary Statement of Questions*.

1. Tr. 7/11/12 at 5 (Volz).

On November 22, 2011, the Board issued an Order granting the towns of Albany and Craftsbury leave to intervene in this appeal proceeding.²

On January 6, 2012, the Board issued an Order granting in part and denying in part GMP's motion to strike portions of the Appellants' *Preliminary Statement of Questions*. The Board also granted the Appellants' motion to file an amended statement of questions

On January 12, 2012, the Appellants filed an *Amended Preliminary Statement of Questions*.

On January 18, 2012, GMP filed a motion to strike and dismiss the Appellants' *Amended Preliminary Statement of Questions*.

On February 3, 2012, the Board granted in part and denied in part GMP's motion to strike and dismiss the Appellants' *Amended Preliminary Statement of Questions*.

On February 17, 2012, GMP filed supplemental direct testimony and exhibits.

On March 26, 2012, the Appellants, ANR and the Department of Public Service ("Department") filed direct testimony and exhibits.

On May 25, 2012, all parties filed rebuttal testimony and exhibits.

On June 29, 2012, GMP and the Appellants filed a *Stipulated Motion to Dismiss Certain Appeals and Questions from Appellant's Statement of Questions*. In the motion, the parties requested that the Board dismiss Dockets 7628-B and E. In a memorandum dated July 3, 2012, the Board directed the Appellants to file a final statement of questions reflecting the dismissed questions and Dockets.

On July 6, 2012, the Appellants filed a *Final Statement of Questions on Appeal* ("Final Statement of Questions").³

On July 10, 2012, the Board conducted a site visit at the Project site.

On July 11, 12, 13, and 16, 2012, technical hearings were held in Montpelier.

On August 17, 2012, the parties filed briefs in this matter.

On September 13, 2012, the parties filed replybriefs in this matter.

2. The Towns have presented arguments that essentially are identical to those of Energize Vermont, Inc., et al. Accordingly, we include the towns of Albany and Craftsbury in the term "Appellants" throughout this Order.

3. In this Order, we refer to the Appellants' questions as numbered in the July 6, 2012, filing.

III. GENERAL PROJECT FINDINGS

1. The Project is a 21-turbine wind-powered electric generation facility, with associated access roads, a substation, an operations and maintenance building, and electrical lines located in the Lowell Mountain Range in Lowell, Vermont. Jeffrey Nelson (hereinafter "Nelson") pf. (Vol. 1) at 5.⁴

2. The Project is located along the Lowell Mountain ridgeline, which generally runs in a north-south orientation. The Project lands located on the westerly side of the ridgeline are within the Vermont River Basin, and the Missisquoi River Drainage Basin. The Missisquoi River watershed ultimately drains to Lake Champlain. The Project lands located on the easterly side of the ridgeline are within the Black River Drainage Basin, which ultimately drains to Lake Memphremagog. Nelson pf. (Vol. 1) at 5-6.

3. The named streams located on the western slope of the Project site include the upper reaches of the East Branch of the Missisquoi River, Ace Brook, and Truland Brook. On the eastern slope, the named streams include Seaver Branch, Rogers Branch, Shalney Branch, McCleary Brook, and Lamphear Brook, all of which are tributaries of the Black River. Numerous unnamed tributaries originate at the Project site as well. Nelson pf. (Vol. 1) at 5-6.

4. Permit 6216-INDC ("Construction Permit") regulates the runoff of stormwater from the construction phase of the Wind Farm Component. This permit will terminate once the earth disturbance associated with construction activities has been permanently stabilized. Nelson pf. (Vol. 1) at 6-7.

5. GMP filed its application for the Construction Permit on November 12, 2010. ANR issued a draft permit on January 28, 2011. Public hearings regarding the draft permit were held on March 2, 2011, and June 2, 2011. The final permit was issued on August 19, 2011. Nelson pf. (Vol. 1) at 9.

6. Permit 6216-INDS (the "Operational Permit") regulates the management of stormwater runoff from the impervious surfaces of the Wind Farm Component. This permit coverage

4. For clarity's sake, we note that Jeffrey Nelson is an expert witness for GMP and should not be confused with Don and Shirley Nelson, who are named parties to this case.

commences upon construction of impervious area on the site and continues in force after the Construction Permit terminates and the Project is operational. The Operational Permit term is five years. This permit (and subsequent renewals) is required for as long as impervious surfaces are present at the Project site. Nelson pf. (Vol. 1) at 7.

7. GMP filed its application for the Operational Permit on September 10, 2010. ANR issued a draft permit on January 31, 2011, and a public hearing was held on March 2, 2011. The final permit was issued on August 19, 2011. Nelson pf. (Vol. 1) at 9.

8. The Project requires a Water Quality Certification ("WQC") pursuant to Section 401 of the Clean Water Act ("CWA"), 33 U.S.C. § 1341. The WQC provides a certification by ANR that the Project complies with the Vermont Water Quality Standards ("VWQS"). Nelson pf. (Vol. 1) at 7; ANR Panel at 4–5.

9. GMP filed its application for the WQC on February 14, 2011. ANR issued a draft certification on May 18, 2011, and public hearings were held on June 20, 2011, and July 13, 2011. The final certification was issued on August 19, 2011. Nelson pf. (Vol. 1) at 9.

IV. STANDARD OF REVIEW

This case is the first appeal brought before the Public Service Board ("Board") under Vermont's consolidated environmental appeals statute, 10 V.S.A. § 8506.⁵ Pursuant to this statute, appeals of decisions or acts by ANR concerning renewable energy plants are assigned to the jurisdiction of the Board. In hearing such appeals, the Board is required to: (1) apply the substantive standards that were applicable in the original permit process before the Secretary of ANR; and (2) hold a *de novo* hearing on those issues which have been appealed, giving equal weight to past decisions of the environmental division and the Board's past decisions.⁶ GMP

5. The text of 10 V.S.A. § 8506(e) is as follows:

In an appeal under this section, the public service board, applying the substantive standards that were applicable before the secretary, shall hold a *de novo* hearing on those issues which have been appealed. In such an appeal, the board shall give the same weight and consideration to prior decisions of the environmental division and of the entities described in subsection 8504(m)(precedent) of this title as the board gives to its prior decisions.

6. 10 V.S.A. § 8506(e).

bears the burden of demonstrating that the permits on appeal in this proceeding comply with all applicable statutory and regulatory requirements implicated by the issues raised on appeal.⁷

Further, Section 1-05 of the VWQS provides that, while ANR is initially responsible for interpreting and determining compliance with the VWQS, the Board, in conducting a *de novo* review on appeal, is not bound by the previous determinations or interpretations of the VWQS made by ANR.⁸

While ANR is not entitled to any deference with respect to its previous determination of the merits of GMP's stormwater permit application, we will accord appropriate deference to ANR's construction of Vermont regulations where ANR is the agency responsible for their execution, absent "compelling indications of error."⁹ Our deference to ANR's interpretations of its regulations does not mean, however, that we must accept any argument advanced by ANR. Rather, our review of ANR's interpretation of its regulations is a matter of statutory construction. We first look to the plain meaning of the regulation's language. Where we discern ambiguity in the regulation, we then apply the traditional tools of statutory construction as warranted.¹⁰

Pursuant to Vermont law, discharges of stormwater that are consistent with the *Vermont Stormwater Management Manual* ("VSMM") are entitled to a presumption of compliance with the VWQS.¹¹ The same presumption applies to discharges of construction stormwater if the discharge complies with the *Vermont Standards and Specifications for Erosion Prevention and*

7. GMP argues that we should accord "substantial deference to ANR's determinations and presume the permits . . . are valid." *Green Mountain Power's Proposed Findings of Fact and Conclusions of Law*, 8/17/12 at 2 ("GMP Brief"). We disagree. The cases cited by GMP relate to the review of agency actions not subject to the consolidated environmental appeals statute. In reviewing 10 V.S.A. § 8504(h)—a statute that essentially is identical to § 8506(e)—the Vermont Supreme Court has held that a *de novo* review means that "the case is heard as though no action whatever had been held prior thereto. All evidence is heard anew, and the probative effect [is] determined by the appellate tribunal." *In re Entergy Nuclear Vt. Yankee Discharge Permit 3-1199*, 2009 VT 124 ¶ 53–55 (citing *In re Poole*, 136 Vt. 242, 245, 388 A.2d 422, 424 (1978)) Given the similarity between § 8504(h) and § 8506(e), we see no reason to depart from the standard of review that was applied in *In re Entergy Nuclear Vt. Yankee Discharge Permit*.

8. *In re Unified Buddhist Church, Inc. Indirect Discharge Permit*, No. 253-10-06 Vtec, slip op. at 2 (Vt. Env'tl. Ct. Jan. 25, 2008) (Wright, J.).

9. *In re Appeal of Elec. Indus. Alliance*, 2005 VT 111 ¶ 7, 179 Vt. 539.

10. *In re Williston Inn Group*, 2008 VT 47 ¶ 14, 183 Vt. 621.

11. 10 V.S.A. § 1264(h).

Sediment Control ("VSS").¹² Additionally, under Sections IX.D.1.(a) and (d) of the *Vermont Interim Anti-Degradation Implementation Procedure* (the "Implementation Procedure") the following types of discharges are presumed to automatically satisfy a Tier 2¹³ review under the Implementation Procedure:

(a) A discharge that meets the requirements of a BMP¹⁴ or treatment and control manual that takes into consideration anti-degradation requirements during its adoption; or

...

(d) A discharge that is in compliance with the Vermont Stormwater Management Manual and any additional best management practices that will be used to control the stormwater discharge.¹⁵

Further, the Environmental Court has held that the statutory presumption of VWQS compliance contained in Section 1264 applies to the anti-degradation policy contained in Section 1-03 of the VWQS.¹⁶ Thus, to the extent that GMP shows that the Construction Permit and Operational Permit comply with the BMP manuals applicable to these permits, a presumption of compliance with both the VWQS and the Implementation Procedure will attach to these discharges. Once GMP has made the requisite showing that the compliance presumption applies to these discharges, the burden shifts to the Appellants to prove that the permitted discharges are causing or contributing to violations of the VWQS and the Implementation Procedure.

12. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 11 n. 8 (Vt. Env'tl. Ct. Sept. 29, 2009) (Wright, J.) ("If the [VSS] establish the BMPs for construction permits, as the 2002 Manual establishes the BMPs for operational permits, then consistency with the [VSS] creates the statutory presumption of compliance with all VWQS.").

13. Tier 2 review is an analysis conducted by the Secretary of ANR of whether a discharge will result in a reduction of high quality waters. Under Implementation Procedure and the VWQS, only limited reductions to high quality waters are permitted where the reduction is justified under the "Socio-Economic Justification Test." *Vermont Interim Anti-Degradation Implementation Procedure* (2010) at 7–10.

14. Best Management Practice.

15. *Vermont Interim Anti-Degradation Implementation Procedure* (2010) at 21.

16. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 11 (Vt. Env'tl. Ct. Sept. 29, 2009) (Wright, J.) ("Since the VWQS include the state's anti-degradation policy, the statutory presumption extends to a permittee's compliance with the anti-degradation policy.") (citation omitted).

V. THE CONSTRUCTION PHASE STORMWATER PERMIT

A. Positions of the Parties

The Appellants address only two issues regarding the Construction Permit in their Brief.¹⁷ The Appellants argue that the EPSC Plan does not contain the minimum required details for silt fence and sediment traps as required by the VSS. As a result, the Appellants allege the Petitioner will not be able to control discharges from the Project site and prevent violations of the Vermont Water Pollution Control Statute and its regulations, the VWQS, and the Interim Anti-Degradation Implementation Procedure. In support of this argument, the Appellants claim that the shortcomings of the Construction Permit have resulted in "numerous discharges with high NTU [Nephelometric Turbidity Units] readings and therefore put the Project's high quality receiving waters at risk[.]"¹⁸

In turn, GMP argues that the Construction Permit complies with all applicable State and Federal requirements for construction stormwater management. GMP contends that the Construction Permit is consistent with the VSS, and accordingly, is entitled to a presumption of compliance with the VWQS. Further, GMP argues that regardless of whether the presumption is applied, GMP has presented sufficient evidence to demonstrate that the construction permit will not cause or contribute to a violation of the VWQS.

With respect to the level of detail regarding silt fence and sediment traps contained in the EPSC Plan, GMP maintains that questions regarding the details of sediment traps were not raised in the Appellants' Final Statement of Questions and therefore are outside the scope of this appeal. GMP further contends that the EPSC Plan does contain all information necessary to implement all practices as required. Finally, GMP also argues that the question regarding the level of detail for traps provided in the EPSC Plan is moot because all sediment traps for the Project already have been constructed and the Appellants have not produced any evidence to show that any sediment traps were incorrectly sized.

17. The Appellants' Brief does not specifically address the questions asked in the Appellants' Final Statement of Questions, thus complicating our review. Nonetheless, we address each of the Appellants' questions below.

18. Appellants Brief at 26.

ANR contends that it conducted a complete and thorough review of GMP's application and that the Construction Permit is consistent with the VSS. ANR further argues that by implementing the requirements of the VSS, the Construction Permit is entitled to a presumption of compliance with the VWQS, as held by the Environmental Court in *In re Sheffield Wind Project*, 252-10-08 Vtec. Sept. 29, 2010. Finally, ANR maintains that the EPSC Plan contain sufficient information to enable proper construction and implementation of all BMPs.

B. Appellants' Question 1

Whether the Projects¹⁹, as proposed will result in the maintenance of the classification of any impacted waters, as required under 10 V.S.A. § 1258(a).

Question 1 Findings of Fact

10. The Project as proposed will result in the maintenance of the classification of any impacted waters, as required under 10 V.S.A. § 1258(a). This finding is supported by findings 11 through 19 below, and our findings and discussion under Questions 2 through 6, below.

11. An individual construction stormwater discharge permit requires BMPs to be utilized during construction with the goal of preventing erosion and minimizing and controlling the discharge of sediment from the area of earth disturbance due to construction and construction-related activities. Part of a well-designed EPSC Plan, BMPs can provide a comprehensive strategy for minimizing erosion and sediment transport on a construction site. Burke pf. at 5–6; Nelson pf. (Vol. 1) at 10–11.

12. The Construction Permit includes an EPSC Plan that depicts the entire area of planned construction activities, identifies the BMPs to be used, and the circumstances and/or location at

19. For organizational purposes, we have begun each analytical section in this Order by reproducing in italicized script the pertinent question as rendered in the Appellants' Final Statement of Questions. We observed that throughout these questions, Appellants occasionally refer to "Projects" in the plural, even though there now is only one Project that is the subject of the three permits under review in this Order. *See supra* p.4 and note 1 (noting the dismissal of the appeal of the construction stormwater permit, which was issued for a second, related project, namely, the transmission upgrades necessary to accommodate the Project itself). When Appellants filed an amended statement of questions to account for the stipulated dismissal of two of the five permits originally appealed, the Appellants omitted to update their questions to reflect that only the "Project" itself is at issue in the three permits remaining on appeal. Accordingly, in this Order, references to "Projects" in the plural in the Appellants' questions should be understood to mean the single "Project" as described in findings 1 and 2, above.

which individual BMPs are to be deployed. The project-specific EPSC Plan was prepared utilizing BMPs selected and designed with reference to the VSS. Nelson pf. (Vol. 1) at 20; exhs. GMP-JAN-A8 and GMP-JAN-A13.

13. The BMPs that are part of an EPSC Plan are essentially the tools for appropriately preparing for, managing and responding to precipitation-driven discharges. An EPSC Plan, though prescriptive in part, should allow for modifications during construction, and should identify specifications for the tools (BMPs) necessary to respond to the dynamic conditions on a construction project, especially related to weather and changing site conditions. Burke pf. at 6; Nelson pf. (Vol. 1) at 11.

14. The EPSC Plan for the Project, in conjunction with the Construction Permit, shows how the construction process will: (1) minimize disturbance, including disturbance of steep slopes; (2) control stormwater volume and velocity to minimize erosion; (3) control stormwater discharges to minimize erosion at discharge outlets and to minimize downstream erosion; (4) minimize sediment discharges; (5) maintain natural buffers and direct stormwater runoff to vegetated areas where feasible; (6) minimize soil compaction and preserve topsoil to the extent feasible; (7) stabilize soils promptly; (8) control dewatering activities; (9) minimize the discharge of pollutants from vehicle and equipment wash water; (10) minimize the exposure of construction materials and wastes to precipitation and stormwater runoff; (11) minimize discharges of pollutants from spills and leaks; and (12) monitor, maintain, and, if necessary, adapt EPSC measures to evolving site conditions. Nelson pf. (Vol. 1) at 20–21; exh. GMP-JAN-A8.

15. The Construction Permit protects the classifications of the receiving waters through the proper implementation of BMPs to ensure that the permitted discharges will not cause or contribute to a violation of the VWQS in the receiving waters. The EPSC Plan specifies the suite of BMPs to be used. Nelson pf. supp. at 3–4.

16. The Construction Permit contains action limits—conditions that require GMP to (1) monitor the Project site, (2) take samples, and (3) undertake corrective actions where runoff from the site is visibly discolored or above 25 Nephelometric Turbidity Units ("NTUs"). Exh. GMP-JAN-A3 at 10–11.

17. GMP is required to report any runoff exceeding the action limit described above, and all corrective actions taken, to the Department of Environmental Conservation ("DEC") within 72 hours of first discovering the runoff. Exh. GMP-JAN-A3 at 11.

18. The 25 NTU action limit is highly protective and will ensure that the quality of receiving waters is protected. Nelson pf. (Vol. 1) at 16.

19. GMP is required to report any noncompliance with the Construction Permit to DEC within 24 hours and to file a written report describing the noncompliance within 5 days. Exh. GMP-JAN-A3 at 20.

Question 1 Discussion

Vermont law states that "waters shall be managed under the supervision of the secretary [of ANR] in order to obtain and maintain the classification established."²⁰ GMP has provided credible testimony and exhibits demonstrating that the EPSC Plan and the Construction Permit are designed to:

(1) minimize disturbance, including disturbance of steep slopes, (2) control stormwater volume and velocity to minimize erosion, (3) control stormwater discharges to minimize erosion at discharge outlets and to minimize downstream erosion, (4) minimize sediment discharges, (5) maintain natural buffers and direct stormwater runoff to vegetated areas where feasible, (6) minimize soil compaction and preserve topsoil to the extent feasible, (7) stabilize soils promptly, (8) control dewatering activities, (9) minimize the discharge of pollutants from vehicle and equipment wash water, (10) minimize the exposure of construction materials and wastes to precipitation and stormwater runoff, (11) minimize discharges of pollutants from spills and leaks, and (12) monitor, maintain, and, if necessary, adapt EPSC measures to evolving site conditions.²¹

Further, the Construction Permit contains stringent monitoring and compliance conditions that are in excess of Federal standards.²² As a result, we are persuaded that the Construction Permit will not result in any receiving waters failing to maintain their established classification. Aside from the issues regarding the level of detail provided in the EPSC Plan, which are addressed in detail below, the Appellants have provided no argument or rationale in their Brief to explain why

20. 10 V.S.A. § 1258(a).

21. Nelson pf. (Vol. 1) at 20–21.

22. Exh. GMP-JAN-A3 at 10–11; Nelson pf. (Vol. 1) at 16.

the Construction Permit is causing or will lead to any waters failing to maintain their established classification. Therefore, we find no merit to Appellants' issue raised in Question 1.

C. Appellants' Question 2

Whether stormwater discharges from the Projects as proposed will reduce the quality of the receiving waters below the classification established for said waters, pursuant to 10 V.S.A. § 1263(c), including whether stormwater discharges will reduce the quality of any class A waters below the classification standard for class A waters.

Question 2 Findings of Fact

20. The stormwater discharges from the Projects as proposed will not reduce the quality of the receiving waters below the classification established for said waters, pursuant to 10 V.S.A. § 1263(c). This finding is supported by the findings under Question 1.

Question 2 Discussion

Appellants' Question 2 essentially restates Question 1 more narrowly. Vermont law states that:

If the secretary determines that the proposed discharge will not reduce the quality of the receiving waters below the classification established for them and will not violate any applicable provisions of state or federal laws or regulations, he shall issue a permit containing terms and conditions as may be necessary to carry out the purposes of this chapter and of applicable federal law.²³

The Appellants' specific arguments regarding whether the Construction Permit complies with all applicable regulations are addressed below under the specific questions from their Final Statement of Questions that fairly raise those issues.

D. Appellants' Question 3

Whether the Projects as proposed meet the requirements of the Vermont Water Pollution Control Rules, Chapter 13, including whether stormwater discharges from the Projects as proposed will comply with any more stringent limitations, including those (i) necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to Vermont law or regulations (under authority preserved by section 510 of the Federal Clean Water Act), or

23. 10 V.S.A. § 1263(c).

(ii) necessary to meet any other Federal law or regulation, or (iii) required to implement any applicable water quality standards, such limitations to include any legally applicable requirements necessary to implement total maximum daily loads established pursuant to section 303(d) and incorporated in the continuing planning process approved under section 303(e) of the Federal Clean Water Act and any regulations and guidelines issued pursuant thereto, as required by Section 13.4(b)(1)(d).

Section 13.4(b)(1)(d) of the Vermont Water Pollution Control Rule requires that all construction permits ensure compliance with any more "stringent limitations" contained in State or Federal statutes or regulations.²⁴ Neither the Appellants' testimony nor their Brief has directed us to any more "stringent limitations" that would require us to change the terms or conditions contained in the Construction Permit. Accordingly, we find no merit to Appellants' issue raised in Question 3.

E. Appellants' Question 4.a.-b.

Whether the Projects as proposed meet the requirements of the Vermont Standards & Specifications for Erosion Prevention & Sediment Control, including the following:

a. Whether the maximum limit of concurrent disturbance proposed by Applicant and lack of sediment basins or other control measures designed to control sediment in the EPSC Plans will lead to unauthorized discharges from the Project in violation of the Vermont Water Pollution Control Law, the Vermont Water Pollution Control Rules, or the Vermont Standards & Specifications for Erosion Prevention & Sediment Control.

b. Whether the maximum limit of concurrent disturbance proposed by Applicant will lead to violations of the Vermont Water Quality Standards or the Interim Anti-Degradation Implementation Procedure.

24. Vt. Admin. Code 16-3-301:13.4. This section requires that all discharge permits must ensure compliance with:

Any more stringent limitation, including those (i) necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to Vermont law or regulations (under authority preserved by section 510 of the Federal Act), or (ii) necessary to meet any other Federal law or regulation, or (iii) required to implement any applicable water quality standards, such limitations to include any legally applicable requirements necessary to implement total maximum daily loads established pursuant to section 303 (d) and incorporated in the continuing planning process approved under section 303(e) of the Federal Act and any regulations and guidelines issued pursuant thereto.

Question 4.a.-b. Findings of Fact

21. The maximum limit of concurrent disturbance authorized by the Construction Permit will not lead to unauthorized discharges from the Project nor to violations of the VWQS or the Implementation Procedure. This finding is supported by findings 22 through 36, below.

22. Construction activity involves earth disturbance, which means that soils are disturbed from their protected, vegetated condition and exposed to the erosive effects of precipitation. Runoff from construction sites occurs during precipitation events and during periods of snowmelt, causing what are known as precipitation-driven discharges. Precipitation-driven discharges are highly variable due to the weather events that cause the discharges (e.g., the length of the precipitation event and its intensity), the weather conditions in the period leading up to a precipitation event, and other environmental factors occurring in the watershed (e.g., the time of year, the conditions of the soil and vegetation). Nelson pf. (Vol. 1) at 10–11.

23. Precipitation-driven discharges from construction sites can also be highly variable due to the status of the construction activities, including the area of disturbed earth at a given time, and ground slopes within work areas. Exposed soils are subject to erosion during precipitation events, and when erosion occurs, sediment is mobilized and can be transported to receiving waters. If not managed, these conditions can lead to the transport of sediment into receiving waters, causing adverse water quality impacts, primarily including elevated turbidity and impacts to aquatic habitat and aquatic life. Nelson pf. (Vol. 1) at 10–11.

24. Stormwater discharges from construction activities can be characterized as temporary in nature, and will vary as construction and construction-related activities proceed with clearing, grading and excavation. The short-term nature of construction stormwater discharges and the variability based on construction make the approach to management and control dynamic. Burke pf. at 16.

25. Construction projects that result in one acre or more of earth disturbance are subject to either a general or an individual permit under DEC's construction stormwater permit program. General permit authorizations and individual permits adhere to the same standards in terms of protection of water quality, but individual permits typically require more site-specific design and controls compared to a general permit authorization. The Wind Farm Component of the Project

required an individual stormwater discharge permit. Nelson pf. (Vol. 1) at 14–16; Burke pf. at 7; exh. GMP-JAN-A3.

26. Construction of the Wind Farm Component involves a total land area of 159 acres. This area consists of both forested lands and lands that were previously cleared (and in some cases graded) for logging roads, skidder trails, and log landings. Nelson pf. (Vol. 1) at 7.

27. The total area of earth disturbance associated with the Project is 135 acres, as authorized in the Construction Permit. This area includes approximately 90 acres along the ridgeline, and the remaining 45 acres are associated with the access road from Vermont Route 100. Nelson pf. (Vol. 1) at 7–8.

28. The Construction Permit limits the area of concurrent earth disturbance that is allowed at any one time, including: (1) a maximum total area of concurrent earth disturbance of 14 acres for the Wind Farm Component while conducting earthwork associated with the access road only; (2) a maximum total area of concurrent earth disturbance of 7 acres for the Wind Farm component while conducting earthwork associated with the crane path only; (3) a maximum total area of concurrent earth disturbance of 10 acres for the Wind Farm Component while conducting earthwork associated with the access road and crane path at the same time; and (4) a maximum total area of concurrent earth disturbance of 3 acres for the Transmission component. Nelson pf. (Vol. 1) at 29; Burke pf. at 3 and 14; exh. GMP-JAN-A3.

29. The EPSC Plan and narrative serve as a phasing plan in the Construction Permit. Specifically, plan sheet C-134 is titled "EPSC Phasing Notes" and describes in detail the construction and stabilization sequence of work for each project component. It is the responsibility of the contractor to properly implement the BMPs, which have been designed for the Project to prevent soil erosion and to control any sediment that is mobilized. Nelson pf. reb. at 4–5; Burke pf. reb. at 5–7; exhs. GMP-JAN-A8, GMP-JAN-A10, and GMP-JAN-A12.

30. The Construction Permit requires that the construction site employ an onsite plan coordinator ("OSPC") who is responsible for overseeing the implementation of the EPSC Plan during construction and is required to be at the construction site every day that active construction is occurring. In addition to the OSPC, the permit requires that the construction site employ an erosion prevention and sediment control specialist ("EPSC Specialist ") who must

inspect the site at least once per week during periods of construction and submit reports for each visit to DEC. Nelson pf. (Vol. 1) at 15; Burke pf. at 8–9.

31. The Construction Permit for the Project requires GMP to designate an OSPC for each of the four earthwork crews involved in the Project, and a fifth OSPC for the EPSC work crew. Each OSPC is responsible for the implementation of the EPSC Plan. Nelson pf. (Vol. 1) at 16; exh. GMP-JAN-A3 at 4-5.

32. The Construction Permit also includes a 25 NTU action limit for turbidity associated with construction stormwater discharges. The 25 NTU level is characterized as an action limit because it requires a permittee to immediately assess the BMPs employed on the site and determine whether any are in need of repair, or if any additional BMPs are required to bring the turbidity levels back below the 25 NTU level. The 25 NTU limit is highly protective. Nelson pf. (Vol. 1) at 16-17, 28; exh. GMP-JAN-A3 at 11.

33. Discharges are specifically authorized by the permit, but where they have turbidity measurements above 25 NTU, the permittee is required to immediately implement corrective measures to reduce the turbidity of discharged waters below 25 NTU. Nelson pf. reb. at 8-9; Burke pf. reb. at 8; exh. GMP-JAN-A3 at 10–11.

34. A discharge in excess of 25 NTU does not automatically constitute a violation of the VWQS. Burke pf. reb. at 8.

35. The BMP and turbidity monitoring protocols are in effect through the entire construction process, including as interim grading is occurring. In the instance that visibly discolored stormwater runoff is occurring, the permit and plans trigger a series of actions to modify or install additional BMPs on an immediate basis. This is one of the measures used to ensure that discharges from the site do not lead to violations of the VWQS. Nelson pf. reb. at 6, 8–9; Nelson pf. (Vol. 1) at 27–28.

36. The limits set forth in the Construction Permit, in conjunction with the authorized EPSC Plan and remaining Construction Permit terms and conditions, is sufficiently protective of the water quality of the receiving waters for the Project. Adherence to the EPSC Plan and Construction Permit terms and conditions will ensure compliance with the VWQS. Burke pf. reb. at 4.

Question 4.a.–b. Discussion

The Project is authorized to disturb up to 14 acres concurrently—which is twice as much land as in a previous construction stormwater permit for a wind project in Vermont.²⁵ The Appellants argue that the Construction Permit's authorization of up to 14 acres of concurrent earth disturbance was "an unjustified departure from standard practice" and that by allowing so much land to be disturbed at one time, the permit creates a risk that sediment could wash off site and pollute waters of the state before action could be taken to prevent this discharge.²⁶ However, the Appellants have not presented specific evidence regarding any "standard practice" regarding concurrent disturbance in Vermont. Nor is there an established hard limit to guide our review of this issue, as Vermont has not adopted a regulatory maximum limit for the area of concurrent disturbance for individual stormwater permits.²⁷ Therefore, the question of how much disturbed earth area is allowable is best described as a matter of finding "an appropriate balance between progressing with construction and managing areas of disturbed earth."²⁸

In this case, GMP has offered sound reasons why the terms of the Construction Permit have struck an appropriate balance. First, GMP has significant resources to manage the Project site, including four work crews, each with their own OSPC, and a fifth crew dedicated to installing and maintaining sediment-control features, all of whom can be mobilized to stabilize the site.²⁹ The OSPCs and their crews are supervised by the EPSC Specialist, who is a professional engineer. These work crews must operate under the terms of the Construction Permit, which requires that all disturbed earth area be stabilized within 10 to 12 days of the disturbance.³⁰ Further, the Project site is subject to self-monitoring and corrective action requirements, as well as being subject to inspection by ANR. Given these resources and safeguards for managing and monitoring disturbed areas, we conclude that the 14-acre limit for

25. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 4 (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.).

26. Goll pf. at 7.

27. Burke pf. reb. at 3; Nelson pf. (Vol. 1) at 3.

28. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 22 (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.).

29. Tr. 7/12/12 at 64–66 (Nelson).

30. This condition is more stringent than the condition in the *Sheffield* permit. Exh. GMP-JAN-A3 at 8; *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.).

concurrent earth disturbance will not lead to unauthorized discharges or violations of the VWQS.³¹

The Appellants point out that there have already been reported discharges of stormwater from the Project site with turbidity readings above the action-limits of the Construction Permit.³² These instances, however, are not evidence that the Construction Permit is inadequate *per se*. The Construction Permit specifically authorizes "the discharge of pollutants in stormwater associated with the construction of the [Project]."³³ The 25 NTU action limit is highly protective and designed to prompt action by the permittee to abate the discharge.³⁴ Absent corroborating evidence showing that discharges from the Project site are causing or contributing to a violation of the VWQS, these reported discharges, alone, are not sufficient evidence to conclude that the Construction Permit is inadequate.³⁵ Accordingly, we find no merit to Appellants' issues raised in Questions 4.a. through b.

F. Appellants' Question 4.c.–e.

4 c. Whether the failure of the EPSC Plans to depict silt fencing locations complies with the "Standard and Specifications for Silt Fence" contained in the Vermont Standards & Specifications for Erosion Prevention and Sediment Control, which require that at a minimum EPSC Plans and specifications shall include the location where the silt fence is to be installed.

d. Whether the failure of the EPSC Plans to depict silt fencing locations will lead, or potentially will lead, to unauthorized discharges from the Project in violation of the Vermont Water Pollution Control Law, the Vermont Water Pollution Control Rules, or the Vermont Standards & Specifications for Erosion Prevention & Sediment Control.

e. Whether the failure of the EPSC Plans to depict silt fencing locations will lead, or potentially will lead, to violations of the Vermont Water Quality Standards or the Interim Anti-Degradation Implementation Procedure.

31. Burke pf. reb. at 4 ("The limits set forth in the construction permits and included as an EPSC strategy, in conjunction with the authorized EPSC [P]lan and remaining permit terms and conditions, is sufficiently protective of the water quality of the receiving waters for the [P]roject. Adherence to the EPSC [P]lan and permit terms and conditions will ensure compliance with the Vermont Water Quality Standards.").

32. Appellants Brief at 26.

33. Exh. GMP-JAN-A3 at 3.

34. Nelson pf. (Vol. 1) at 16–17; *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 12 n. 9 (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.).

35. Burke pf. reb. at 8 ("[A] discharge in excess of 25 NTU does not automatically constitute a violation of the VWQS.").

Question 4.c.-e. Findings of Fact

37. The EPSC Plan's depiction of silt fencing locations complies with the VSS, will not lead to unauthorized discharges from the Project, nor violations of the VWQS or the Implementation Procedure. This finding is supported by findings 38 through 42, below.

38. Table 2 on EPSC Plan sheet C-130 identifies the parameters that determine the location where silt fence or other perimeter controls are required. Additionally, the EPSC Plan sheets for the access road and crane path show the limits for the applicable Water Resource Areas ("WRAs"), as these areas require particular treatment; it is therefore critical that the contractor clearly understand where these areas are located on the site. Nelson pf. reb. at 6-7; exh. GMP-JAN-8.

39. The EPSC Plan contains a schedule and narrative that set forth a clear protocol for the installation of silt fence. Exh. GMP-JAN-A8 at C-130.

40. It is not practicable to show every possible location for silt fence, which change as construction advances. Tr. 7/12/12 at 80 (Nelson).

41. The level of detail contained in the EPSC Plan is standard practice, in keeping with the VSS and sufficient to allow for proper construction under the direction of the OSPC. Burke pf. reb. at 5-7.

42. The silt fence detail and additional perimeter control details in the EPSC Plan provide adequate information to instruct the permittee and the designated contractor as to where to properly install appropriate perimeter controls, including silt fence. Burke pf. reb. at 5.

Question 4.c.-e. Discussion

The VSS states that:

Plans and specifications for installing silt fences shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following:

- (1) Location where the silt fence is to be installed. . . .³⁶

The Appellants argue that the EPSC Plan fails to meet this VSS requirement because GMP has conceded that "the specific locations where silt fence might ultimately be deployed are not

36. Exh. GMP-JAN-A13 at 5.6.

displayed on the plans."³⁷ According to GMP, the EPSC Plan instead contains a schedule and narrative description of where silt fence should be installed, which must be interpreted and implemented in the field.³⁸ Appellants, however, maintain that this alternative content is insufficient to comply with the VSS standard.

We are unpersuaded by the Appellants' argument that the VSS requires all silt fence locations to be shown graphically on the plan.³⁹ While the VSS does state that the plan must contain the "location where the silt fence is to be installed," there is no explicit requirement that the locations be shown as a drawing.⁴⁰ It would be unreasonable to interpret the relevant portions of the VSS as requiring graphical depictions of every silt fence on the Project site because it is not practicable to show every possible location for silt fence, which change as construction advances.⁴¹

Instead, the EPSC Plan contains a schedule and narrative that set forth a clear protocol for the installation of silt fence.⁴² GMP's expert described how the OSPC reads the drawings, notes, and details contained in the EPSC Plan and translates that into properly constructed BMPs.⁴³ He further testified that there is an independent monitor on site—the EPSC Specialist—who has the responsibility of checking the OSPC's work.⁴⁴ ANR's expert testified that the level of detail contained in GMP's plan was standard practice, in keeping with the VSS and sufficient to allow for proper construction under the direction of the OSPC.⁴⁵ The Environmental Court has also affirmed the use of "typical" symbols for BMPs that do not necessarily graphically depict all BMPs to scale.⁴⁶ Accordingly, we conclude that the EPSC Plan contains sufficient detail to properly install silt fence, as required by the VSS. Therefore, we conclude that the Appellants'

37. Nelson pf. reb. at 7.

38. Exh. GMP-JAN-A8 at C-130.

39. Appellants Brief at 22.

40. Nelson pf. reb. at 7.

41. Tr. 7/12/12 at 80 (Nelson).

42. GMP-JAN-A8 at C-130.

43. Tr. 7/12/12 at 74–82 (Nelson).

44. Tr. 7/12/12 at 68–69 (Nelson).

45. Burke pf. reb. at 5–6.

46. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 12, 22–23 (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.).

arguments under Questions 4.c.-e. regarding the level of detail required by the EPSC Plan are without merit.

G. Appellants' Question 4.f.-g.

f. Whether the failure of the EPSC Plans to provide calculations associated with the sizing of the ponds, dry ponds or level spreaders will lead, or potentially will lead, to unauthorized discharges from the Project in violation of the Vermont Water Pollution Control Law, the Vermont Water Pollution Control Rules, or the Vermont Standards & Specifications for Erosion Prevention & Sediment Control.

g. Whether the failure of the EPSC Plans to provide calculations associated with the sizing of the ponds, dry ponds or level spreaders will lead, or potentially will lead, to violations of the Vermont Water Quality Standards or the Interim Anti-Degradation Implementation Procedure.

Question 4.f.-g. Findings of Fact

43. The details contained in the EPSC Plan for sediment traps will not lead to unauthorized discharges from the Project, nor to violations of the VWQS or the Implementation Procedure. This finding is supported by findings 44 and 45, below.

44. Details for the construction of sediment traps are provided on EPSC Plan sheets C-127 (details T1 and D1) and Sheet C-133 (detail D7). These details provide construction specifications, including sizing requirements for level spreaders (which are to be used as sediment traps during construction). Nelson pf. reb. at 8; Burke pf. reb. at 6; exhs. GMP-JAN-A8 at details T1, D1, D7, GMP-JAN-A13 at 5.21 and 5.44.

45. The information provided in the EPSC Plan is sufficient to allow for proper construction of sediment traps at the Project site. Burke pf. reb. at 6.

Question 4.f.-g. Discussion

Appellants' Questions 4.f and g ask whether the failure to provide calculations associated with the sizing of ponds, dry ponds, or level spreaders in the EPSC Plan would lead to violations of state law, regulations or the VWQS. All of the practices listed in these questions are operational stormwater treatment practices—not construction sediment control BMPs. Therefore, none of these practices were either implemented as part of the Construction Permit or subject to the requirements of the VSS. Appellants have not demonstrated that there is a

requirement for the sizing of these operational stormwater practices to be included in the EPSC Plan. Similarly, Appellants have not shown us any requirement for GMP to provide "calculations" as part of their EPSC Plan. Accordingly, we conclude that Questions 4.f and g lack foundation and are without merit.

The Appellants also question the adequacy of the EPSC Plan with respect to the details provided for sediment traps. First, we note that sediment traps are not one of the stormwater features listed in Question 4.f and g. By statute, we are limited to "those issues which have been appealed" as stated in the Appellants' Final Statement of Questions. The Final Statement of Questions contains no mention of any issue regarding "sediment traps." Therefore, as Appellants have not properly preserved this issue for appeal, we need not reach the merits of this issue.⁴⁷

Leaving aside, however, the question of whether the "sediment trap" issue is properly preserved, we find that the information necessary to size and construct temporary sediment traps during construction is adequately presented in the EPSC Plan and consistent with the VSS. The purpose of the VSS is to "assist designers in developing" EPSC Plan.⁴⁸ The VSS states that:

Plans and specifications for installing sediment traps shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes

47. 10 V.S.A. § 8506(e).

48. Exh. GMP-JAN A13 at 1.4.

7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)
9. The construction detail for each type of sediment trap designated.⁴⁹

The Appellants argue that the EPSC Plan does not contain a summary table showing drainage area, storage required, storage provided, and storage depth as required by the plain language of the VSS.⁵⁰ As a preliminary matter, we reject the Appellants' assertion that a summary table is required in this case. The manifest purpose of the VSS language is to ensure that the information presented will not be confused with any other features on the EPSC Plan and can be applied effectively to properly construct and maintain the sediment traps.⁵¹ More specifically, the VSS states that "[e]ach trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. *If* the drawings are such that this information cannot be delineated on the drawings, *then* a table shall be developed."⁵² Accordingly, we find it reasonable to construe this language to mean that a summary table is only necessary where the information necessary to properly construct and maintain a sediment trap cannot be delineated on the drawings.

The VSS does not specify what information is "necessary to properly construct and maintain" a sediment trap."⁵³ Therefore, the question of whether the EPSC Plan contains all the information necessary to ensure that sediment traps are properly constructed is a factual question that depends on the ability and resources of the contractor using the EPSC Plan.

Turning to the EPSC Plan, each sheet of drawings has a legend that shows the symbols used to delineate the exact location of features present at the construction site including level lip spreaders and wet ponds.⁵⁴ Above the legend is an index of EPSC measures, which also shows the symbols used for each practice. Next to the symbols for wet ponds and level spreaders are

49. Exh. GMP-JAN A13 at 5.24.

50. Appellants Brief at 24.

51. Exh. GMP-JAN-A13 at 5.24.

52. Exh. GMP-JAN-A13 at 5.24 (emphasis added).

53. The VSS does specify what information must be in a summary table, but only requires a summary table where "all the information necessary to construct and maintain" a sediment trap cannot be delineated on the drawings. Exh. GMP-JAN A13 at 5.24.

54. *See e.g.*, exh. GMP-JAN-A8 at C-104.

descriptions of these ESPC measures, which state "sediment trap" and direct the contractor to look at Sheets C-127 and C-128 for the details on how to construct level spreaders and wet ponds. Turning to Sheets C-127 and 128, the notes state that these features are to be used as sediment traps during construction and refer to "detail D7/C-133 on EPSC Plan Set."⁵⁵ Turning to Sheet C-133, we find construction specifications for a "Typical Temporary Sediment Trap."⁵⁶ The specifications include a drawing of a sediment trap, notes, and a table containing the relevant design parameters, including drainage area, storage volume, bottom and outlet dimensions, depth and side slope.⁵⁷

ANR's expert testified that this information was "more than sufficient to allow for proper construction under the direction of the [OSPC]."⁵⁸ While the generalized nature of the information does require the OSPC or EPSC specialist to measure the contributing drainage area and to make an arithmetic calculation in the field, we conclude that this practice is acceptable considering these professionals' training and the stringent inspection requirements contained in the Construction Permit.⁵⁹ The Project is staffed by several OSPCs who interpret the EPSC Plan with oversight and review by the EPSC Specialist, who is a professional engineer.⁶⁰ Further, the Project is subject to the inspection and monitoring requirements contained in the individual Construction Permit.⁶¹ Given these facts, a more generalized presentation of the information is acceptable under our reading of the VSS because procedures exist to ensure that all sediment traps are properly constructed and maintained. We are satisfied that an independent expert reviewing the plans would have the information needed to adequately assess whether the sediment traps would be adequately constructed and maintained. Accordingly, we conclude that the EPSC Plan's presentation of information for sediment traps complies with the VSS and that

55. Exh. GMP-JAN-A8 at C-127 and C-128.

56. Exh. GMP-JAN-A8 at C-133.

57. Exh. GMP-JAN-A8 at C-133.

58. Burke pf. reb. at 6.

59. See tr. 7/12/12 at 68 (Nelson) (stating qualifications of EPSC specialist as a Professional Engineer); see exh. GMP-JAN A8 at C-128 (requiring that OSPC or EPSC specialist shall ensure "adequate number of and sizing of sediment traps"); see exh. GMP-JAN-A3 at 10 (outlining permit conditions for inspection, sampling, and corrective actions).

60. Tr. 7/12/12 at 72-73 (Nelson).

61. Exh. GMP-JAN-A3 at 10.

therefore, any failure to include calculations associated with sediment traps neither will cause, nor potentially lead to, unauthorized discharges from the Project.

We are not persuaded by Appellants' contention that the Stop Work Order issued on October 5, 2011, demonstrates that the EPSC Plan contains insufficient detail and is, therefore, leading to violations of the VWQS. ANR's expert testified that the Stop Work Order was issued when a contractor at the site failed to install BMPs as directed in the EPSC Plan. The fact that ANR's inspector was able to identify the deficiency and order compliance is evidence that the EPSC Plan contains sufficient detail and that the Construction Permit's enforcement mechanism operated as intended to stop uncontrolled discharges from the site.⁶²

Finally, even if a summary table were required in this case, we find that GMP has substantially complied with this requirement. The VSS at page 5.24 outlines nine pieces of information that must be included in a summary table.⁶³ Almost every piece of required information can be found on Sheets C-127 and C-133 of the EPSC Plan, though not in a single table. Sheet C-127 of the EPSC Plan contains a table identifying by number each level spreader that will function as a sediment trap.⁶⁴ Sheet C-133 provides the relevant design parameters for sediment traps, albeit in generalized terms.⁶⁵ That said, the information in the table on Sheet C-133 is sufficient to derive each of the nine sizing criteria for a sediment trap summary table listed on page 5.24 of the VSS. The only piece of information that cannot be derived from the EPSC Plan is the area of the individual drainage areas contributing to each sediment trap.⁶⁶ As discussed above, we think that the OSPCs and ESPC Specialist have the training and ability needed to measure the contributing drainage area in the field.⁶⁷ In any event, Appellants have not shown how the absence of a summary table in the EPSC Plan is causing unauthorized

62. Burke pf. reb. at 7-8.

63. Exh. GMP-JAN A13 at 5.24.

64. Exh. GMP-JAN-A8 at C-127.

65. Exh. GMP-JAN-A8 at C-133.

66. Sheet C-133 does contain a general drainage area requirement, stating that each sediment trap must be sized proportionally to the general numbers provided in the table. Exh. GMP-JAN-A13 at C-133.

67. GMP has presented the sizes of the drainage areas contributing to each level spreader at the Project in Exhibit GMP-JAN-A4. Appellants have not alleged that any of these areas are incorrect or that any sediment trap is incorrectly sized based on these drainage areas. Further, we think that in-the-field measurement of drainage areas based on actual site conditions seems preferable to a drainage area estimated during the Project's planning phase.

discharges. Therefore, even if we were to conclude that a summary table was warranted in this case, which we do not, we would find that GMP has substantially complied with the essentially administrative requirement to generate a summary table and that the Appellants have failed to show how they were harmed by any defect in GMP's presentation of this information.⁶⁸

For the reasons set forth above, we find no merit to Appellants' issue raised in Questions 4.f. and g.

H. Appellants' Question 4.h.

h. Whether the sediment control practices in the EPSC Plan are under-designed based on the Vermont Standards & Specifications for Erosion Prevention and Sediment Control such that they will lead, or potentially will lead, to the pollution of the waters of the State of Vermont in violation of the Vermont Water Quality Standards and the Interim Anti-Degradation Implementation Procedure.

Question 4.h. Findings of Fact

46. The sediment control practices in the EPSC Plan are designed based on the VSS and will not lead, or potentially will not lead, to the pollution of the waters of the State of Vermont in violation of the VWQS and the Implementation Procedure. This finding is supported by findings 47 through 51, below.

47. The EPSC Plan for the Project includes several BMPs chosen to prevent erosion or control sediment. These include stone-lined swales, grass swales, sediment traps, construction demarcation schedule, perimeter erosion control schedule, construction limit barrier, erosion control mix berms, silt fence, reinforced silt fence, stone berms, secured silt fence, staked fiber rolls, timber matting, hay bale check dams, and water bars. Nelson pf. (Vol. 1) at 23-25; exh. GMP-JAN-A8.

48. The EPSC Plan contains sheets with design details for the structural BMPs and non-structural BMPs chosen for the Project, along with an explanation of how each is employed to either prevent erosion or control sediment. Nelson pf. (Vol. 1) at 23–30; exh. GMP-JAN-A8.

68. *Nemi v. Todd*, 89 Vt. 502, 502, 96 A. 14, 14 (1915) (holding that application setting forth required information in a technically incorrect manner was still valid where there was no prejudice). *Cf. Rutz v. Essex Junction Prudential Committee*, 142 Vt. 400, 413, 457 A.2d 1368, 1374, (1983) (holding that substantial compliance with administrative regulations was acceptable where there was a clear absence of prejudice).

49. The EPSC Plan shows how permit objectives will be met by depicting the areas of earth disturbance, the limits of earth disturbance, and the BMPs to be employed within each area of earth disturbance. The EPSC Plan also includes notes and instructions regarding how BMPs are installed and how construction activity will progress and be phased. Nelson pf. (Vol. 1) at 21; exhs. GMP-JAN-A8, Sheet C-134 and GMP-JAN-A12.

50. The EPSC Plan contains appropriately selected and designed non-structural BMPs that, in concert with the structural BMPs associated with the Project, will protect water quality and ensure compliance with the VWQS, when properly constructed and maintained. Nelson pf. (Vol. 1) at 32.

51. The water quality monitoring data collected for the Project have shown that construction activities have not had a negative impact on water quality and that receiving waters are continuing to meet the VWQS. Nelson pf. reb. at 10; exh. GMP-Redirect-1.

Question 4.h. Discussion

The Appellants question whether the sediment control practices contained in the EPSC Plan are "under-designed" and thus, will lead to violations of the VWQS and the Implementation Procedure. GMP has provided persuasive testimony outlining the process by which all BMPs were sized and constructed, including in-the-field verification.⁶⁹ The Appellants have not presented evidence demonstrating that any individual BMP is undersized. Instead, the Appellants have only offered criticism of the way GMP presented the information necessary for the sizing of BMPs contained in the EPSC Plan. As discussed above, the manner in which the BMPs employed in the Project were depicted and described in the EPSC Plan is consistent with the requirements of the VSS. Accordingly, we find that GMP has demonstrated that the sediment control practices in the EPSC Plan are appropriately sized and will not contribute to violations of the VWQS. Therefore, we find no merit to Appellants' issue raised in Question 4.h.

69. Nelson pf. (Vol. 1) at 32.; tr. 7/12/12 at 82-83; (Nelson); exh. GMP-JAN-A8.

I. Appellants' Question 5

Whether the Projects as proposed meet the requirements of the Vermont Water Quality Standards, including the following:

a. Whether discharges from the Projects as proposed will result in a reduction in the level of water quality in violation of Section 1-03.C.

b. Whether discharges from the Projects as proposed will meet the following criteria:

i. The proposed discharge is in conformance with all applicable provisions of the Vermont Water Quality Standards, as required by Section 1-04.A.1;

ii. The receiving waters will have sufficient assimilative capacity to accommodate the proposed discharge, as required by Section 1-04.A.6; and

iii. Assimilative capacity has been allocated to the proposed discharge consistent with the classification set forth in Chapter 4 of the Vermont Water Quality Standards, as required by Section 1-04.A.7.

c. Whether discharges from the Projects as proposed will result in violations of the Water Quality Criteria in Chapter 3 of the Vermont Water Quality Standards.

Question 5 Findings of Fact

52. The Project as proposed meets the requirements of the Vermont Water Quality Standards. This finding is supported by findings 53 through 57, below, and our findings and discussion under Questions 1 through 4, above.

53. In this case, the EPSC Plan for an individual discharge permit is developed in the context of the VSS. The authorized EPSC Plan, supporting application materials, and ANR-specified permit conditions together provide for a comprehensive strategy to manage construction stormwater discharges so that they do not cause or contribute to a violation of the VWQS. Burke pf. at 8.

54. GMP conducted extensive field work to identify and classify all of the water resources within and adjacent to the Project area, including streams, wetlands, vernal pools, and associated buffer zones. Nelson pf. (Vol. 4) at 4.

55. The results of this benchmark study provide a set of observations of conditions in the associated streams prior to initiation of construction, consistent with the Anti-Degradation Policy in the VWQS and DEC's Implementation Procedure, both of which are focused on the protection and maintenance of water quality. The results of the benchmark monitoring can be used in the future to evaluate the efficacy of the Project's water quality controls. Nelson pf. (Vol. 4) at 7, 9-10.

56. Site-specific stormwater discharge control plans were developed for the construction phases of the Project. These plans, and the final permits, include specific control measures and monitoring conditions that are designed to ensure compliance with the VWQS. Nelson pf. (Vol. 4) at 19–21.

57. The Construction Permit will protect water quality and prevent a lowering of water quality below any applicable water quality standards. Nelson pf. sup. at 3–4.

Question 5 Discussion

Under 10 V.S.A. § 1264(h), qualifying stormwater discharges are entitled to a presumption of compliance with the VWQS "in any appeal."⁷⁰ We have already determined that the contested aspects of the Construction Permit comply with the VSS. Accordingly, we conclude that the discharges associated with the Construction Permit are entitled to the statutory presumption of compliance in Section 1264(h). Therefore, it is the Appellants' burden to present evidence to rebut this presumption. In previous cases, the Environmental Court has evaluated evidence presented to rebut this presumption against a benchmark measure of the receiving waters' quality and uses when considering whether certain additional permit conditions were required.⁷¹ In this case, GMP has presented a benchmark study outlining existing water quality and uses.⁷² The Appellants have not presented persuasive evidence demonstrating that the Construction Permit is causing or will contribute to a reduction of the quality or uses of the

70. See 10 V.S.A. §§ 1264(g)–(h). Section 1264(g)(1) outlines the presumption. Section 1264(g)(2) applies the presumption to stormwater discharges, such as the discharges authorized by the Construction Permit, authorized under the federally-delegated National Pollutant Discharge Elimination System ("NPDES") program. Finally, Section 1264 (h) applies the presumption to permitted discharges into receiving waters that already meet water quality standards. The criteria that such a discharge must meet to receive the benefit of the compliance presumption include: "The secretary shall, for new stormwater discharges, require a permit for discharge of, regulated stormwater runoff consistent with, at a minimum, the 2002 stormwater management manual." 10 V.S.A. § 1264(e). The Environmental Court has interpreted this statutory language to mean that the presumption of compliance applies to construction stormwater discharges that are subject to a permit that is consistent with the VSS. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 13 (Vt. Env'tl. Ct Aug. 26, 2010) (Wright, J.) ("consistency with the Vermont Standards and Specifications for construction-phase permits creates the statutory presumption of compliance with all VWQS").

71. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 12 (Vt. Env'tl. Ct Sept. 29, 2009) (Wright, J.) ("[a]n agreed or otherwise established benchmark of the existing uses and existing quality of the receiving waters is necessary against which to measure that evidence.").

72. Exh. GMP-JAN-E3.

receiving waters.⁷³ Therefore, we have no basis to conclude that the Project is violating or will cause a violation of the VWQS.

Even if we did not apply the Section 1264(h) compliance presumption, we find that the Construction Permit satisfies the provisions of the VWQS implicated by Question 5. GMP and ANR have presented persuasive evidence and testimony that the discharges authorized by the Construction Permit will not result in a reduction of water quality as required by Section 1-03.C.⁷⁴ The Construction Permit contains strict monitoring provisions and a compliance protocol designed to prevent and abate discharges of sediment and thus prevent a reduction in water quality. Further, post-construction monitoring of the Sheffield Wind Project, which employed similar permit conditions, has not found a reduction in water quality at that site.⁷⁵ As discussed above, we are not persuaded by the Appellants' arguments regarding the reported "above action limit" discharges and the Stop Work Order of October 5, 2011.⁷⁶ Therefore, we find that the Construction Permit will not result in a reduction of water quality.

Turning to the standards of Section 1-04.A.1, which requires that the Construction Permit conform to "all applicable" portions of the VWQS, we find the Appellants' Question 5.b.i. to be impermissibly broad. The Environmental Court has held that "the applicant is entitled to understand in what respect an appellant believes that the application fails to meet . . . [the applicable regulatory] criteria."⁷⁷ Appellants' Question 5.b.i. fails to give notice as to what specific criteria contained in the VWQS the Project allegedly fails to achieve. Accordingly, we will not address this broad question any further but instead will examine the Appellants' other questions which at least indicate specific provisions of the VWQS.

73. As discussed above, we do not agree that the reported actionable discharges from the Project or the Stop Work Order are persuasive evidence that the receiving waters' existing quality or uses has been reduced.

74. *See e.g.*, Burke pf. reb. at 4.

75. Nelson sup. pf. at 5-7 ("It is my opinion that the similar measures required by the stormwater permits under appeal here will be equally effective at protecting water quality.").

76. *See supra* pp. 20, 27.

77. *In re: Unified Buddhist Church, Inc.*, Docket No. 253-10-06 Vtec, slip op. at 5 (Vt. Env'tl. Ct., May 11, 2007).

We find that the Construction Permit complies with Sections 1-04.A.6 and 7 of the VWQS.⁷⁸ Section 1-01. B.7 of the VWQS defines assimilative capacity as "a measure of the capacity of the receiving waters to assimilate wastes without lowering their quality below the applicable water quality standards." Therefore, the issue of "assimilative capacity" is synonymous with the question of whether the Project will reduce water quality. We find that the Construction Permit will protect water quality and prevent a lowering of water quality below any applicable water quality standards.⁷⁹ For the same reasons, we also conclude that the Construction Permit will not lead to a violation of the Water Quality Criteria contained in Chapter 3 of the VWQS. Accordingly, we find no merit to Appellants' issues raised in Question 5.

J. Appellants' Question 6

Whether the Projects as proposed meet the requirements of the Vermont Interim Anti-Degradation Implementation Procedure, including the following:

- a. Whether the Projects as proposed qualify for any of the presumptions provided for in Section IX.D .1 of the Vermont Interim Anti-Degradation Implementation Procedure, including whether discharges from Applicant's Project meet the requirements of a "BMP" or "treatment and control manual" that takes into consideration anti-degradation requirements during its adoption, per Section IX.D.1(a);*
- b. Whether the presumptions in Section IX.D.1 of the Vermont Interim Anti-Degradation Implementation Procedure may be rebutted by credible and relevant information, as provided in Section IX.D.2.*
- c. Whether notwithstanding any presumption in Section IX.D.1, the potential cumulative impact associated with a proposed discharge will result in a reduction in water quality warranting a complete Tier 2 review prior to the issuance of these permits, as provided in Section IX.D .3.*

78. Appellants reference to 1-04.A.7 in Question 5.b.iii. is without basis. The Appellants have not identified any receiving water segment subject to a wasteload allocation, nor have they provided any analysis or argument as to how the Project's discharges would violate any applicable wasteload allocation. Accordingly, we have no basis for reviewing this question any further.

79. Nelson pf. sup. at 4–7.

Question 6 Findings of Fact

58. The Project as proposed meet the requirements of the Vermont Interim Anti-Degradation Implementation Procedure. This finding is supported by finding 59, below and the findings under Question 1 through Question 5, above.

59. The Project will protect existing high-quality waters (Tier 1), and will maintain and protect all existing and designated uses (Tier 2). There are no Outstanding Natural Resource Waters impacted by the Project and therefore Tier 3 analysis is not applicable. Nelson pf. (Vol. 4) at 21; Nelson pf. supp. at 2-3.

Question 6 Discussion

As we have discussed above, we conclude that the Construction Permit implements BMPs that comply with the VSS and therefore, discharges authorized by the Construction Permit are entitled to a presumption of compliance with the VWQS. Similarly, we conclude that these discharges are entitled to a presumption of compliance with the Implementation Procedure under Section X.D.1.(a) which states that "[a] discharge that meets the requirements of a BMP or treatment and control manual" automatically satisfies a Tier 2 review under the policy.⁸⁰ The Appellants have not presented any evidence or argument as to why the VSS does not qualify as a "BMP or treatment and control manual." Therefore, we regard the VSS as the standard that the Construction Permit must meet to be entitled to the compliance presumption.

Turning to Question 6.b., for the reasons set forth in our discussion under Questions 4.c. through 4.g., we conclude that the Appellants have failed to present persuasive and credible evidence that would rebut the VWQS compliance presumption.

Turning to the issue of cumulative impacts raised in Question 6.c., the Implementation Procedure states that, notwithstanding the presumption of compliance, the Secretary of ANR may determine that a complete Tier 2 review is warranted "based on credible and relevant information" that the cumulative impacts associated with the Project will result in a reduction in

80. The Tier 2 review is an analysis conducted by the Secretary of ANR of discharges to determine if they will result in a reduction of high quality waters. Under the Implementation Procedure and the VWQS, limited reductions to high quality waters are only permitted where the reduction is justified under the "Socio-Economic Justification Test." Vermont Interim Anti-Degradation Implementation Procedure at 8.

water quality.⁸¹ The Appellants have failed to present credible and relevant information regarding any cumulative impacts from the Project that would persuade us to require a complete Tier 2 review. Instead, for the reasons discussed at length above, we are persuaded by the testimony of ANR and GMP that the Project will not reduce water quality and thus, no Tier 2 review is warranted. Accordingly, we find no merit to Appellants' issues raised in Questions 6.a. through 6.c.

VI. OPERATIONAL PHASE STORMWATER PERMIT

A. Positions of the Parties

The Appellants contend that ANR disregarded the requirements of the Vermont Stormwater Management Manual ("VSMM") in approving the Project's level spreaders⁸² as a New Design Alternative System and by misapplying the Alternative Design Standard for the Chanel Protection Treatment Standard ("CP_v"). Therefore, the Appellants contend, the Operational Permit should not be presumed to comply with the VWQS. The Appellants further argue that the Operational Permit relies on level spreaders that are incorrectly designed, based on faulty modeling assumptions, and therefore will not function as intended. Hence, the Appellants assert that the level spreaders will not meet the requisite treatment standards for new development and thus will result in a reduction of water quality. Each of these arguments is described more fully, below.

GMP argues that the Operational Permit will meet all applicable treatment standards and is consistent with the VSMM. GMP asks that we defer to ANR's interpretation of the VSMM. GMP further argues that because the permit is consistent with the requirements of the VSMM, the Operational Permit should be presumed to comply with the VWQS. Overall, GMP contends that the Appellants have merely offered minor technical critiques of the Operational Permit and that the Appellants have failed to produce any evidence showing that the permits will cause or contribute to violations of any applicable water quality law.

81. Vermont Interim Anti-Degradation Implementation Procedure at 21.

82. A level spreader is a feature used to control operational stormwater. A level spreader consists of a dug trough with a level "lip." Stormwater is diverted into the level spreader and the stormwater flows over the lip in a dispersed manner.

ANR argues that the Operational Permit complies with all applicable requirements and asks us to defer to its interpretation of the VSMM. ANR argues that adopting the interpretations of the VSMM urged by the Appellants would frustrate the intent of the stormwater management statute and would lead to increased disturbance at the Project site.

B. Appellants' Question 7

Whether the Project as proposed will result in the maintenance of the classification of any impacted waters, as required under 10 V.S.A. § 1258(a).

Question 7 Findings of Fact

60. The Project, as proposed, will result in the maintenance of the classification of any impacted waters, as required under 10 V.S.A. § 1258(a). This finding is supported by findings 61 through 70, below, and the findings under Questions 8 through 15, below.

61. The classifications of all waters in the state, including the Project's receiving waters, are established by the Water Resources Panel and can be found in the VWQS. Nelson pf. supp. at 3; exh. GMP-JAN-E1 at Chapter 4.

62. The Operational Permit is designed to maintain the classifications of the receiving waters through the proper implementation of BMPs and ensures that the permitted discharges will not cause or contribute to a violation of the VWQS in the receiving waters. Nelson pf. supp. at 3.

63. The Operational Permit implements BMPs that consist of Stormwater Treatment Practices ("STPs") that satisfy the applicable VSMM criteria. Nelson pf. supp. at 4.

64. GMP conducted extensive field work to identify and classify all of the water resources within and adjacent to the Project area, including streams, wetlands, vernal pools, and associated buffer zones. Nelson pf. (Vol. 4) at 4.

65. Following that general identification by GMP, ANR was consulted to develop a detailed baseline water quality monitoring program. The baseline water quality monitoring was conducted during 2010 within specific receiving waters throughout the Project area and was used to both characterize the current water quality of potential receiving waters, and to identify the existing uses of those waters. The primary purpose of the water quality monitoring study was to

provide an assessment of existing uses and existing water quality within the receiving waters associated with the Project's proposed stormwater discharges. Nelson pf. (Vol. 4) at 4–5, 7.

66. The benchmark monitoring stations were located downstream of Project construction areas but upstream of other existing impacts, to the maximum degree feasible. The details of specific attributes of these monitoring stations (elevation, drainage area, etc.) are provided on Table 1 of the Benchmark Water Quality Monitoring Report. The locations of the monitoring stations are shown on page 1 of Appendix 2 of the report. Nelson pf. (Vol. 4) at 8–9; exh. GMP-JAN-E3.

67. The most comprehensive overall measurement of the water quality is provided through the assessment of aquatic biota. ANR scientists have developed extensive criteria based on aquatic biota to assess whether specific water bodies meet established VWQS criteria and classifications. Nelson pf. supp. at 4.

68. The Project benchmark monitoring included aquatic biota sampling. The samples collected in the fall of 2010 were analyzed and the results were compared to the DEC-established metrics for aquatic biota. Nelson pf. (Vol. 4) at 8; exh. GMP-JAN-E5.

69. The measures required by the Project stormwater permit will be effective at protecting water quality and maintaining the existing classifications for receiving waters around the Project site. The benchmark water quality sampling collected for the Project will allow for a pre-construction and post-construction comparison in this case. Nelson pf. supp. at 7–8.

70. DEC stormwater staff have observed the performance of level spreaders in the field for this Project, and although not yet certified as final design for the Operational Permit, the level spreaders are performing as expected, even in large storm events, and those level spreaders that are at final design specifications are performing remarkably well. Tr. 7/13/12 at 140–141 (Burke).

Question 7 Discussion

Vermont law states that "waters shall be managed under the supervision of the secretary [of ANR] in order to obtain and maintain the classification established."⁸³ Classifications of all waters in the State can be found in the VWQS.⁸⁴

Broadly speaking, the Appellants raise three arguments in support of their position that the Project will result in waters failing to obtain and maintain their established classifications. First, the Appellants argue that the Project's use of level spreaders does not comply with the applicable requirements of the VSMM. Second, the Appellants contend that the design of the level spreaders is flawed and that the level spreaders and forested buffers will not function as intended. Third, the Appellants argue that even if the Project's level spreaders are permitted, GMP's hydrologic model underestimates the volume of runoff that will be generated by the Project and thus fails to demonstrate that the level spreaders will meet the applicable treatment standards. We address each of the Appellants' arguments in detail under Question 13, which specifically raises those arguments.

Overall, we find that the Project, subject to the conditions contained in the Operational Permit, will not cause or contribute to any receiving waters failing to maintain their classification.⁸⁵ In our discussion under Question 13 we address the Appellants' criticisms of the Project's level spreaders and conclude that the Operational Permit is consistent with the VSMM. Additionally, for the reasons discussed under Question 10, we do not accept the Appellants' proposed conditions because we do not find that they are necessary to ensure that the established classifications of receiving waters are retained. Accordingly, we conclude that the Operational Permit satisfies the requirements of Section 1258(a). Therefore, we find no merit to Appellants' issue raised in Question 7.

83. 10 V.S.A. § 1258(a).

84. Nelson pf. sup. (2/18/12) at 3.

85. See e.g., Nelson pf. sup. (2/17/12) at 3 ("The stormwater discharge permits ensure that the classifications of the receiving waters are maintained through the proper implementation of best management practices ("BMPs") to ensure that the permitted discharges will not cause or contribute to a violation of the VWQS in the receiving waters.").

C. Appellants' Question 8

Whether stormwater discharges from the Project as proposed will reduce the quality of the receiving waters below the classification established for said waters, pursuant to 10 V.S.A. § 1263(c).

Question 8 Findings of Fact

71. The stormwater discharges from the Project, as proposed, will not reduce the quality of the receiving waters below the classification established for said waters, pursuant to 10 V.S.A. § 1263(c). This finding is supported by the discussion and findings under Question 7, above, and Questions 9–15, below.

Question 8 Discussion

Section 1263(c) of Title 10 of the Vermont Statutes Annotated states:

If the secretary determines that the proposed discharge will not reduce the quality of the receiving waters below the classification established for them and will not violate any applicable provisions of state or federal laws or regulations, he shall issue a permit containing terms and conditions as may be necessary to carry out the purposes of this chapter and of applicable federal law. Those terms and conditions may include, but shall not be limited to, providing for specific effluent limitations and levels of treatment technology; monitoring, recording, reporting standards; entry and inspection authority for state and federal officials; reporting of new pollutants and substantial changes in volume or character of discharges to waste treatment systems or waters of the state; pretreatment standards before discharge to waste treatment facilities or waters of the state; and toxic effluent standards or prohibitions.

Section 1263 generally requires any person intending to discharge waste into waters of the state to apply for a permit, and sets forth the general standards for the Secretary of ANR to issue such a permit. While the requirement that a proposed discharge may not reduce the quality of receiving waters may be generally applicable to stormwater discharges, it is important to

recognize that the Legislature enacted a specific provision for stormwater discharges in Section 1264.⁸⁶ Section 1264(e)(1) states that:

Except as otherwise may be provided in subsection (f) of this section, the secretary shall, for new stormwater discharges, require a permit for discharge of, regulated stormwater runoff consistent with, at a minimum, the 2002 stormwater management manual. The secretary may issue, condition, modify, revoke, or deny discharge permits for regulated stormwater runoff, as necessary to assure achievement of the goals of the program and compliance with state law and the federal Clean Water Act. The permit shall specify the use of best management practices to control regulated stormwater runoff. The permit shall require as a condition of approval, proper operation, and maintenance of any stormwater management facility and submittal by the permittee of an annual inspection report on the operation, maintenance and condition of the stormwater management system. The permit shall contain additional conditions, requirements, and restrictions as the secretary deems necessary to achieve and maintain compliance with the water quality standards, including but not limited to requirements concerning recording, reporting, and monitoring the effects on receiving waters due to operation and maintenance of stormwater management facilities.

Section 1264(e)(1) is the relevant standard for operational stormwater permits. Section 1264 states that "consistency" with the VSMM is the primary requirement for operational stormwater permits. Like Section 1263(c), Section 1264(e)(1) requires that permits for stormwater discharges shall contain "additional conditions . . . necessary to achieve and maintain compliance" with the VWQS. Therefore, we consider evidence of consistency with the VSMM and the inclusion of all conditions necessary to maintain compliance with the VWQS to be a sound basis for concluding that the Project will protect the quality of receiving waters.

The Appellants' Final Statement of Questions raises several issues concerning whether the Project meets the relevant standards contained in Section 1264. Question 8, however, is hopelessly broad and does not identify what specific standard the Operational Permit fails to meet. Based on our findings and discussions under Questions 9 through 15, below, we find that the Project complies with VSMM and contains sufficient conditions to maintain compliance with the VWQS. We also conclude that the Project will not reduce the quality of the receiving waters below their established classification for the same reasons stated under Question 7, above, and

86. For example, it is settled law that stormwater discharges are not subject to the effluent limitations discussed in Section 1263(c). *In re: Stormwater NPDES Petition*, Docket No. 14-1-07, slip op. at 17 (Vt. Env'tl. Ct. Aug. 28, 2008) (Durkin, J.).

based on our findings under Questions 9 through 15, below. Accordingly, we find no merit to Appellants' issue raised in Question 8.

D. Appellants' Question 9

Whether the Project as proposed specifies the use of best management practices to control regulated stormwater runoff as required under 10 V.S.A. § 1264(e)(1).

Question 9 Findings of Fact

72. The Project, as proposed, specifies the use of BMPs to control regulated stormwater runoff as required under 10 V.S.A. § 1264(e)(1). This finding is supported by findings 73 through 80, below.

73. Stormwater management design must consider both pre-development and post-development runoff conditions, taking into account on-site soils, slopes, receiving waters, existing drainage, and local precipitation data for a range of storm events as defined in the VSMM. The VSMM is essentially a design toolbox that allows the designers to select and develop the most appropriate STPs with the intent of meeting the applicable stormwater treatment standards. Burke pf. at 17.

74. STPs are BMPs for post-construction stormwater management. Section 2.2 of the VSMM identifies "Acceptable STPs" for meeting the applicable treatment standards. The Project will use the following "Acceptable STPs": wet ponds, grass channels, infiltration basins, and dry ponds. Nelson pf. (Vol. 2) at 7; exh. GMP-JAN-C2 at 2.2.

75. The VSMM anticipates and allows the use of new stormwater treatment designs through the Alternative STPs Designs standard of Section 2.5. The VSMM identifies two categories of alternative STPs: Existing Alternative Systems of Section 2.5.1; and the New Design Alternative Systems of Section 2.5.2. Nelson pf. (Vol. 2) at 5; Burke pf. at 18; exh. GMP-JAN-C2 at 2.5.

76. The Project utilizes New Design Alternative STPs in the form of level spreaders and vegetated buffers. A level spreader is a constructed feature which is used to convert concentrated runoff to sheet flow and release it in a non-erosive manner across a slope. Vegetated buffers are defined as the land areas immediately downslope of the level spreader which provide for the

"disconnection" of runoff from impervious surfaces to undisturbed natural vegetated terrain. Nelson pf. (Vol. 2) at 9; exh. GMP-JAN-C1.

77. A total of 58 different STPs are associated with the operational phase stormwater design for the Project. Level spreaders with vegetated buffers are planned to be used at 31 locations on the Project site. Wet ponds are planned at 16 locations, dry ponds at 4 locations, grass channels at 6 locations, and infiltration basins at one location. Nelson pf. (Vol. 2) at 8-9.

78. The use of level spreaders and vegetated buffers allow: (1) a reduction in the amount of clearing and earth disturbance necessary for the treatment practices, compared to that which would be required for conventional pond-based STPs; (2) a reduction in the required disturbance along roadways that would be needed to convey stormwater runoff to a smaller number of large ponds; and (3) maintenance of the natural hydrology of the site since there is less collection and consolidation of stormwater flows at specific (pond) locations. The replacement of level spreaders with conventional pond-based STPs would result in the disturbance of approximately 12 more acres of land. Nelson pf. (Vol. 2) at 9-10; Nelson pf. reb. at 14-15; tr. 7/12/12 at 91 (Nelson).

79. The Project's level spreaders will achieve the requisite Treatment Standards contained in the VSMM. Nelson pf. (Vol. 2) at 11.

80. The Project's level spreaders are consistent with the VSMM's requirements for New Design Alternative Systems. Nelson pf. (Vol. 2) at 10-12.

Question 9 Discussion

Section 1264(e)(1) states that:

Except as otherwise may be provided in subsection (f) of this section, the secretary shall, for new stormwater discharges, require a permit for discharge of, regulated stormwater runoff consistent with, at a minimum, the 2002 stormwater management manual. . . . The permit shall specify the use of best management practices to control regulated stormwater runoff.⁸⁷

The VSMM defines "Best Management Practices" as:

87. 10 V.S.A. § 1264(e)(1).

A schedule of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce water pollution, including but not limited to the stormwater treatment practices (STPs) set forth in this Manual.⁸⁸

The broad definition of BMPs contained in the VSMM indicates that any effort to reduce or prevent pollution would qualify as a BMP—even if it is not set forth in the VSMM.⁸⁹ The Operational Permit contains a schedule of permitted discharges, each with a description of the STPs designed to treat and control the runoff from the Project.⁹⁰ Under the broad definition contained in the VSMM, these measures constitute BMPs.

Of course, the relevant issue raised by the Appellants is whether the BMPs specified in the Operational Permit are consistent with the VSMM and sufficient to protect water quality, not whether they qualify as BMPs generally. The Appellants' Question 13 better frames the Appellants' position that the Project's STPs do not meet the applicable regulatory requirements. Therefore, we address those arguments under that question. Because we are not persuaded by the Appellants' specific arguments raised under Question 13, and because we find that the Project's STPs comply with the requirement of the VSMM, we conclude that the Operational Permit does specify the use of BMPs, as required by Section 18-306(b). Accordingly, we find no merit to Appellants' issue raised in Question 9.

E. Appellants' Question 10

Whether the Project as proposed and any permit issued thereunder should contain additional conditions requirements and restrictions necessary to achieve and maintain compliance with the Water Quality Standards as allowed under 10 V.S.A. §1264(e)(1).

Question 10 Findings of Fact

81. The permit for the Project contains all the conditions, requirements, and restrictions necessary to achieve and maintain compliance with the VWQS as allowed under 10 V.S.A.

88. Exh. GMP-JAN-C2 at G-1.

89. *Id.*

90. Exh. GMP-JAN-C21 at 2–6.

§1264(e)(1). This finding is supported by findings 82 through 89, below, and the findings and discussion under Questions 8, above, and 13, below.

82. The Operational Permit includes relevant provisions to ensure continued operation of the stormwater system as designed and modeled. Nelson pf. reb. at 37; exh. GMP-JAN-C21.

83. The Operational Permit includes a condition requiring the permittee to provide a written report that includes an inspection and designer's certification that the Project has been built in compliance with the approved Project design. The certification condition requires the designer to certify that the surfaces are operating according to the design. Exh. GMP-JAN-21 at 7.

84. The Operational Permit imposes maintenance and inspection reporting requirements. The permit requires that the Stormwater collection, treatment and control systems, including the level spreaders and vegetated buffers, be maintained in good operating condition at all times and be inspected annually and cleaned as necessary to maintain design specifications. Exh. GMP-JAN-C21 at 7.

85. The monitoring and oversight on the Project will ensure that if the level spreaders are not performing as designed and not meeting the water quality volume treatment standard, any deficiency will be identified early, and GMP will be required to repair or modify as appropriate the stormwater management systems on site to continue to protect water quality. Exh. GMP-JAN-C21 at 7–8; tr. 7/13/12 at 154 (Burke).

86. The monitoring protocol mandated by the permit is a step-wise evaluation of remedial actions to correct any deficiencies in system performance, including but not limited to replacement of the New Design Alternative STPs with Acceptable STPs. If such a reconstruction were necessary, upon approval of the amendment by DEC, GMP would construct the replacement system. This condition provides assurance that the stormwater treatment practices, as constructed or modified, will perform in a manner that are consistent with VSMM criteria. Nelson pf. (Vol. 2) at 12–13; Nelson pf. reb. at 49.

87. The monitoring locations selected by GMP are consistent with the VSMM. When combined with the conditions in the Operational Permit that require the permittee to inspect and maintain all STPs, the monitoring protocol will ensure that the Project's STPs are functioning as intended. Nelson pf. (Vol. 2) at 11–13; exh. GMP-JAN-C21 at 7–8.

88. It would be technically feasible to install Acceptable STPs on the Project site should one or more of the Alternative STPs require replacement. GMP completed a series of designs for stormwater basins at three selected locations where level spreaders are proposed. In all cases, fully compliant wet ponds could be constructed at these locations, without impacts to wetlands, streams, or buffers, but additional areas of tree clearing and grading would be required, and some additional tree and land clearing beyond currently authorized limits of earth disturbance would be required. Nelson pf. at (Vol. 2) at 11–12; Nelson pf. reb. at 50–52; exh. GMP-JAN-Reb-8.

89. Replacing level spreaders with Acceptable STPs would result in approximately 12 acres of additional earth disturbance. Tr. 7/12/12 at 91 (Nelson).

Question 10 Discussion

Section 1264(e)(1) provides that:

. . . The permit shall contain additional conditions, requirements, and restrictions as the secretary deems necessary to achieve and maintain compliance with the water quality standards, including but not limited to requirements concerning recording, reporting, and monitoring the effects on receiving waters due to operation and maintenance of stormwater management facilities.

Therefore, in conducting a *de novo* review, we may choose to include additional conditions to the Operational Permit where the record shows that the additional conditions are necessary to achieve and maintain compliance with the VWQS.⁹¹ The Appellants have requested that we remand the Operational Permit to ANR for amendment and that any such amended permit shall contain the following provisions:

1. All level spreaders and vegetated buffers on slopes greater than 15% shall be removed and replaced with [A]ccept[able] STPs⁹² listed on Table 2.1 and/or Table 2.2 of the VSMM.
2. For all level spreaders and vegetated buffers not required to be replaced due to slope restrictions, Appellee shall demonstrate compliance with the CP_v performance standard by providing 12 hours of extended detention storage, and may not rely on the Alternative Design Standard unless the credits in Section 3 are

91. While the Vermont Supreme Court has not delineated the limits of the Environmental Court's authority to amend discharge permits, new conditions have been struck down where they were not supported by the record. *In re Entergy Nuclear Vt. Yankee Discharge Permit*, 2009 VT 124, ¶ 55.

92. Section 2 of the VSMM addresses "Acceptable STPs."

being used to achieve disconnection of the applicable impervious surfaces. For purposes of modeling extended detention storage, Appellee shall use a CN value of 96 for all areas of the access road and crane path, and must provide scientific support for the modeling assumptions used to model the flow of water through the vegetated buffer area. Any level spreaders and vegetated buffers that cannot demonstrate compliance with the CP_v performance standard must be replaced with [A]ccept[able] STPs as set forth in Table 2.1 and/or Table 2.2 of the VSMM.

3. In addition to the water quality monitoring locations already proposed, water quality monitoring must be implemented at the actual discharge points identified on Exhibit GMP-JAN-C4, Sheet C-100.⁹³

Turning to the Appellants' proposed conditions 1 and 2, we do not find that the record supports the need for these conditions to achieve and maintain compliance with the VWQS. We address the Appellants' technical critiques of level spreaders in our discussions under Appellants' Question 13. Based on our findings and conclusions thereunder, we determine that the Project's implementation of level spreaders meets the requirements of the VSMM. Therefore, the discharges authorized by the Operational Permit are entitled to a presumption of compliance with the VWQS. Accordingly, the Appellants bear the burden of demonstrating that their proposed conditions are necessary to ensure that the Project complies with the VWQS.

The Appellants contend that we should not allow the "use [of] experimental technology on a high risk site when [A]ccept[able] STPs would be used without additional impacts and would pose a lesser risk to water quality."⁹⁴ We disagree with this characterization of the Project. As a preliminary matter, the VSMM specifically allows for the use of new technologies *via* the review and approval of Alternative STPs.⁹⁵ The Legislature has stated that it is the policy of Vermont to use structural STPs "only when necessary."⁹⁶ While it is true that it would be technically feasible to replace the level spreaders with Acceptable STPs, this change would result in additional environmental impacts—including roughly 12 acres of additional clearing and earth

93. Appellants Brief at 56.

94. Appellants Brief at 54.

95. Burke pf. at 18.

96. 10 V.S.A. § 1264(a).

disturbance.⁹⁷ Further, the record does not show that Acceptable STPs always produce an optimal outcome.⁹⁸ GMP has demonstrated that the level spreaders will meet the applicable treatment standards.⁹⁹ Therefore, the record does not demonstrate that it is necessary to require GMP to replace the proposed level spreaders with Acceptable STPs to ensure compliance with the VWQS.

Turning to the Appellants' third proposed condition, the Appellants argue that the water quality monitoring locations proposed by GMP are inadequate to demonstrate compliance with the VWQS because the monitoring locations are located too far downstream from the actual points of discharge.¹⁰⁰ The Appellants further assert that "limits on temperature, phosphorus, nitrates, settleable solids, color, alkalinity and pH are among the water quality standards that must be achieved in the Project's receiving waters pursuant to the VWQS" and that monitoring for these standards must occur at the discharge locations.¹⁰¹ We find these arguments unpersuasive. GMP's expert testified that the monitoring locations were chosen to avoid areas that might run dry during parts of the year and also to ensure scientifically valid data for monitoring aquatic biota, which is the best indicator of whether the Project's waters are meeting the VWQS.¹⁰² GMP and ANR have both testified that the monitoring requirements are capable of effectively monitoring impacts from the Project across all receiving waters, including upstream impacts.¹⁰³ Finally, Section 2.5.2 of the VSMM requires permittees implementing New Design Alternative Systems to undertake a plan of study to demonstrate that all Alternative

97. Tr. 7/12/12 at 91 (Nelson); Nelson pf. reb. at 52 ("Although no impacts to wetlands, streams or buffers would occur, additional areas of tree clearing and grading would be required, and some additional tree and land clearing beyond currently authorized limits of disturbance would be required. These three examples provide a clear example of the benefits using the alternative level spreader design on the site; the impacts of the level spreader features are smaller than that of traditional systems, and that is part of the reason for proposing such systems here.").

98. See e.g., tr. 7/13/12 at 136 (Burke) (explaining how Acceptable STPs do not always meet the treatment standards for CP_v because of physical limitations.).

99. Our findings and discussion regarding the treatment standards can be found under Question 13.c. and its sub-questions at *infra* pp. 65–87.

100. Appellants Brief at 45.

101. Appellants Brief at 46.

102. Tr. 7/12/12 at 117 (Nelson); Nelson pf. sup. (2/17/12) at 4.

103. Tr. 7/12/12 at 117 (Nelson); tr. 7/13/12 at 148 (Burke).

STPs are achieving the requisite performance standards.¹⁰⁴ Section 2.5.2 of the VSMM does not specify where monitoring stations implemented pursuant to such a plan of study must be located. Accordingly, we conclude that there is an insufficient basis in the record to support the adoption of the Appellants' proposed condition 3.

For these reasons, we find no merit to Appellants' issue raised in Question 10.

F. Appellants' Question 11

Whether the rebuttable presumption identified in 10 V.S.A § 1264(g)(1) is applicable to the Projects as proposed, pursuant to 10 V.S.A. § 1264(h).

Question 11 Discussion

Title 10, Section 1264(g)(1) of the Vermont Statutes Annotated provides:

The secretary may issue a permit consistent with the requirements of subsection (f) of this section, even where a TMDL¹⁰⁵ or wasteload allocation has not been prepared for the receiving water. In any appeal under this chapter an individual permit meeting the requirements of subsection (f) of this section shall have a rebuttable presumption in favor of the permittee that the discharge does not cause or contribute to a violation of the Vermont water quality standards for the receiving waters with respect to the discharge of regulated stormwater runoff. This rebuttable presumption shall only apply to permitted discharges into receiving waters that are principally impaired by sources other than regulated stormwater runoff.

In turn, Section 1264(h) applies the corresponding presumption to discharges into receiving waters that meet the water quality standards of the state, provided that the discharge is subject to a permit that is "consistent with the 2002 stormwater management manual."¹⁰⁶ The Appellants have raised several arguments regarding the Operational Permit's consistency with the VSMM. We address those arguments under Question 13. For the reasons discussed thereunder, we find that the operational stormwater permit complies with the VSMM. Therefore, we conclude that

104. Exh. GMP-JAN-C2 at 2.5.2.

105. Total Maximum Daily Load. A TMDL "is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards." [Water.epa.gov](http://water.epa.gov), Impaired Waters and Total Maximum Daily Loads, <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/index.cfm> (last visited March 7, 2013).

106. 10 V.S.A. § 1264(e)(1).

the presumption contained in Section 1264(h) applies in this case. Accordingly, we find no merit to Appellants' issue raised in Question 11.

G. Appellants' Question 12.a.

Whether the Project as proposed complies with the Vermont Stormwater Management Rule, Chapter 18 of the Environmental Protection Rules, including the following:

a. Whether Applicant failed to completely described [sic] the Project in its application materials such that it needs to submit an additional permit application in order to avoid circumvention of the requirements of the Stormwater Management Rule, as required by § 18-303.

Question 12.a. Findings of Fact

90. GMP completely described the Project in its application materials such that it does not need to submit an additional permit application in order to avoid circumvention of the requirements of the Stormwater Management Rule, as required by § 18-303. This finding is supported by findings 91 through 94, below.

91. The DEC has developed regulations that apply to the management and treatment of operational stormwater runoff. The receiving waters for the Project are not impaired; therefore, the Project is regulated under Vermont Environmental Protection Rules, Chapter 18, which applies to discharges of stormwater runoff to unimpaired waters. Burke pf. at 16; Nelson pf. (Vol. 2) at 3; exh. GMP-JAN-C1.

92. Chapter 18, § 18-306(a)(1) sets the required permitting standards for stormwater discharges from new development of greater than one acre that is associated with the impervious surfaces proposed as part of the wind farm component of the Project. The rule requires that the Project obtain a permit consistent with treatment standards for new development in the VSMM. Burke pf. at 16; Nelson pf. (Vol. 2) at 2–3; exh. GMP-JAN-C2.

93. The Operational Permit regulates the management of stormwater runoff from the impervious surfaces on the Project. Nelson pf. (Vol. 1) at 7.

94. The impervious surfaces associated with the Project are the access road, crane path, crane pads, turbine foundation, the Operations and Maintenance building rooftop, and associated parking areas. Crane pads represent the relatively small areas of the turbine pads within which a

crane will operate to install turbine blades. The remainder of the turbine pads will be constructed using an uncompacted shot rock surface similar to that used for electrical substations, and is therefore not considered impervious. The total impervious area associated with the Project is 27.47 acres. Nelson pf. (Vol. 2) at 6.

Question 12.a. Discussion

Section 18-303 of the Stormwater Management Rule prohibits developers from "separat[ing] a single project into components in order to avoid the regulatory minimum threshold or other requirements of this Rule."¹⁰⁷ The Appellants have not presented evidence demonstrating that GMP has separated any portions of the Project in order to avoid the regulatory minimum threshold for a permit, nor have they directed us to any portion of the Project's impervious surface that requires a new permit application. Further, the Appellants have presented no argument on this issue in their Brief. Because the Operational Permit covers all impervious area constructed at the Project, we conclude that no additional permit application is necessary under § 18-303. Accordingly, we find no merit to Appellants' issue raised in Question 12.a.

H. Appellants' Question 12.b.

Whether the Project as proposed complies with the Vermont Stormwater Management Rule, Chapter 18 of the Environmental Protection Rules, including the following:

...

b. Whether discharges from the Project as proposed are consistent with the treatment standards for new development under the Vermont Stormwater Management Manual, pursuant to § 18-306(a);

107. The primary concern of the rule against circumvention is that developers might build a larger project in small pieces to avoid exceeding the one acre of constructed impervious surface that would trigger the need for a permit.

Question 12.b. Findings of Fact

95. The discharges for the Project are consistent with the Treatment Standards for new development contained in the VSMM. This finding is supported by findings 96 and 97, below, and by our findings and discussion under Questions 13.c.i through 13.c.v., below.

96. The VSMM includes five treatment standards for stormwater discharges from new development: (1) Water Quality ("WQ_v") - a standard that ensures removal of sediment, as measured by total suspended solids, and nutrients, as measured by total phosphorus loads; (2) Channel Protection ("CP_v") - a standard to reduce the potential for instream channel degradation; (3) Groundwater Recharge - a standard to ensure that a certain amount of runoff is infiltrated into native materials; (4) Overbank Flood Protection - a standard to control the post-development peak stormwater runoff discharge rates so that they do not exceed pre-development peak discharge rates during the 10-year, 24-hour storm event; and (5) Extreme Flood Protection - a standard to control the post-development peak stormwater runoff discharge rates so that post-development peak discharge rates do not exceed pre-development peak discharge rates during the 100-year, 24-hour storm event. Nelson pf. (Vol. 2) at 3-4; Burke pf. at 16-17; exh. GMP-JAN-C2 at Table 1.1.

97. The Project implements STPs that are designed to be consistent with all five of the Treatment Standards. Nelson pf. (Vol. 2) at 7-8, 12.

Question 12.b. Discussion

Section 18-306(a) states that all discharges of regulated stormwater must:

. . . obtain an individual permit or coverage under a general permit consistent with the treatment standards for new development in the Vermont Stormwater Management Manual[.]

Question 13.c. and its subparts also ask whether the Project addresses each of the treatment standards set forth in the VSMM. Because many of the Appellants' arguments were framed in terms of the Project's ability to meet the CP_v Standard, we address whether the Project meets each standard individually in our discussion under Question 13.c.

I. Appellants' Question 12.c.

Whether the Project as proposed complies with the Vermont Stormwater Management Rule, Chapter 18 of the Environmental Protection Rules, including the following:

. . .

c. Whether the Project as proposed employs best management practices to control regulated stormwater runoff, pursuant to § 18-306(b); and

Question 12.c. Findings of Fact

98. The Project, as proposed, employs BMPS to control regulated stormwater runoff, pursuant to § 18-306(b). This finding is supported by the findings under Question 9, above.

Question 12.c. Discussion

Section 18-306(b) of the Vermont Stormwater Management Rule states that:

Any individual or general permit issued for discharges of regulated stormwater runoff to waters that are not stormwater-impaired waters shall specify the use of best management practices to control regulated stormwater runoff. Permit compliance shall be judged on the basis of performance of the terms and conditions of the discharge permit, including construction and maintenance in accordance with BMP specifications.

The VSMM defines "Best Management Practices" as:

A schedule of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce water pollution, including but not limited to the stormwater treatment practices (STPs) set forth in this Manual.¹⁰⁸

The broad definition of BMPs contained in the VSMM indicates that any effort to reduce or prevent pollution would qualify as a BMP—even if it is not set forth in the VSMM.¹⁰⁹ The Operational Permit contains a schedule of permitted discharges, each with a description of the STPs designed to treat and control the runoff from the Project.¹¹⁰ Under the broad definition contained in the VSMM, these measures constitute BMPs.

The core of the issue raised by the Appellants is whether the BMPs specified in the Operational Permit are consistent with the VSMM and sufficient to protect water quality, and not

108. Exh. GMP-JAN-C2 at G-1.

109. *Id.*

110. Exh. GMP-JAN-C21 at 2–6.

whether they qualify as BMPs generally. The Appellants' Question 13 better frames the Appellants' position that the Project's STPs do not meet the applicable regulatory requirements. Therefore, we address those arguments under that question. Because we are not persuaded by the Appellants' specific arguments raised under Question 13, and because we find that the Project's STPs comply with the requirement of the VSMM, we conclude that the Operational Permit does specify the use of best management practices, as required by Section 18-306(b). Accordingly, we find no merit to Appellants' issue raised under Question 12.c.

J. Appellants' Question 12.d.

Whether the Project as proposed complies with the Vermont Stormwater Management Rule, Chapter 18 of the Environmental Protection Rules, including the following:

...

d. Whether discharges from the Project as proposed will achieve and maintain compliance with Vermont Water Quality Standards, pursuant to § 18-306(c);

Question 12.d. Findings of Fact

99. The discharges from the Project will achieve and maintain compliance with the VWQS. This finding is supported by finding 100, below, and our findings under Question 13 and its sub-questions, below.

100. The Project will protect water quality and ensure compliance with the VWQS due to the number and type of STPs in the design, the monitoring and reporting requirements contained in the Operational Permit, and the comprehensiveness of the requirements of the VSMM. Nelson pf. (Vol. 2) at 14.

Question 12.d. Discussion

Section 18-306(c) of the Vermont Stormwater Management Rule states that:

Any individual or general permit issued for discharges of regulated stormwater runoff to waters that are not stormwater-impaired waters shall contain such additional conditions, requirements, and restrictions as the Secretary deems necessary to achieve and maintain compliance with Vermont water quality standards.

Essentially, the Appellants raise three arguments in support of their position that the Project does not comply with the VWQS. First, the Appellants argue that the Project's use of level spreaders does not comply with the applicable requirements of the VSMM. Second, the Appellants contend that the design of the level spreaders is flawed and that the level spreaders and forested buffers will not function as intended. Third, the Appellants argue that even if the Project's level spreaders are permitted, GMP's hydrologic model underestimates the volume of runoff that will be generated by the Project and thus fails to demonstrate that the level spreaders will meet the applicable treatment standards. We address each of the Appellants' arguments in detail under Question 13, which specifically raise those arguments.

In our findings and discussion under Question 13 and its sub-questions, we conclude that the Operational Permit is consistent with the VSMM. Additionally, for the reasons discussed under Question 10, we do not accept the Appellants' proposed conditions because we do not find that they are necessary to achieve and maintain compliance with the VWQS. Accordingly, the Operational Permit is entitled to a presumption of compliance with the VWQS.¹¹¹ The Appellants have failed to present persuasive evidence to overcome this presumption. Therefore, we find that GMP has demonstrated that the Project will achieve and maintain compliance with the VWQS as required by § 18-306(c). Accordingly, we find no merit to Appellants' issue raised in Question 12.d.

K. Appellants' Question 13.a.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

a. Whether Applicant's proposed use of level spreaders as an Alternative STP design, notwithstanding that the Project does not qualify to use the Watershed Hydrology Protection Credit set forth in Section 3.7 of the Vermont Stormwater Management Manual, complies with the requirements of the Vermont Stormwater Management Manual.

¹¹¹. 10 V.S.A. § 1264(h).

Question 13.a. Findings

101. The proposed use of level spreaders as an Alternative STP design, notwithstanding that the Project does not qualify to use the Watershed Hydrology Protection Credit set forth in Section 3.7 of the VSMM, complies with the requirements of the VSMM. This finding is supported by findings 102 through 120, below.

102. The stormwater treatment field is rapidly evolving and new stormwater management technologies and approaches are constantly emerging. The VSMM anticipates and encourages the use of new stormwater treatment designs through the Alternative STP Designs Standard of Section 2.5 of the VSMM. Burke pf. at 18; exh. GMP-JAN-C2 at 2.5; tr. 7/13/12 at 141-142 (Burke).

103. The VSMM identifies two categories of Alternative STPs: Existing Alternative Systems of Section 2.5.1; and the New Design Alternative Systems of Section 2.5.2. The permittee may make use of the Alternative STPs as long as the permittee can demonstrate that they will meet the five Treatment Standards and that the STPs will achieve long-term performance in the field. Nelson pf. (Vol. 2) at 5; Burke pf. at 18; exh. GMP-JAN-C2 at 2.5.1-2.5.2.

104. Section 3.7 of the VSMM provides a voluntary credit called the Watershed Hydrology Protection Credit ("WHPC") that may be used for high-elevation renewable energy projects. The Project does not rely upon the WHPC to meet the applicable stormwater treatment standards as set forth in the VSMM. Nelson pf. (Vol. 2) at 13; Burke pf. reb. at 9; exh. GMPJAN-C1 at 40.

105. The level spreaders and vegetated buffers for the Project were designed based on the HydroCAD modeling. The modeling provides a breakdown of performance aspects of the level spreaders, including an analysis of the peak flow rates and velocities for each of the level spreaders associated with the Project. Nelson pf. reb. at 23; exh. GMP-JAN-Reb-1.

106. The Project level spreaders were designed consistent with the technical criteria developed by DEC for level spreaders provided in the WHPC: (1) limiting the source of runoff that is directed to level spreaders to road surface, shoulder, ditch, and ditch back slope runoff; (2) limiting the peak flow rate of stormwater to 0.25 cubic feet per second ("cfs") per foot of level spreader lip during the ten-year design storm; (3) constructing stone berms across contours, with a minimum dimension of 1 foot high and 2 feet wide at top, with 2:1 side slopes, using

well-graded stone of median size 3 inches and a maximum size 6 inches; and (4) establishing vegetative buffers of 150 feet in forested conditions outside of wetlands, and limiting buffer slopes to grades of less than 30%. Nelson pf. reb. at 18-20.

107. The Project's level spreaders are consistent with the VSMM requirements for New Design Alternative STPs and the Treatment Standards. The level spreaders were designed using conservative sizing criteria, which means that each structure is oversized for the amount of runoff that will be reaching it. According to analyses of the discharges, the level spreaders and vegetated buffers will perform in a manner such that the stormwater released from the level spreaders will meet the Treatment Standards. Nelson pf. (Vol. 2) at 12; exhs. GMP-JAN-C3 at 10-11; and GMP-JAN-C5-C20.

108. The inlet channels for the Project level spreaders have been designed with an appropriate geometry and sufficient capacity to convey the flows to the level spreaders in an acceptable and controlled manner. The inlet channels are all stone-lined, which allows for slowing the flow of water, even on steeper slopes. Nelson pf. reb. at 20-21; tr. 7/11/12 at 182-185 (Nelson).

109. The vegetative buffers for the Project reflect the modeling assumptions by including areas that: (1) limit slopes to grades under 30%; (2) avoid water resources (streams, wetlands, and associated buffers); (3) are predominantly undisturbed and naturally vegetated, or have minimal disturbance; and (4) contain soils described as moderately well drained or better, with moderate or faster permeability rates. Nelson pf. reb. at 24; GMP-JAN-Reb-2.

110. The HydroCAD modeling included a roughness coefficient to reflect the wooded conditions that will occur in the Project vegetative buffers. Nelson pf. reb. at 23.

111. The WHPC limits the loading rates of level spreaders to 0.25 cfs/foot for a 10-year storm. This standard is in part designed to ensure that the velocity of water leaving a level spreader will not reach or exceed erosive thresholds of underlying ground cover. Nelson pf. reb. at 26.

112. The design of the Project's level spreaders significantly limits the velocity of water leaving the level spreaders by limiting the hydrologic loading of the level spreaders to less than 0.25 cfs per foot of level spreader during a 10-year storm, and substantially less during more

common lesser-magnitude storms which are considered design storms for water quality purposes. Nelson pf. reb. at 21–22.

113. The HydroCAD modeling for the Project indicate that the loading rate values for the Project level spreaders range from 0.007 cfs/foot to 0.162 cfs/foot for a 10-year storm, which are more conservative than the 0.25 cfs/foot criterion contained in the WHPC. Nelson pf. reb. at 27; exh. GMP-JAN-Reb-1.

114. The generally accepted erosive velocity thresholds for forest cover are in the range of 2-feet per second. The predicted peak velocity values for the sheet flow areas within the vegetative buffers calculated from the Project level spreaders range from 0.03 feet per second to 0.18 feet per second, which are uniformly below all established erosive velocity thresholds for forest or meadow-types of ground cover. Nelson pf. reb. at 27.

115. Low peak velocity is an important factor in terms of maintaining sheet flow when water leaves the level spreaders. At such low volumes and speeds, the water exiting the level spreaders will remain appropriately distributed across the natural topography of the vegetative buffer, where depressions and variations will provide opportunity for infiltration. Nelson pf. reb. at 21–22.

116. The Project level spreaders are designed with sufficient length to discharge water with a minimal depth and rate of flow, which will allow for overland flow of the discharged water. The lengths of level spreaders for the Project exceed the 150-foot length criterion approved by DEC in Section 2.3.7.1 of the WHPC. This conservative design feature will ensure that the flows will be well-distributed across the length of the level spreaders, with minimal depths and velocities as they leave the level spreader lips. Nelson pf. reb. at 22; Burke pf. reb. at 12.

117. The forested terrain below the Project level spreaders, which is devoid of streams and wetlands, will allow infiltration, temporary pooling, and vegetative uptake to occur. Pollutant removal processes such as infiltration, absorption, and deposition will also occur. Nelson pf. reb. at 22.

118. There is considerable distance between the downslope limit of all of the Project vegetative buffer areas and any receiving waters, in some cases as much as an additional 900 feet

of additional forest cover between the end of the 150-foot vegetative buffer and any receiving waters. Nelson pf. reb. at 25-26; exh. GMP-JAN-Reb-1.

119. The stone lip design of the Project level spreader allows for maintenance to be done as needed to ensure consistent performance. The stone lip design of the Project level spreaders will be easier to repair than a concrete or wooden lip design. For example, a level spreader with a wooden or concrete lip would likely fail due to cold climate issues with the freeze/thaw cycle or differential settlement of the lip, resulting in it not being level, or cracking or breaking the concrete or wooden structural features. Nelson pf. reb. at 19-20; tr. 7/13/12 at 157 (Burke).

120. The Operational Permit contains inspection and maintenance requirements that will ensure that the level spreaders achieve long-term performance. Exh. GMP-JAN-C21 at 7-8.

Question 13.a. Discussion

Generally, the VSMM requires that an applicant protect receiving waters by implementing STPs that will meet the five Treatment Standards.¹¹² Certain STPs have "established pollutant removal efficiencies," and thus, are recognized as "Acceptable STPs" in the VSMM.¹¹³ The VSMM also recognizes, however, that the "stormwater treatment field is rapidly evolving."¹¹⁴ Thus, in order to allow new technologies to emerge, the VSMM permits applicants to use "Alternative STP Designs," where the applicant can demonstrate to ANR's satisfaction that the proposed Alternative STP will attain the applicable Treatment Standards.¹¹⁵ In this case, GMP has chosen to use level spreaders, which are not presently classified as Acceptable STPs in the VSMM.¹¹⁶ Therefore, the question before us is whether the Project's level spreaders are consistent with the VSMM's requirements for Alternative STP Designs.¹¹⁷

Section 2.5 of the VSMM sets forth the relevant standards for Alternative STPs. Within this section, there are two options by which a proposed STP may qualify as an Alternative STP

112. Exh. GMP-JAN-C2 at 1.0 to 1.1, 2.0.

113. Tr. 7/13/12 at 103 (Burke); exh. GMP-JAN-C2 at 2.1.

114. Exh. GMP-JAN-C2 at 2.5.

115. *Id.*

116. Tr. 7/13/12 at 103 (Burke).

117. See 10 V.S.A § 1264(e)(1) (requiring that permits for discharges of stormwater be "consistent" with the VSMM); Vt. Admin. Code 16-3-505:18-306.

Design: first, either as an Existing Alternative System or, second, as a New Design Alternative System.¹¹⁸ In this case, GMP has proposed the use of level spreaders as a New Design Alternative System under Section 2.5.2 of the VSMM which provides that:

The performance standard for STPs shall meet the applicable treatment standards specified in section 1.1, and shall have the capability to achieve long-term performance in the field. For an alternative STP to be submitted to the Agency for consideration, a designer's certification of compliance, including pertinent design information must be provided. This certification must provide details, with a reasonable level of surety, on how the system will achieve the requisite performance standards.¹¹⁹

In addition, the applicant is required to implement a plan of study to monitor the performance of the Alternative STP.¹²⁰ In the event ANR determines that the Alternative STP is failing to meet the treatment standards, the applicant must modify the Alternative STP to correct the deficiency within a reasonable time or replace the failing Alternative STPs with Acceptable STPs.¹²¹

As an initial matter, the fact that the Project does not qualify for the WHPC is not dispositive of whether the Project's use of level spreaders satisfies the requirements of the VSMM for Alternative STPs. There is no requirement in the VSMM that Alternative STPs implement the WHPC. The WHPC is a strictly voluntary credit.¹²² Development that qualifies for the WHPC is deemed to satisfy several of the Treatment Standards.¹²³ On the other hand, development electing to implement Alternative STPs must address the Treatment Standards. That said, the WHPC does contain design parameters for ridgeline wind projects and level spreaders. The fact that the Project substantially complies with, and in some ways, exceeds the

118. Exh. GMP-JAN-C2 at 2.5-2.5.2.

119. Exh. GMP-JAN-C2 at 2.5.2.

120. *Id.* The plan of study must meet seven criteria: (1) at least five storm events must be sampled; (2) storm events must be sampled under a varying and representative range of precipitation intensities and antecedent conditions; (3) concentrations reported in the study must be flow-weighted; (4) the study and/or design may be independently verified by the Agency; (5) the study must be conducted in the field, as opposed to laboratory testing; (6) the practice must have been in the ground for at least one year at the time of monitoring; and (7) the study must be completed within three years of construction.

121. *Id.*

122. Exh. GMP-JAN-C1 at 40.

123. *Id.*

criteria contained in the WHPC is relevant to our examination of whether the Project meets the requirements for Alternative STPs contained in Section 2.5.2 of the VSMM.¹²⁴

The Appellants contend that there are four key elements in the approval of New Design Alternative Systems, and that the Project fails to satisfy these elements.¹²⁵ First, the Appellants insist that GMP has failed to demonstrate that the level spreaders have the capability to achieve long-term performance in the field. In support of this argument, the Appellants assert that the Project's "experimental" use of level spreaders is against the weight of guidance from other jurisdictions and that the level spreaders are improperly designed.¹²⁶ Second, the Appellants argue that GMP's design certification is inadequate, and thus, fails to provide "a reasonable level of surety on how the system will achieve the requisite performance standards."¹²⁷ Third, the Appellants maintain that GMP has failed to demonstrate that level spreaders can meet the applicable treatment standards, including the Channel Protection Treatment Standard, contained in the VSMM.¹²⁸ Fourth, Appellants argue that GMP's proposed plan of study is flawed and will fail to demonstrate that the level spreaders are meeting the treatment standards because the water quality monitoring stations are improperly located too far downstream from the points of discharge.¹²⁹

Turning to the Appellants' first issue concerning the long-term performance capability of the level spreaders, we reject the Appellants' argument that GMP has failed to demonstrate that the level spreaders will perform adequately in the field for an extended period of time. Although the proposed use of level spreaders is inconsistent with guidance from other jurisdictions, we do not find this point to be persuasive evidence on this issue. The VSMM contemplates the use of emerging technologies even when there are no instances of those technologies being

124. The wording of Appellants' Question 13.a. suggests that the Appellants think that the Project must implement the WHPC to properly qualify as an Alternative STP. This issue is distinct from the Appellants' contention that the Project must implement the credits found in Section 3 of the VSMM in order to satisfy the Alternative Design Standard with respect to CP_v. We address this distinct argument regarding CP_v below under Question 13.c.ii.

125. Appellants Brief at 33.

126. Appellants Brief at 53.

127. Appellants Brief at 34.

128. Appellants Brief at 38, 53.

129. Appellants Brief at 45.

implemented in similar situations.¹³⁰ Accordingly, it is not surprising that GMP's proposal for level spreaders as a New Design Alternative System would not comply with the majority of other states' stormwater manuals because no other jurisdiction has ever permitted this application of level spreaders before. While the Appellants may be correct to characterize this application as "experimental," we find that the level spreaders exemplify the type of technologic innovation that the New Design Alternative Systems provision in the VSMM is intended to allow.¹³¹

Turning next to the Appellants' criticisms of the level spreaders' design, the Appellants' primary concern is that the grade of the forested buffers is too steep to prevent erosion and the reconcentration of stormwater runoff.¹³² However, GMP has presented persuasive evidence that the Project's level spreaders are conservatively designed to function on steeper slopes.¹³³ As a result of the conservative design, water will enter and discharge from the level spreaders at a significantly lower rate than the standard set forth in the WHPC, thus justifying the Project's departure from other design requirements that would be otherwise necessary if the Project implemented the credit.¹³⁴ This evidence supports our conclusion that GMP has demonstrated that the level spreaders will achieve long-term performance and also provides surety that level spreaders will meet the applicable treatment standards.

The Appellants also contend the topography of the vegetated buffers will not facilitate sheet-flow as predicted by GMP's hydrologic model.¹³⁵ We find these arguments unpersuasive. GMP selected buffer areas that reflected their modeling assumptions by limiting slopes to grades under 30% and avoiding existing stream channels.¹³⁶ GMP's model also included a roughness coefficient to account for wooded conditions in the buffer.¹³⁷ Finally, GMP conservatively sized

130. Exh. GMP-JAN-C2 at 2.5.

131. Finding 102, above; tr. 7/13/12 at 141 (Burke) (explaining that the purpose of Alternative STPs is to try new technologies).

132. Appellants Brief at 35–36.

133. Nelson pf. reb. 21; exh. GMP JAN-Reb-1.

134. Nelson pf. reb. at 27; exh. GMP-JAN-Reb-1.

135. Appellants Brief at 36.

136. Nelson pf. reb. at 23–24.

137. Nelson pf. reb. at 23.

the level spreaders to control the volume of water discharging from the level spreaders to prevent erosive forces in the forested buffers.¹³⁸

We are similarly unpersuaded by the Appellants' argument that the lip of the level spreaders will not allow sheet flow.¹³⁹ The design length of the level spreaders exceeds the parameters for level spreaders approved by ANR, which will result in a low volume of water flowing over the level lip, thereby protecting the level spreader from erosive forces.¹⁴⁰ Additionally, the stone lip design of the level spreaders will be easier to repair than the concrete or wooden lip design preferred by the Appellants.¹⁴¹

Moreover, the Operational Permit itself contains additional mechanisms to assure the performance of the level spreaders in the long term, including stringent maintenance, inspection, and monitoring requirements.¹⁴² The Operational Permit requires annual inspections and requires that all level spreaders be "maintained in good operating condition" and "cleaned as necessary."¹⁴³ Thus, for the reasons stated above, we conclude that GMP has demonstrated that the level spreaders will have the capability to achieve long-term performance in the field.

We further conclude that the Project satisfies the three other key elements for New Design Alternative Systems set forth in Section 2.5.2 of the VSMM. For the reasons discussed under Question 10, we conclude that the Project's plan of study is consistent with the relevant standards contained in the VSMM and is sufficient to ensure that the level spreaders are meeting the Treatment Standards. For the reasons discussed under Question 13.b., we conclude that GMP has provided the required design certification. Finally, for the reasons discussed under Question 13.c., we conclude that GMP has demonstrated that the Project's level spreaders will meet the applicable treatment standards. Accordingly, we conclude that the Operational Permit implements Alternative STPs in a manner consistent with Section 2.5.5 of the VSMM. Therefore, we find no merit to Appellants' issue raised in Question 13.a.

138. Nelson pf. reb. at 21-27; exh. GMP-JAN-Reb-1.

139. Appellants Brief at 37.

140. Nelson pf. reb. at 22.

141. Tr. 7/13/12 at 157 (Burke).

142. Exh. GMP-JAN-C21 at 7.

143. Exh. GMP-JAN-C21 at 7-8.

L. Appellants' Question 13.b.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

b. Whether the application, as submitted, supplies the details, required in sections 2.5 and 2.5.2 of the Vermont Stormwater Management Manual, necessary to provide a reasonable level of surety that the level spreaders and "rock sandwiches" will achieve the requisite performance standards.

Question 13.b. Findings of Fact

121. The Operational Permit application, as submitted, supplies the necessary details, required in sections 2.5 and 2.5.2 of the VSMM, necessary to provide a reasonable level of surety that the level spreaders and "rock sandwiches"¹⁴⁴ will achieve the requisite performance standards. This finding is supported by findings 122 through 125, below.

122. The Operational Permit application contains sufficient detail to provide reasonable surety that the Alternative STPs will perform as intended and are consistent with the required Treatment Standards. Nelson pf. (Vol. 2) at 12; exhs. GMP-JAN-C10 and GMP-JAN-C3.

123. The Operational Permit application contained a memorandum, dated September 20, 2010, which outlines the technical justification for using level spreaders to meet the Treatment Standards. GMP's application includes a hydrologic model that estimates the runoff from the Project and demonstrates that the Project's level spreaders will meet the applicable Treatment Standards. Exhs. GMP-JAN-C8, C9, and C10.

124. GMP submitted a certification with its Operational Permit application stating that all design-related materials submitted with the application were true and accurate in the designer's reasonable professional judgment. The certification further states that the Project complies with the VSMM. Exh. GMP-JAN-C3 at 4-5.

125. GMP has evaluated all five of the Treatment Standards for each individual discharge point to waters of the state. Exh. GMP-JAN-C5 provides a summary of the STP design

144. A rock sandwich is a stormwater drainage feature used in lieu of a culvert to convey water under a road-way. The Appellants' Brief does not address rock sandwiches. Further, rock sandwiches are not employed at the Project as an Alternative STP and hence, need not meet the requirements of VSMM Sections 2.5 and 2.5.2. Therefore, we do not address this issue further.

associated with each discharge point that will provide compliance with the Treatment Standards. Compliance with the VSMM criteria would be provided through the use of 31 level spreaders, 4 dry ponds, 16 wet ponds, 1 infiltration basin and 6 grassed channels. These proposed systems will provide adequate treatment and control from stormwater runoff from impervious surfaces, as displayed in the application materials submitted. Nelson pf. (Vol. 2) at 7–8.

Question 13.b. Discussion

Pursuant to Section 2.5.2 of the VSMM:

[A] designer's certification of compliance, including pertinent design information, must be provided. This certification must provide details, with a reasonable level of surety, on how the system will achieve the requisite performance standards.

The Appellants' contention that GMP's certification is defective because it lacks the required details is without merit.¹⁴⁵ GMP's certification includes a narrative and appendices that outline the technical justification for the use of level spreaders, including how the level spreaders will meet the treatment standards.¹⁴⁶ Further, GMP's application includes a hydrologic model that estimates the runoff from the Project and demonstrates that the Project's level spreaders will meet the applicable Treatment Standards.¹⁴⁷ These materials demonstrate a thorough analysis of the performance of the level spreaders and provide reasonable surety that the level spreaders will meet the applicable Treatment Standards. While the Appellants have challenged the assumptions underlying GMP's analyses, for the reasons discussed under Question 13.c.ii., we are not persuaded by their arguments. Therefore, we conclude that GMP's application supplies the details required by Section 2.5.2 of the VSMM.

The Appellants' contention that GMP's certification is defective or less reliable because it is based on a generic form is similarly without merit. The certification states that "the design-related information with the application for permit coverage . . . is, in the exercise of my reasonable professional judgement, true, accurate and complete."¹⁴⁸ We interpret this statement to mean that *all* material relating to the design of STPs submitted in conjunction with the

145. Appellants Brief at 34.

146. Exhs. GMP-JAN-C3 and C6–C10.

147. See e.g., exh. GMP-JAN-C8 (outlining Channel Protection Volume calculations).

148. Exh. GMP-JAN-C3.

application, including the September 20, 2010, memorandum cited by the Appellants, are covered by the designer's certification.

Moreover, even if any of the materials submitted by GMP are lacking the required certification, such error is harmless. GMP has demonstrated that the materials submitted in conjunction with its application and this appeal are credible and based on sound professional judgment. Thus, based on these materials and their expert testimony, we conclude that GMP has established, with a reasonable level of surety that the level spreaders will achieve the requisite performance standards. The Appellants' have not shown any harm from any of the alleged administrative defects in the certification submitted by GMP. Accordingly, we conclude that GMP's application supplies the details required in sections 2.5 and 2.5.2 of the VSMM. Therefore, we find no merit to Appellants' issue raised in Question 13.b.

M. Appellants' Question 13.c.i.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

...

c. Whether discharges from the Project as proposed will comply with the treatment standards for new development set forth in the Vermont Storm water Management Manual, as required by § 18-306 of the Vermont Stormwater Management Rule, including the following:

i. The Water Quality Treatment Standard, Section 1.1.1 of the Vermont Stormwater Management Manual;

Question 13.c.i. Findings of Fact

126. The discharges from the Project, as proposed, will comply with the Water Quality Treatment Standard, Section 1.1.1 of the VSMM, as required by § 18-306 of the Vermont Stormwater Management Rule. This finding is supported by finding 127, below.

127. GMP's application includes worksheets outlining how the Project meets the Water Quality Treatment Standard. Exh. GMP-JAN-C13.

Question 13.c.i. Discussion

The VSMM states that the "objective of the [Water Quality Treatment Standard] is to capture 90 percent of the annual storm events, and to remove 80 percent of the average annual

post development total suspended solids load (TSS), and 40 percent of the total phosphorus (TS) load."¹⁴⁹ Normally, this objective is met through the use of an "Acceptable STP" which is sized according to an equation used to determine the "water quality storage Volume" or "WQ_v."¹⁵⁰ The WQ_v is the volume of water, in acre-feet, that an STP must control to achieve the standard.

The Appellants' Brief does not address whether the Project meets this standard. To the extent the Appellants argue that the Project does not satisfy the requirements for New Design Alternative Systems contained in the VSMM and, therefore, does not provide reasonable surety that the Project will meet the applicable treatment standards, we address these arguments under Questions 13.a. and b., above.

GMP has produced technical analyses demonstrating that the STPs employed at the site meet the Water Quality Treatment Standard contained in the VSMM.¹⁵¹ Further, in a memorandum dated September 20, 2010, the Project's designer, Venasse Hangen Brustlin, Inc., outlined the technical basis for the use of level spreaders to ensure that the Water Quality Treatment Standard was met.¹⁵² The technical basis supporting the use of level spreaders included collaboration with State officials from Maine where similar practices are being developed.¹⁵³ As discussed in detail under Questions 13.a., d., and e., we are not persuaded by the Appellants' arguments that the level spreaders employed at the Project are improperly designed and based on faulty modeling assumptions. Thus, we find no basis to conclude that the discharges from the Project will violate the Water Quality Treatment Standard. Accordingly, we find no merit to Appellants' issue raised in Question 13.c.i.

N. Appellants' Question 13.c.ii.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

...

149. Exh. GMP-JAN-C2 at 1.1.1.

150. *Id.*

151. *See* exh. GMP-JAN-C7 (showing how each receiving water was treated by a specific STP); exhs. GMP-JAN-C13, C14, C16, C19 (containing WQ_v analyses for individual STPs).

152. Exh. GMP-JAN-C10 at 4.

153. *Id.*

c. Whether discharges from the Project as proposed will comply with the treatment standards for new development set forth in the Vermont Stormwater Management Manual, as required by § 18-306 of the Vermont Stormwater Management Rule, including the following:

...

ii. The Channel Protection Treatment Standard, Section 1.1.2 of the Vermont Stormwater Management Manual;

Question 13.c.ii. Findings of Fact

128. The discharges from the Project, as proposed, are consistent with the Channel Protection Treatment Standard, Section 1.1.2 of the Vermont Stormwater Management Manual, as required by § 18-306 of the Vermont Stormwater Management Rule and 10 V.S.A. § 1264(e)(1). This finding is supported by findings 129 through 136, below.

129. The Channel Protection Treatment Standard protects receiving waters from excessive scour due to high flows. This is typically accomplished by capturing stormwater runoff from the one-year 24-hour storm event and providing 12 to 24 hours of extended detention. If a stormwater discharge is to a coldwater fish habitat, 12 hours of extended detention is required and if a stormwater discharge is to a warmwater fish habitat, 24 hours of extended detention is required. GMP. Exh. GMP-JAN-C2 at 1.1.2.

130. Under the standard established in the VSMM, site designers only need to provide the detention time provided by the one-inch minimum-sized orifice. Some drainage areas on a project may in fact provide less than 12-hours of extended detention, if the outlet structure design has been reduced to the one-inch orifice. Burke pf. reb. at 10-11.

131. The term "disconnection" refers to directing runoff to pervious areas so that the runoff either infiltrates into the ground or is filtered, as opposed to being discharged as concentrated flow. Exh. GMP-JAN-C2 at 3.3.

132. For projects that have disconnected a majority of impervious surfaces, the VSMM provides for an Alternative Design Standard for the CP_v Standard. Burke pf. reb. at 10-11; tr. 7/13/12 at 137 (Burke).

133. To meet the Alternative Design Standard a designer must ensure the post development peak discharge from the disconnected portion of the site is no greater than the peak discharge

from that same portion of the site modeled as if 12 hours of detention were provided. Burke pf. reb. at 10; tr. 7/13/12 at 144 (Burke); exh. GMP-JAN-C2 at 1.1.2.

134. Compliance with the CP_v Standard is evaluated at a point along the receiving water(s). In selecting this compliance evaluation point the designer may consider the amount of contributing impervious area to the receiving water(s) and/or the pre-routed post-development peak discharge from the site to the receiving water. The Alternative Design Standard for Channel Protection was evaluated at a downstream confluence for the Project. Burke pf. reb. at 10.

135. During the permit application review for the Project, GMP worked with DEC to determine a set of 17 analysis points for CP_v compliance. Each of these analysis points represents a discharge point, or a series of discharge points, located based on the existing receiving stream network, where the total proposed upslope impervious area would exceed one acre. Nelson pf. reb. at 46, 48; exh. GMP-JAN-C8.

136. Given that most of the Project's impervious surfaces are disconnected through the use of the level spreader/vegetative buffer systems, GMP used the Alternative Design Standard of VSMM Section 1.1.2 to evaluate whether there would be increases in peak discharge for the 1-year design storm between pre- and post-development conditions. Nelson pf. reb. at 46; exh. GMP-JAN-C8; Burke pf. reb. at 9-10; tr. 7/13/12 at 111, 142-149, 165 (Burke).

137. Under the alternative design standard in VSMM Section 1.1.2., the designer sets up a "test scenario" in HydroCAD which includes hypothetical ponds (in place of the actually proposed STPs which accomplish the disconnection of runoff) to compare against the results for the proposed suite of STPs. The test scenario model is then run using the standard approaches for HydroCAD evaluation, as well as the VSMM directives and guidance. Nelson pf. reb. at 47.

Question 13.c.ii. Discussion

Title 10 Section 1264(e)(1) requires that all stormwater discharge permits be, at a minimum, "consistent with the 2002 stormwater management manual." Further, the Vermont

Stormwater Management Rule states that "new development . . . must obtain an individual permit . . . consistent with the treatment standards for new development in the VSMM."¹⁵⁴

The CP_v standard is characterized as a "quantity control" in the VSMM, meaning that the goal of the CP_v standard is to control a certain volume of water to diminish the erosive force of stormwater runoff.¹⁵⁵ Generally, STPs that provide 12 to 24 hours of extended detention meet the CP_v standard for new development.¹⁵⁶ The purpose of detaining runoff is to mitigate the deleterious effects of a large volume of runoff entering a stream in a short time period.¹⁵⁷ By detaining the water in an STP, the water is released more gradually, and thus, with less impact to the receiving waters. The only express exception to the extended detention requirement is set forth in Section 1.1.2 of the VSMM:

For projects that have disconnected the majority of impervious surfaces per use of the credits in Section 3 such that routing to a detention facility is not achieved, the designer may use an alternative design standard. In these cases, the designer shall demonstrate that the post-developed peak discharge from the disconnected portion of the site for the one-year storm is no greater than the peak discharge from the same portion of the site as modeled as if 12-hour detention were provided.¹⁵⁸

The purpose of this exception, which is referred to as the "Alternative Design Standard," is to encourage project designers to route runoff to non-structural BMPs, such as forested buffers, that treat or control runoff in a manner that better mimics natural hydrologic processes, as opposed to routing runoff to large structural STPs, such as retention ponds, that provide extended detention.¹⁵⁹ This approach, which ANR has referred to as "lower impact development," seeks to maintain existing hydrologic systems and to minimize the constructed footprint of the STPs which are necessary to protect water quality.¹⁶⁰ In recognition of these principles, the Legislature has stated that it is the goal of Vermont to "rely on structural treatment only when necessary."¹⁶¹

154. Vt. Admin. Code 16-3-505:18-306.

155. Exh. GMP-JAN-C2 at 1.0.

156. *Id.* at 1.1.2.

157. *Id.*

158. *Id.*

159. Tr. 7/13/12 at 142-144 (Burke).

160. Tr. 7/13/12 at 142-144 (Burke).

161. 10 V.S.A. § 1264(a).

Still, neither approach, whether meeting the CP_v standard via a structural STP providing extended detention or low-impact development, is a perfect solution to stormwater pollution. STPs that provide extended detention, which essentially act like bathtubs, cannot always hold a volume of water for the required 12 or 24 hours because to do so would require an extremely small outlet orifice which would be subject to clogging.¹⁶² As a result, the VSMM recognizes that the minimum detention time required for an STP design is limited to the detention time provided by the one-inch minimum orifice.¹⁶³ Further, structural STPs like ponds require considerable earth disturbance to construct, which is an environmental impact that is additional to the stormwater generated by the Project.¹⁶⁴

Similarly, the low-impact approach to development has its limitations as well. Stormwater management is a "rapidly evolving" field and many of the STPs associated with low-impact development are new and less proven, whereas detention ponds have known pollutant removal efficiencies.¹⁶⁵ Accordingly, the VSMM contains treatment standards, including CP_v , that can be met through structural STPs that provide detention, and the VSMM also contains the Alternative Design Standard, the purpose of which is to provide "some assurance that CP_v will be met" while "meeting the goal of trying to . . . maintain hydrology."¹⁶⁶

The Appellants argue that Section 1.1.2 of the VSMM restricts the circumstances under which the Alternative Design Standard may be applied. The Appellants contend that the Alternative Design Standard is an option that is *exclusively* available "[f]or projects that have disconnected the majority of impervious surfaces per use of the credits in Section 3 such that routing to a detention facility is not achieved."¹⁶⁷ Therefore, the question before us is whether ANR erred by interpreting the VSMM to allow the Project to apply the Alternative Design

162. Sometimes due to the minimum orifice requirement, structural STPs may only provide as little as 20 minutes of detention for smaller storms. Exh. GMP-JAN-C2 at 1.1.2 ("Site designers only need to provide the detention time provided by the one-inch minimum orifice size."). See tr. 7/13/12 at 135–136 (Burke).

163. Exh. GMP-JAN-C2 at 1.1.2.

164. In testimony, ANR's expert stated that the design for the Project was informed by ANR's experience with the Sheffield Wind Project. In that case, ANR approved traditional detention ponds which, while working adequately to control stormwater, were large and were in of themselves, significant impacts to the mountain. Tr. 7/13/12 at 155 (Burke).

165. Exh. GMP-JAN-C2 at 2.5; tr. 7/13/12 at (Burke).

166. Tr. 7/13/12 at 144–145 (Burke).

167. Exh. GMP-JAN-C2 at 2.5.2 (emphasis added).

Standard to meet the CP_v treatment standard, despite the fact that the Project does not qualify for any of the credits contained in Section 3 of the VSMM.

The Appellants contend that the plain language of the VSMM precludes the application of the Alternative Design Standard because the Project does not meet the requirements for any of the credits contained in Section 3 of the VSMM.¹⁶⁸ The Appellants contend that in seeking affirmation on appeal of the Operational Permit, ANR and GMP are essentially requesting that the Board amend the requirements of the VSMM without the public process required by a rulemaking. Appellants further argue that the VSMM provides no discretion to deviate from its requirements. The Appellants contend that their strict interpretation of the VSMM is necessary to achieve the State water policy of Vermont, which requires the provision of "clear, consistent and enforceable standards" for the protection of water quality.¹⁶⁹ In the alternative, the Appellants argue that even if the Alternative Design Standard could be applied in this case, GMP's hydrologic model underestimates the amount of runoff produced by the Project.¹⁷⁰

GMP replies that, pursuant to 10 V.S.A. § 1264 and the Vermont Stormwater Management Rule, Operational Permits need only be "consistent with" the VSMM, as opposed to strict compliance.¹⁷¹ GMP also argues that the VSMM only requires that GMP demonstrate "to the Agency's satisfaction and with a reasonable level of surety," that the Project will meet the CP_v Standard and further, that the Alternative Design Standard is the only reasonable method to make such a demonstration.¹⁷² Finally, GMP argues that the Appellants' strict interpretation of the VSMM will lead to "absurd" results.¹⁷³

ANR also opposes the Appellants' strict reading of the VSMM by arguing that the words "per the use of credits in Section 3" do not signify an exclusive requirement for projects proposing to use the Alternative Design Standard to comply with those credits.¹⁷⁴ Instead, ANR contends, it is the Project's disconnection of impervious surfaces that is the more important

168. Appellants Brief at 38.

169. 10 V.S.A. § 1250.

170. Appellants Brief at 40.

171. 10 V.S.A. § 1264(e)(1); GMP Brief at 78.

172. GMP Brief at 95 (internal quotation marks omitted).

173. GMP Brief at 95.

174. ANR Brief at 39.

consideration.¹⁷⁵ According to ANR, it would be unreasonable to require projects seeking to apply the Alternative Design Standard to implement the voluntary credits contained in Section 3 because, by implementing those credits, the Project would be relieved of meeting the CP_v standard, thus obviating the utility of the Alternative Design Standard altogether. ANR further argues that their interpretation is the only reasonable interpretation of the VSMM which would accomplish the Legislature's stated policy goal of using structural practices only when necessary.

It is undisputed that the Project under review here does not rely on any of the credits in Section 3, including the WHPC, which was specifically developed for high altitude wind projects.¹⁷⁶ However, in our view, Appellants have misread the plain language of Section 1.1.2 of the VSMM. In advancing their narrow reading of Section 1.1.2, the Appellants assert that "the Alternative Design Standard is *only* available to demonstrate compliance 'for projects that have disconnected the majority of impervious surfaces'"¹⁷⁷ Significantly, though, the limiting word "only" does not appear anywhere in Section 1.1.2, nor do we read this language to compel the inference that the word "only" was intended to be read into Section 1.1.2. Rather, we read Section 1.1.2 to simply state expressly that in the case of disconnected projects using Section 3 credits, the Alternative Design Standard may be used. Beyond that, there is nothing in the language of Section 1.1.2 that either authorizes or prohibits the use of the Alternative Design Standard in other cases.

We agree with GMP that the Legislature intended only for stormwater discharge permits to be "consistent" with the VSMM, as opposed to requiring strict compliance or conformity.¹⁷⁸ The Vermont Stormwater Management Rule similarly states that permits shall be "consistent" with the VSMM's treatment standards.¹⁷⁹ Therefore, ANR has discretion to tailor an individual stormwater permit to achieve its intended purpose of protecting water quality so long as such permit is consistent with the VSMM and meets the other statutory criteria for discharge

175. ANR Brief at 40.

176. Nelson pf. reb. at 15–16.

177. Appellants Brief at 38 (emphasis added).

178. See BLACK'S LAW DICTIONARY 308 (6th ed. 1990) (defining consistent as "[h]aving agreement with itself or something else; accordant; harmonious; congruous; compatible; compliable; not contradictory."). See *Town School Dist. of St. Johnsbury v. Town School Dist. of Topsham*, 122 Vt. 268, 272 (1961) (holding that it is a standard canon of statutory construction to presume that statutory language is chosen advisedly).

179. Vt. Admin. Code 16-3-505:18-306(a)(1).

permits.¹⁸⁰ Further, ANR has discretion in choosing the manner that an applicant "provides, with a reasonable level of surety, . . . how the system will achieve the requisite performance standards" in reviewing New Design Alternative Systems under Section 2.5.2 of the VSMM.¹⁸¹

Thus, in light of the discretion that has been reserved to ANR pursuant to the Vermont Stormwater Management Rule, it is useful to review the context under which the Alternative Design Standard was drafted to determine whether it was reasonable for ANR to interpret the VSMM to allow the use of the Alternative Design Standard for the purposes of complying with the CP_v Standard in Section 1.1.2 of the VSMM.¹⁸² The Legislature has expressed a clear preference for allowing non-structural STPs where possible.¹⁸³ Further, ANR's expert testified the Alternative Design Standard was included in the VSMM in order to allow developers to implement lower impact designs without having to meet the requirement for a structural STP.¹⁸⁴

With the foregoing context in mind, we find no error in ANR's interpretation of the VSMM to permit the application of the Alternative Design Standard in this case. We conclude that the narrow reading sought by the Appellants would lead to an irrational result in this case because it would require GMP to install structural STPs where they are not necessary to protect water quality, while causing additional environmental impacts through increased clearing.¹⁸⁵

180. See 10 V.S.A. § 1264(e)(1) ("The permit shall contain additional conditions, requirements, and restrictions as the secretary deems necessary to achieve and maintain compliance with the water quality standards.").

181. Exh. GMP-JAN-C2 at 2.5.2.

182. *Gasoline Marketers of Vt., Inc. v. Agency of Natural Res.*, 169 Vt. 504, 508 (1999) ("[A]bsent a clear and convincing showing to the contrary, decisions made within the expertise of administrative agencies are presumed to be correct, valid, and reasonable").

183. 10 V.S.A. § 1264(a).

184. Tr. 7/13/12 at 144 (Burke) ("we felt it was necessary to provide some type of alternative such that we weren't discouraging . . . [the maintenance of natural hydrology] rather than . . . send it to one large basin at the bottom of the hill. And this was our best shot at it when it was incorporated into the manual."); see, 10 V.S.A. 1264(a) (expressing policy preference for non-structural STPs). See *In re Williston Inn Group*, 2008 VT 47 ¶ 19 (upholding an agency's interpretation where it was consistent with regulation's purpose).

185. See *Craw v. District Court of Vermont, Unit No. 1, Windham Circuit*, 150 Vt. 114, 119 (1988) ("Such a holding would glorify a technicality and exalt an absurdity. A presumption obtains against a construction that would lead to absurd results.") ANR's expert testified that the implementation of structural STPs on ridgelines in other similar wind projects had resulted in at least one "Olympic sized" detention facility located on mountain tops that was likely not necessary to protect water quality. Tr. 7/13/12 155 (Burke). Given the sensitive nature of these natural areas, we conclude that it is appropriate for ANR to have the flexibility to approve less intensive designs, assuming that these designs are adequately protective of the environment. As discussed in this Order, we conclude that ANR has demonstrated that the permits issued for the Project are conservatively designed and contain adequate

(continued...)

The Appellants have not demonstrated that ANR's interpretation constitutes compelling error, particularly in light of our conclusion that the Project's level spreaders are properly designed and based on valid modeling assumptions.¹⁸⁶

Having determined that ANR's decision to permit the application of the Alternative Design Standard is consistent with the VSMM and the CP_v Standard, we must examine the soundness of the model GMP used to demonstrate that the level spreaders will meet the Alternative Design Standard. Under the Alternative Design Standard, GMP must "demonstrate that the post-developed peak discharge from the disconnected portion of the site for the one-year storm is no greater than the peak discharge from the same portion of the site as modeled as if 12-hour detention were provided."¹⁸⁷ The Appellants contend that the Project cannot meet this standard for three reasons. First, the Appellants challenge the modeling assumptions used in GMP's calculation of runoff from the Project.¹⁸⁸ Second, the Appellants contend that the topography of the vegetated buffers will cause runoff to recollect and discharge faster than anticipated.¹⁸⁹ Third, the Appellants argue that GMP's monitoring locations are located too far downstream from the actual points of discharge. According to the Appellants, GMP cannot demonstrate that the upstream portions of the receiving waters will meet the treatment standards and, therefore, the Project is violating the VSMM and the VWQS.¹⁹⁰

The Appellants' first argument is directly raised by Questions 13.d. and e., which are discussed later in this Order. For the reasons discussed under Questions 13.d. and e., we conclude that GMP's hydrologic model complies with all applicable standards and does not underestimate the volume of runoff produced by the Project. The Appellants' third argument has already been addressed above in our discussion under Question 10, where we concluded that GMP's monitoring locations and plan of study meet the applicable standard set forth in Section

185. (...continued)
safeguards to protect the environment.

186. *See supra* pp. 55–63; *infra* pp. 80–82.

187. Exh. GMP-JAN-C2 at 1.1.2.

188. Appellants Brief at 40–43.

189. Appellants Brief at 44.

190. Appellants Brief at 54.

2.5.2 of the VSMM and will adequately assess whether the Project is meeting the treatment standards, including the CP_v Standard.¹⁹¹

Turning to the Appellants' second argument, GMP selected buffer areas that reflected their modeling assumptions by limiting slopes to under 30% and avoiding existing stream channels.¹⁹² GMP's model also included a roughness coefficient to account for wooded conditions in the buffer.¹⁹³ Finally, GMP conservatively sized the level spreaders to control the volume of water discharging from the level spreaders to prevent erosive forces in the forested buffers.¹⁹⁴ Based on this evidence, we conclude that GMP has demonstrated that the forested buffers will function as designed.

GMP has demonstrated that, by meeting the Alternative Design Standard, the level spreaders used at the Project will be as protective of the environment as if structural STPs were implemented.¹⁹⁵ We agree with ANR that this is a rational approach to protecting the Project's receiving waters, consistent with the requirements of the VSMM, and it fulfills the Legislature's stated policy of relying on structural treatment only when necessary. Accordingly, we conclude that the Operational Permit is consistent with the VSMM's CP_v Standard. Therefore, we find no merit to Appellants' issue raised in Question 13.c.ii.

O. Appellants' Question 13.c.iii.–v.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

...

c. Whether discharges from the Project as proposed will comply with the treatment standards for new development set forth in the Vermont Storm water Management Manual, as required by § 18-306 of the Vermont Stormwater Management Rule, including the following:

...

iii. The Groundwater Recharge Treatment Standard, Section 1.1.3 of the Vermont Stormwater Management Manual;

191. *See supra* pp. 44–48.

192. Nelson pf. reb. at 23–24.

193. Nelson pf. reb. at 23.

194. Nelson pf. reb. at 21–27; exh. GMP-JAN-Reb-1.

195. Tr. 7/12/12 at 88–89 (Nelson). *See* exh. GMP-JAN-C-8 (analysis showing that post-development peak discharges will be comparable to hypothetical design providing detention).

iv. The Overbank Flood Protection Treatment Standard, Section 1.1.4 of the Vermont Stormwater Management Manual; and
v. The Extreme Flood Protection Treatment Standard, Section 1.1.5 of the Vermont Stormwater Management Manual.

Question 13.c.iii.-v. Findings of Fact

138. As required by § 18-306 of the Vermont Stormwater Management Rule, the discharges from the Project, as proposed, will comply with the Groundwater Recharge Treatment Standard (Section 1.1.3 of the VSMM), the Overbank Flood Protection Treatment Standard (Section 1.1.4 of the VSMM), and the Extreme Flood Protection Treatment Standard (Section 1.1.5 of the VSMM). This finding is supported by findings 139 and 140, below, and the findings under Questions 13.a., d., and e.

139. The application for the Operational Permit included: Schedule A forms detailing how each receiving water was treated by a specific STP; a downstream analysis summary spreadsheet containing the hydrologic analyses for the 10- and 100-year storm; and a Project groundwater recharge analysis. Nelson pf. (Vol. 2) at 6; exhs. GMP-JAN-C7, C9, and C14.

140. The Project complies with the Groundwater Recharge, Overbank, and Extreme Flood Protection Treatment Standards as required by the VSMM. Nelson pf. (Vol. 2) at 14.

Question 13.c.iii.-v. Discussion

The Groundwater Recharge Treatment Standard requires that new development maintain the "average annual recharge rate for the prevailing hydrologic soil group."¹⁹⁶ The Overbank Protection and Extreme Flood Protection Treatment Standards are designed to ensure that new development does not cause the post-development peak-discharge rate to exceed the 10-year and 100-year, 24-hour events.¹⁹⁷

Though the Appellants have provided neither discussion nor argument in their Brief on these treatment standards specifically, the Appellants generally argue that the Project will fail to meet the applicable treatment standards because GMP's hydrologic model underestimates the

196. Exh. GMP-JAN-C2 at 1.1.3.

197. Exh. GMP-JAN-C2 at 1.1.4-1.1.5.

peak discharge of runoff from the Project.¹⁹⁸ We address the Appellants' arguments regarding GMP's modeling assumptions in detail under Questions 13.d. and e., below. To the extent that the Appellants have argued that level spreaders will fail to meet these treatment standards due to design flaws, we have already addressed those arguments under Question 13.a., above.

GMP has produced technical analyses demonstrating that the STPs employed at the site, including the level spreaders, meet the Groundwater Recharge, Overbank, and Extreme Flood Protection Treatment Standards contained in the VSMM.¹⁹⁹ The Appellants have failed to present persuasive evidence that would lead us to conclude that the discharges from the Project are violating the treatment standards implicated here. Accordingly, we are satisfied that the Project meets the Groundwater Recharge, Overbank, and Extreme Flood Protection Treatment Standards as required by the VSMM. Therefore, we find no merit to Appellants' issue raised in Questions 13.c.iii. through v.

P. Appellants' Questions 13.d.–e.

Whether the Project as proposed complies with the Vermont Stormwater Management Manual, including the following:

...

d. Whether Applicant's water quality peak flow calculations use a curve number that under estimates runoff and time of concentration in contravention of the procedures required in Section 1 of the Vermont Stormwater Management Manual.

e. Whether the utilization of inaccurate water quality peak flow calculations will result in under-designed stormwater systems which have the potential to pollute Vermont's waters in violation of the Vermont Stormwater Management Manual and the Vermont Water Quality Standards.

Question 13.d.–e. Findings of Fact

141. The Applicant's water quality peak flow calculations use a curve number ("CN") that appropriately estimates runoff and Time of Concentration ("Tc") as required by the procedures in

198. Goll pf. at 31 ("Without an accurate model, the project will most likely not meet the Treatment Standards of the VSMM.").

199. See exh. GMP-JAN-C7 (showing how each receiving water was treated by a specific STP); exh. GMP-JAN-C9 (containing the hydrologic analyses for the 10- and 100-year storms); exh. GMP-JAN-C14 (detailing GMP's groundwater recharge analysis).

Section 1 of the Vermont Stormwater Management Manual and will result in appropriately designed stormwater systems in compliance with VSMM and the VWQS. This finding is supported by findings 142 through 161, below.

142. Proper stormwater management requires the implementation of stormwater runoff controls to ensure that the post-development peak discharge rate at a given location is no greater than the peak discharge rate at that same location for pre-development, existing conditions. This requires a calculation of the peak discharge rate for pre-development, existing conditions and a calculation of the peak discharge rate for post-development conditions. Lake pf. at 4.

143. The peak discharge rate is important for proper stormwater management, because it determines the erosive force of water. The most commonly accepted method for calculating the peak discharge rate is based on a model developed by the United States Department of Agriculture Natural Resources Conservation Service ("USDA-NRCS"), and is referred to as Technical Release-55, or TR-55. The TR-55 model is incorporated into a number of different software programs, including the HydroCAD Model. Lake pf. at 4-5.

144. The four main inputs necessary to calculate the peak discharge rate using TR-55 are as follows: (1) the rainfall event in inches; (2) the size of the drainage area; (3) the CN; and (4) the Tc. The rainfall event and the size of the drainage area can be measured directly, and are straightforward numbers. Lake pf. at 7.

145. The CN is the measurement of runoff volume from a given storm event and is dependent upon the underlying soil type and soil cover. When surfaces are assigned a higher CN, that reflects the fact that more water is expected to run off the surface, with less water being absorbed into the underlying soil. For a comparatively lower curve number, less water will run off the surface, and more will be absorbed. Where a drainage area is composed of more than one soil type or cover, a weighted runoff Curve Number is used that is based on the respective surface area of each type of soil type with each type of cover in the drainage area. Lake pf. at 5-6; Nelson pf. reb. at 31; Nelson pf. (Vol. 2) at 8-9.

146. Tc is defined as the time it takes surface water from the hydraulically most distant point in the drainage area to reach the design point. The Tc is determined by the shape and steepness of the drainage area. It has a great impact on the peak discharge rate at the drainage area outlet.

The shorter the T_c , the higher the peak discharge rate will be due to the storm runoff volume leaving the basin faster. Conversely, the longer the T_c , the lower the peak discharge rate will be. Lake pf. at 11.

147. The hydrograph time increment value (" dt ") is the interval of time at which computations of runoff rates are performed within the HydroCAD modeling. If time increments are too long, the calculations may result in a lower peak discharge rate. If the peak discharge rates that have been calculated are lower than actual rates, the stormwater treatment practices may be undersized and in a storm event more water than anticipated will be routed through the stormwater treatment practices increasing the risk of a system failure. Lake pf. at 14; Nelson pf. reb. at 43.

148. TR-55 uses the CN and the number of inches of rainfall for a given storm event, and the surface area of a given drainage to determine the volume of runoff that a particular storm event will produce for that drainage. Once runoff volume is calculated, TR-55 is used to calculate the peak discharge rate by combining the runoff volume with the T_c . Lake pf. at 6.

149. The USDA-NRCS has published a CN table for a variety of given soil types and soil covers, and have published guidance documents on how to determine CNs for other ground covers. Gravel roads without rights of way are included in the USDA-NRCS table and in the HydroCAD Curve Number table, and are assigned a Curve Number of 96. Lake pf. at 5-6 and 8.

150. DEC does not prescribe a specific CN value associated with all impervious surfaces that are regulated under the VSMM. Rather, it is the responsibility of the designer to assign specific CN values that are representative of a site and the associated post-development land over conditions. Nelson pf. reb. at 32.

151. The Project CNs were determined based on TR-55 guidance. For those Project areas that corresponded directly with a particular NRCS cover type and hydrologic condition, the associated CN value was used. Project areas that did not correspond directly with a particular NRCS cover type and hydrologic condition were treated as non-standard cover-type areas, and conservative CN values were developed based on professional judgment in consultation with DEC and were confirmed based on the direction provided by HydroCAD for establishing CN values for non-standard, special conditions. Nelson pf. reb. at 32; exh. GMP-JAN-Reb-4.

152. The HydroCAD modeling for the Project did not use standard CN values for the turbine pads, the crane paths, crane pads, and upper access roads at the Project site. Nelson pf. reb. at 32–33.

153. The turbine pads are not considered impervious surfaces that fall under the jurisdiction of the Operational Permit. However, the turbine pads are modeled as surfaces that contribute to drainage in the receiving waters in the operational stormwater models. Nelson pf. reb. at 33.

154. Turbine pad construction involves similar materials and methods as are used in constructing electrical substations in Vermont. ANR has for many years treated substations as pervious surfaces and excluded them from the jurisdiction of the operational phase stormwater program. Like substations, the turbine pads will be constructed of coarse uncompacted shot rock. Based on electrical substations and stormwater permitting in Vermont, a CN value was assigned to the turbine pads that is consistent with the way substations are treated. Nelson pf. reb. at 33.

155. The lower portion of the Project access road, which extends from Vermont Route 100 up to the substation and maintenance building, will be accessed by passenger vehicles and a typical gravel road surface has been specified for this segment. A corresponding CN value of 98 has been assigned in the HydroCAD modeling for the Project. Nelson pf. reb. at 34; exh. GMP-JAN-C4 at Sheet C-132, Detail D8, note 2.

156. The upper portion of the Project access road, which extends the crane path and the crane pads to the substation, will have limited usage by light trucks and will have a more porous, larger diameter shot rock surface than the gravel road surface. The upper access road, crane paths, and crane pads, depending on underlying soil types, were assigned CN values of 89 and 91 in the HydroCAD modeling for the Project. Nelson pf. reb. at 34–36; exh. GMP-JAN-C4 at Sheet C-132, Detail D8, note 2.

157. The turbine pads will be scarified and subject to infiltration testing following the completion of construction to ensure their porosity. The notes and details provided for the turbine pads and adopted by the Operational Permit state that these surfaces must be tested after construction to ensure minimum infiltration rates of at least one inch per hour and must perform as relatively permeable surfaces, as modeled. Nelson pf. reb. at 38–39; exh. GMP-JAN-C4 at Sheet C-132, Detail D10.

158. GMP conducted on-site testing of the road surface materials of the upper access roads to determine the void ratio of the materials in order to calculate a runoff curve number for the actual material installed at the access road. The on-site testing indicated a minimum void ratio of 16.3 percent, which results in a computed CN value of 77.5. Nelson pf. reb. at 42; exh. GMP-JAN-Reb-6.

159. The HydroCAD modeling for the Project used a minimum Tc value of 6 minutes, which is the recommended minimum value in TR-55. This is standard practice for all stormwater permit applications prepared in Vermont. Nelson pf. reb. at 45.

160. The HydroCAD modeling for the Project assigned a maximum length of 100 feet to sheet flow. This is consistent with TR-55 guidance, which specifies a maximum sheet flow length of 100 feet. Nelson pf. reb. at 28.

161. The HydroCAD modeling for the Project used 0.1 hours as the hydrograph time increment, which is the commonly accepted standard time increment used in Vermont for modeling operational stormwater systems. Nelson pf. reb. at 43.

Question 13.d.-e. Discussion

To design the stormwater management STPs employed at the Project, GMP modeled the amount of stormwater discharging from impervious surfaces constructed at the Project site. The purpose of this model is to calculate what is referred to as "peak flow" or "peak discharge" which represents the amount of water that runs off the developed site.²⁰⁰ In its model, GMP assigned a CN to each type of surface that was to be present at the Project site. The CN represents the amount of water that discharges from the surface as opposed to infiltrating into the ground.²⁰¹ Generally speaking, more porous surfaces such as forest or meadow, receive a lower CN, while impervious surface receives a higher CN, representing the larger amount of water that would discharge from that surface.²⁰²

Another input to the model is the Tc, which represents "the computed time that it takes for a theoretical drop of water to move from the most hydrologically remote portion of the

200. Goll pf. at 3, 23.

201. Tr. 7/12/12 at 43 (Nelson).

202. *Id.*

watershed to the base of the watershed."²⁰³ In this case, GMP assigned a minimum value of 6 minutes for all small watersheds.²⁰⁴ Smaller Tc values represent water reaching a point quicker and therefore, result in a higher peak flow.

The Appellants argue that the CN and Tc values assigned by GMP underestimate the amount of water that will discharge from the Project.²⁰⁵ Therefore, the Appellants contend, the STPs employed to manage that runoff will be undersized and fail to meet the treatment standards contained in the VSMM. Accordingly, we must determine whether GMP's model inputs comply with any applicable standards set forth in the VSMM and whether GMP's model is generally reliable because the Project will not meet the applicable Treatment Standards if the model underestimates the volume of runoff generated by the Project.²⁰⁶

The VSMM does not set general standards for the selection of CN values. Instead, the VSMM states that "[t]he models TR-55 or TR-20 (or approved equivalent) shall be used for determining peak discharge rates."²⁰⁷ The TR-20 and TR-55 models contain standard CN values for various constructed surfaces.²⁰⁸ Additionally, the VSMM limits the length used in Tc calculations to 100 feet:

The length of overland flow used in . . . [Tc] calculations shall be typically limited to no more than 100 feet for post-developed conditions. However, this length can be increased to 150 feet if [the] pervious off-site area is part of the contributing drainage area and a component of the Tc calculation.²⁰⁹

Turning to the merits of this issue, we are not persuaded by the Appellants' arguments regarding CN values. While the Appellants are correct that there are standard CN values for gravel road, it is also true that a designer may use an estimated CN number for "special

203. Nelson pf. reb. at 44.

204. *Id.* at 45.

205. Appellants Brief at 40–41. The Appellants' prefiled testimony also addresses a third input to the model called Time Increment. The Appellants' Brief does not raise any issue regarding this input. Therefore, we have no basis for reviewing this issue any further in this Order.

206. This more general analysis is necessary to complete our findings under Question 13.c., which asks whether the Project meets the five treatment standards contained in the VSMM.

207. Exh. GMP-JAN-C2 at 1.1.2.

208. Torrizon pf. at 7.

209. Exh. GMP-JAN-C2 at 1.1.2.

conditions."²¹⁰ We find no applicable standard in the VSMM limiting a designer's discretion to determine where a special condition exists. In this case, the Project designer determined that the crane path and access road would function differently than a standard gravel road based on the geological composition of the shot-rock used to construct these surfaces.²¹¹ This use of professional judgment was further based on the designer's previous experience with the Sheffield Wind Project.²¹² Finally, the testing of the actual constructed surface of the access road found that the access road has a calculated CN of 77 which is even less than the 89 or 91 assigned in GMP's model.²¹³ Based on this evidence, we conclude that GMP's use of special condition CN values for the access road is conservative and was appropriately based on sound professional judgment.

We are also not persuaded by the Appellants' arguments regarding the Tc model input. In its model, GMP assigned a value of 6 minutes from all small watersheds, which is the recommended minimum value in TR-55.²¹⁴ Appellants argue that GMP should have calculated the Tc for each small watershed instead of assigning the minimum value.²¹⁵ GMP has presented persuasive evidence that the assumed 6-minute Tc values are technically appropriate for the Project and are in keeping with standard practice in Vermont.²¹⁶ Additionally, the Appellants' have not rebutted GMP's testimony that adopting the Appellants' recommended Tc values would not result in a significant change to the overall design of the Project.²¹⁷ While the Appellants' suggested modeling methodology may also be technically acceptable, the Appellants have presented no persuasive evidence showing that their modeling assumptions are necessary to

210. Exh. GMP-JAN-Reb-4 at 2 ("This approach may also be useful for . . . artificial soil profiles where the total voids are known.").

211. Neslon pf. reb. at 32-35 ("Based on our prior experience with similar surfaces at other projects, we know that shot rock surfaces are substantially different than a traditional gravel road, and there is no standard CN value provided in TR55 or HydroCAD that corresponds to the design of the roads, crane paths, and crane pads using shot rock. As with the turbine pads, we determined that these shot rock surfaces were a non-standard, 'special condition' land cover type, and in consultation with DEC determined that they should be assigned a CN value of 89 or 91.").

212. Tr. 7/12/12 at 55 (Nelson).

213. *Id.*; exh. GMP-JAN-Reb-6.

214. Nelson pf. reb. at 45.

215. Goll pf. at 31.

216. Nelson pf. reb. at 45.

217. *Id.*

maintain the quality of the receiving waters. Accordingly, we conclude that GMP's modeling assumptions comply with the VSMM and will not contribute to a violation of the VWQS.

Therefore, we find no merit to Appellants' issue raised in Questions 13.d. and e.

Q. Appellants' Question 14

Whether the Project as proposed meets the requirements of the Vermont Water Quality Standards, including the following:

a. Whether discharges from the Project as proposed will result in a reduction in the level of water quality in violation of Section 1-03.C.

b. Whether discharges from the Project as proposed will meet the following criteria:

i. The proposed discharge is in conformance with all applicable provisions of the Vermont Water Quality Standards, as required by Section 1-04.A.1;

ii. There is neither an alternative method of waste disposal, nor an alternative location for waste disposal, that would have a lesser impact on water quality including the quality of groundwater, or if there is such an alternative method or location, it would be clearly unreasonable to require its use, as required by Section 1-04.A.2;

iii. The receiving waters will have sufficient assimilative capacity to accommodate the proposed discharge, as required by Section 1-04.A.6; and

iv. Assimilative capacity has been allocated to the proposed discharge consistent with the classification set forth in Chapter 4 of the Vermont Water Quality Standards, as required by Section 1-04.A.7.

c. Whether discharges from the Project will result in violations of the Water Quality Criteria in Chapter 3 of the Vermont Water Quality Standards.

Question 14 Findings of Fact

162. The discharges from the Project, as proposed, will meet the requirements of the applicable criteria identified in Chapters 3 and 4 of VWQS. This finding is supported by findings 163 through 167, below, and the findings under Questions 9 and 13, above.

163. The Project's design and application materials demonstrate that level spreaders and associated vegetated buffers, in conjunction with permit terms and conditions, provide a reasonable level of surety that the Alternative STP design will attain the applicable treatment performance standards. Burke pf. reb. at 13.

164. The Operational Permit issued for the Project provides a reasonable assurance that the Project will not violate VWQS, and thus supports the issuance of the Section 401 Water Quality Permit. Nelson pf. reb. at 54.

165. The Project will maintain and protect water quality as required by Section 1-03.C. Burke pf. reb. at 13; Nelson pf. reb. at 54.

166. The monitoring protocol required under Condition 14 of the Operational Permit will detect excessive inflows to the level spreader, which would therefore be subject to remedial action, either through modifying the contributing surface to decrease runoff or revising the design of the STP. Nelson pf. reb. at 42.

167. The ongoing monitoring plan of study and subsequent certification and inspection requirements referenced in the Operational Permit will ensure that the Alternative STP design meets the treatment standards set forth in the VSMM over the life of the Project. Burke pf. reb. at 13.

Question 14 Discussion

Under 10 V.S.A. § 1264(h), qualifying stormwater discharge permits are entitled to a presumption of compliance with the VWQS.²¹⁸ For the reasons discussed above we conclude that the Operational Permit complies with the VSMM and contains the conditions necessary to achieve and maintain compliance with the water quality standards. Accordingly, we conclude that the Operational Permit is entitled, pursuant to Section 1264(h), to a presumption of compliance with the VWQS. Therefore, the Appellants bear the burden of presenting evidence to rebut this presumption.

The Environmental Court has assessed evidence presented to rebut this presumption against a benchmark measure of the receiving waters' quality and uses when considering whether certain additional permit conditions were required.²¹⁹ In this case, GMP has presented a benchmark study outlining existing water quality and uses.²²⁰ The Appellants have not presented persuasive evidence demonstrating that the Operational Permit will cause or contribute

218. See 10 V.S.A. § 1264 (g)(1). The criteria to receive the benefit of this presumption of compliance include the following standard: "[T]he secretary shall, for new stormwater discharges, require a permit for discharge of, regulated stormwater runoff consistent with, at a minimum, the 2002 stormwater management manual." 10 V.S.A. § 1264(e)(1).

219. *In re Sheffield Wind Project*, No. 252-10-08 Vtec, slip op. at 12 (Vt. Envtl. Ct. Sept. 29, 2009) (Wright, J.) ("[a]n agreed or otherwise established benchmark of the existing uses and existing quality of the receiving waters is necessary against which to measure that evidence").

220. See Exh. GMP-JAN-E3.

to a reduction of the quality or uses of the receiving waters. Therefore, we have no basis to conclude that the Project is violating or will cause a violation of the VWQS.

Even if we did not apply the compliance presumption discussed above, we find that the Operational Permit satisfies the provisions of the VWQS cited by Appellants in Question 14. GMP and ANR have presented persuasive evidence and testimony that the Project will not result in a reduction of water quality as required by Section 1-03.C.²²¹ Further, the Operational Permit contains strict monitoring and compliance protocol designed to prevent a reduction in water quality over the life of the Project.²²² Therefore, we find that the Operational Permit will not result in a reduction of water quality.

Turning to Appellants' Question 14.b.i. regarding the requirements of Section 1-04.A.1 of the VWQS, which requires that the Operational Permit conform to "all applicable" portions of the VWQS, we conclude that this question is framed in an impermissibly broad manner. As we have observed earlier in this Order, "the applicant is entitled to understand in what respect an appellant believes that the application fails to meet [the applicable regulatory] criteria."²²³ Question 14.b.i. fails to give notice as to what specific criteria contained in the VWQS the Project fails to achieve. Thus, the Appellants have failed to meet the threshold under Section 1-04.A.2. Accordingly, we will not address this broad question but instead will examine the Appellants' other subparts to this question, which at least indicate specific provisions of the VWQS.

Under Section 1-04.A.2, a discharge permit must contain a method and location for waste disposal that will have the least impact on water quality, unless it would be unreasonable to require such a method or location. The Appellants argue that Acceptable STPs, as opposed to level spreaders, would have a lesser impact on water quality.²²⁴ For the reasons discussed under Question 13, above, we do not find that Acceptable STPs would have a lesser impact on water quality. Therefore, we do not conclude that GMP is required to implement them. We find that it

221. See e.g., Nelson pf. reb. at 14–15 (outlining the overall design of the Project's stormwater features); Burke pf. reb. at 12–13 (describing how level spreaders will function).

222. See e.g., Nelson pf. reb. at 42.

223. *In re: Unified Buddhist Church, Inc.*, Docket No. 253-10-06 Vtec, slip op. at 5 (Vt. Env'tl. Ct., May 11, 2007) (Wright, J.).

224. Appellants Brief at 53.

would be unreasonable to require the replacement of level spreaders without evidence that the level spreaders are not functioning as intended because such replacement would result in the additional disturbance of approximately 12 acres of land.²²⁵

We further find that the Operational Permit complies with Sections 1-04.A.6 and 7 of the VWQS.²²⁶ Section 1-01. B.7 of the VWQS defines "assimilative capacity" as "a measure of the capacity of the receiving waters to assimilate wastes without lowering their quality below the applicable water quality standards." Therefore, we conclude that the issue of "assimilative capacity" is synonymous with the question of whether the Project will reduce water quality. We find that the Operational Permit will protect water quality and prevent a lowering of water quality below any applicable water quality standards.²²⁷ We also conclude that the Operational Permit will not lead to a violation of the Water Quality Criteria contained in Chapter 3 of the VWQS for the same reasons. Accordingly, we find no merit to Appellants' issue raised in Question 14.

R. Appellants' Question 15

Whether the Project as proposed complies with the Vermont Interim Anti-Degradation Implementation Procedure, including the following:

a. Whether the Project as proposed qualifies for any of the presumptions provided for in Section IX.D.1 of the Vermont Interim Anti-Degradation Implementation Procedure, including whether discharges from Applicant's Project are in compliance with the Vermont Stormwater Management Manual and any additional best management practices that will be used to control the stormwater discharge, per Section IX.D.1(d).

b. Whether the presumptions in Section IX.D.1 of the Vermont Interim Anti-Degradation Implementation Procedure may be rebutted by credible and relevant project or site-specific information, as provided in Section IX.D.2.

c. Whether notwithstanding any presumption is [sic] Section IX.D.1, the potential cumulative impact associated with a proposed discharge will result in a reduction in water quality warranting a complete Tier 2 review, as provided in Section IX.D.3.

225. Tr. 7/12/12 at 91 (Nelson);

226. Appellants refer to 1-04.A.7 in Question 14.b.iii. without basis. The Appellants have not identified any receiving water segment subject to a wasteload allocation, nor have they provided any analysis or argument as to how the Project's discharges would violate any applicable wasteload allocation. Accordingly, we do not address this question any further in this Order.

227. Nelson pf. sup. at 4–7.

Question 15 Findings of Fact

168. The Project, as proposed, complies with the Implementation Procedure. This finding is supported by our findings under Questions 7 through 14, above.

Question 15 Discussion

As we have discussed above, the Operational Permit implements STPs that comply with the VSMM and therefore, is entitled to a presumption of compliance with the VWQS. Similarly, we conclude that the Operational Permit is entitled to a presumption of satisfying a Tier 2 Review under Section X.D.1.(a) of the Implementation Procedure which states that "[a] discharge that meets the requirements of a BMP or treatment and control manual" automatically satisfies a Tier 2 review under the policy.²²⁸ The Appellants have not presented any argument why the VSMM does not qualify as a BMP or treatment and control manual. Therefore, we regard the VSMM as the standard that the Operational Permit must meet to be entitled to this presumption.

Turning to Question 15.b., for the reasons discussed earlier under Question 13, we conclude that the Appellants have failed to present credible and persuasive evidence that would rebut this presumption.

Turning to Question 15.c. and the issue of "cumulative impacts," the Implementation Procedure states that, notwithstanding the presumption, the Secretary of ANR may determine that a complete Tier 2 review is warranted "based on credible and relevant information" that cumulative impacts associated with the Project will result in a reduction in water quality.²²⁹ The Appellants have failed to present "credible and relevant information" regarding "cumulative impacts" from the Project that would persuade us to require a complete Tier 2 review. Instead, for the reasons discussed above, we are persuaded by the testimony of ANR and GMP that the Project will not reduce water quality and thus, that no Tier 2 review is warranted.

Accordingly, we find no merit to Appellants' issue raised in Question 15.

228. The Tier 2 review is an analysis conducted by the Secretary of ANR of discharges and whether they will result in a reduction of high-quality waters. Under the Interim Anti-Degradation Implementation Procedure and the VWQS, only limited reductions to high quality waters are permitted where the reduction is justified under the "Socio-Economic Justification Test." Vermont Interim Anti-Degradation Implementation Procedure at 8.

229. Vermont Interim Anti-Degradation Implementation Procedure at 21.

VII. SECTION 401 WATER QUALITY CERTIFICATION

A. Appellants' Questions 16 and 17

16. *Whether the Project as proposed meets the requirements of the Vermont Water Quality Standards, including in the following respects:*

- a. *Whether the Project as proposed will result in any reduction of water quality in violation of Section 1-03.C.*
- b. *Whether the Project as proposed will allow for the management and maintenance of existing water quality as required by Section 1-03.C.1;*
- c. *Whether the Project as proposed will maintain and protect all existing uses as well as applicable water quality criteria, as required by Section 1-03.C.1;*

17. *Whether the Project as proposed meets the requirements of the Vermont Interim Anti-Degradation Implementation Procedure, including the following:*

- a. *Whether the Project as proposed will result in a reduction of the existing higher quality of high quality waters, as determined in accordance with Section X.F.1 and Section X.F.2 of the Vermont Interim Anti-Degradation Implementation Procedure.*
- b. *Whether Applicant has submitted information sufficient to enable the determinations to be made that are required by Section X.F of the Vermont Interim Anti-Degradation Implementation Procedure.*
- c. *Whether cumulative impacts will result in a lowering of water quality for the waters impacted by the Project, as determined in accordance with Section X.F.2(f) of the Vermont Interim Anti-Degradation Implementation Procedure.*
- d. *Whether discharges from the Project as proposed will maintain and protect the existing uses of waters and the level of water quality necessary to protect those existing uses, as determined in accordance with Section X.G. of the Vermont Interim Anti-Degradation Implementation Procedure.*

169. The Section 401 WQC is one of a suite of permit reviews, that includes the Vermont Wetlands Permit, the Operational Permit and the Construction Permit, all of which are used to review the Project for potential water quality impacts. ANR Panel pf. at 5.

170. The primary focus of the water quality certification process is assuring compliance with state water quality standards. The applicable Vermont Water Quality Standards (VWQS or Standards) were adopted by the Vermont Water Resources Board in 2008. Nelson pf. (Vol. 4) at 2; exh. GMP-JAN-E1.

171. The Project's potential water quality impacts fall into four broad categories:

(1) construction-related stormwater discharge impacts; (2) operational stormwater discharge

impacts; (3) wetlands impacts; and (4) stream impacts (associated with culverts and crossings). ANR Panel pf. at 5.

172. Impacts to Class II wetlands and impacts associated with stream crossings are the only Project-related aquatic impacts that were not specifically addressed by separate ANR/DEC permits. Impacts to those resources were evaluated by United States Army Corps of Engineers during the federal 404 permitting process, and have been considered by ANR during its review of the Project application for a Section 401 WQC. ANR Panel pf. at 5.

173. The fact that standards for perennial stream crossings are being met provides reasonable assurance that they will not impact stream stability. ANR Panel pf. at 13.

174. ANR conducted an anti-degradation review of the Project. The anti-degradation policy in the VWQS (the "Anti-Degradation Policy") exists to ensure the maintenance and protection of water quality, and its existing and designated uses. There are multiple tiers of anti-degradation review. The Tier 1 anti-degradation review protects existing uses of waters by maintaining the level of water quality necessary to maintain and protect all existing uses as well as applicable water-quality criteria. The Tier 2 review protects and maintains water quality in high-quality waters. The Tier 3 review protects Outstanding Resource Waters ("ORW"). ANR Panel pf. at 18; VWQS § 1-03.

175. In addition to the Anti-Degradation Policy, ANR has adopted the Implementation Procedure. Pursuant to Tier 2 of the Anti-Degradation Policy, a limited reduction in existing quality of high quality waters may only be allowed when the limited reduction satisfies a socioeconomic justification analysis set forth in the Anti-Degradation Policy. Under Tier 1, the Anti-Degradation Policy does not allow an elimination of existing uses. The Anti-Degradation Policy allows only a temporary reduction in the quality of an ORW. ANR Panel pf. at 18.

176. The receiving waters for the Project are Class A and B waters. None of the receiving waters are an ORW. Therefore, ANR's review of impacts from this Project consisted of a Tier 1 and Tier 2 anti-degradation review. ANR Panel pf. at 18.

177. ANR evaluated the expected biological, physical, and chemical condition of streams within, and immediately downstream, from the Project area. ANR Panel at pf. 14.

178. The biological criteria, unlike the water chemistry criteria of the VWQS, result from the direct measure of an existing use. Aquatic biota is an existing use. The VWQS were designed to maintain and protect existing uses. If an existing use is being maintained, the water quality necessary to sustain that existing use is also being maintained. ANR Panel at pf. 14.

179. The chemical and other physical criteria in the VWQS serve as surrogates for the aquatic health of streams. Measuring aquatic biota, provides a direct measure of the aquatic health of a stream. Biological communities reflect the overall ecological integrity (i.e., chemical, physical and biological integrity) of a stream. Biological communities integrate the effects of environmental stressors, thereby providing a consistent ecological measure of fluctuating environmental conditions. An evaluation of aquatic biota then, represents the product or aggregate of specific ambient physical and chemical parameters. ANR Panel at pf. 14.

180. ANR has imposed a monitoring plan as a condition of the Section 401 WQC. The objective of the monitoring plan is to provide ANR with key water quality data in order to evaluate the status of surface waters associated with the Project, with respect to the VWQS specific criteria. Nelson pf. (Volume 4) at 18-19; exhs. GMP-JAN-E6 and GMP-JAN-E13.

181. As part of its obligation under the 401 WQC, GMP has conducted chemical, physical, and biological monitoring of the receiving waters associated with the Project. The monitoring GMP has conducted on the Project site demonstrates that water quality on and around the site has not been negatively impacted by Project construction activities. Nelson pf. reb. at 54.

Question 16 and 17 Discussion

Section 401 of the federal Clean Water Act requires a state water quality certification for any federal action or permit which may result in discharges to waters of the state.²³⁰ In this case, the Project was required to obtain an individual wetlands permit and a Rivers and Harbors Act permit from the U.S. Army Corps of Engineers. The Rivers and Harbors Act permit triggered the need for a water quality certification.

The Appellants argue that because the Construction Permit and the Operational Permit do not meet the applicable regulatory criteria, the issuance of these permits violate the VWQS.

230. 33 U.S.C. § 1341(a)(1).

Therefore, the Appellants argue, ANR cannot issue a valid Section 401 WQC until the permit defects are corrected. For the reasons discussed in this Order, we do not agree with the Appellants' criticisms of the Construction permit and the Operational Permit and we conclude that the permits comply with both the VSS and VSMM. Accordingly, these permits are entitled to a presumption of compliance with the VWQS. The Appellants have failed to present persuasive evidence that would overcome this presumption. Therefore, the Construction Permit and the Operational Permit support the issuance of the Section 401 WQC.

The Section 401 WQC contains a detailed statement of the analysis conducted by the Secretary of ANR under both the VWQS and the Implementation Procedure.²³¹ In that analysis, the Secretary concluded that both construction and operational stormwater runoff are known to have increased levels of pollution but that the BMPs utilized in the Construction Permit and Operational Permit are designed to prevent or minimize such pollution and that, as a result, the Project would not negatively impact the physical and chemical quality of receiving waters, the aquatic biota of perennial streams, and the existing recreational uses of the receiving waters.²³² The evidence presented in this case has persuaded us that both the Construction Permit and Operational Permit are consistent with the requirements of their respective manuals, are appropriately designed, and contain numerous safeguards and conditions such that they will achieve their intended purpose of protecting water quality.

Aside from their evidence and arguments relating to the Construction and Operational Permits, which we do not find persuasive, the Appellants have neither offered any countervailing evidence nor challenged the credibility of GMP's evidence supporting the Section 401 WQC. For these reasons, we affirm ANR's issuance of the Section 401 WQC.

VIII. CONCLUSION

For the reasons discussed in this Order and based on the findings in this Order as derived from the evidence of record developed during the technical hearings convened on July 11, 12, 13, and 16, 2012, we find good cause to affirm the issuance of Stormwater Permit # 6216-INDC,

231. Exh. GMP-JAN-E6 at 18–22.

232. Exh. GMP-JAN-E6 at 16–17.

Stormwater Permit # 6216-INDS, and the Section 401 Water Quality Certification for the Project.

IX. ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that Stormwater Permit #6216-INDC, Stormwater Permit #6216-INDS, and the Section 401 Water Quality Certification for the Kingdom Community Wind Project, located in Lowell, Vermont, are affirmed.

Dated at Montpelier, Vermont, this 20th day of March, 2013.

| | | |
|------------------------|---|----------------|
| <u>s/James Volz</u> |) | |
| |) | PUBLIC SERVICE |
| |) | |
| <u>s/David C. Coen</u> |) | BOARD |
| |) | |
| |) | OF VERMONT |
| <u>s/John D. Burke</u> |) | |

OFFICE OF THE CLERK

FILED: March 20, 2013

ATTEST: s/Susan M. Hudson
Clerk of the Board

NOTICE TO READERS: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Board (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: psb.clerk@state.vt.us)

Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Board within thirty days. Appeal will not stay the effect of this Order, absent further order by this Board or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Board within ten days of the date of this decision and Order.