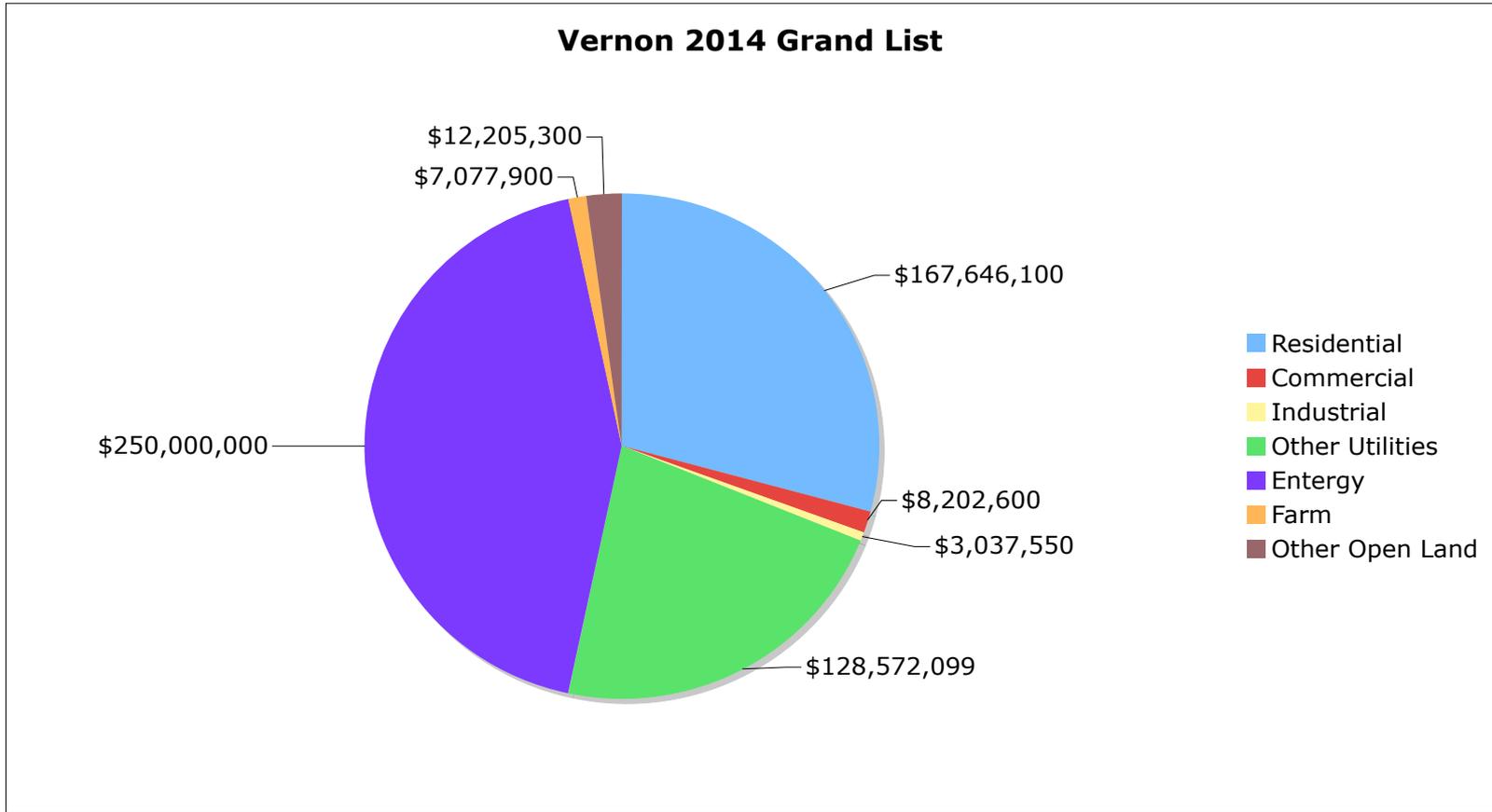


Vernon Planning Commission

Supplemental material on
Natural Gas Power Plant

Vernon 2014 Grand List



- As of December 2014, Vermont Yankee ceased operation.
 - While operating, Entergy paid property taxes based on the Generation Tax.
 - Post the close, Vermont Yankee property returned to the town Grand List at a yet undetermined future value.
 - Based on other nuclear plant closings, the value of VY property will be much lower going forward.
 - Value will likely step down to minimal value over a period of years.

- Commission became aware that that Kinder Morgan was planning to construct a natural gas pipeline from Pennsylvania to Dracut Massachusetts to be used to expand electrical power supply in New England.
- Although pipeline' s path was not designed to come to Vermont, Commission explored possibility of repurposing existing VY infrastructure for use as a natural gas power plant that could be connected to the Kinder Morgan Northeast Direct pipeline (approximately 7 miles of additional pipeline), utilizing existing VELCO switchyard and power lines.

Map of Proposed Kinder Morgan Northeast Direct Pipeline

Proposed Pipeline Route



Why Vernon as an Attractive Site?

- Pre Existing Easy Access to:
 - VELCO Switch Yard.
 - Railroad spur
 - Connecticut river
 - Possible re-use of certain VY structures
- Requires just 7 miles of additional pipeline from current path through Northfield MA to VY site.

Timeline for Proposed Pipeline

ACTION

TIMING

Outreach Meetings	Ongoing
Route Selection and Permit Preparation	Ongoing
Agency Consultations	Ongoing
Filed for FERC Pre-Filing	Sept. 15, 2014
Participate in FERC Pre-Filing Process (including filing draft resource reports)	4th Quarter 2014- 4th Quarter 2015
File Certificate Application with FERC	4th Quarter 2015
Anticipated FERC Approval	4th Quarter 2016
Proposed Start of Construction Activity	January 2017
Proposed In-Service Date	November 2018

U.S. Energy Information Administration Vermont State Profile

(iea.gov/electricity/state/vermont)

- Energy usage is dominated by transportation and heating requirements. As fuel costs to meet those needs rose, Vermont established long-term policies designed to increase both residential and business efficiency, reduce energy usage and shift energy consumption to renewable sources.
- At present, 3/4 of energy consumed in Vermont is petroleum based. The state does not produce or refine petroleum -- petroleum products are brought in by railroad and truck from neighboring states and Canada
- There is no natural gas production within Vermont, the state receives all of its natural gas by a small capacity line from Canada.

- Nearly 1/4 of all energy consumed in Vermont comes from renewable sources, and the state is expanding the use of renewable energy for both heating and electricity.
 - Almost 1/3 of schools are heated by wood products, such as wood pellets or other biomass.
- Solar power produced less than 0.5% of Vermont's net electricity generation in 2014, but all new electricity generating capacity that went online during the year was solar powered.
 - Including both utility scale and small scale residential and business solar installations, the state had 70 megawatts of solar capacity installed by the end of 2014.
- 4 utility-scale wind farms contributed 4.4% of Vermont's net electricity generation in 2014. Several more wind projects are in the regulatory pipeline.

Vermont Electricity Prices as of 9/17/15

Electricity	Vermont	U.S. Average	Period
Residential	17.39 cents/kWh	12.39 cents/kWh	June 2015
Commercial	14.75 cents/kWh	10.87 cents/kWh	June 2015
Industrial	10.16 cents/kWh	6.98 cents/kWh	June 2015

Average Retail Prices of Electricity to Residential Sector, June 2015

Rank	State	Avg. Price
1	Hawaii	30.39
2	Connecticut	22.52
3	Alaska	21.06
4	Massachusetts	19.52
5	New York	18.81
6	New Hampshire	18.72
7	Rhode Island	18.32
8	Vermont	17.39
9	California	17.21
10	New Jersey	16.43
11	Maine	15.84
12	Wisconsin	15.21
13	Michigan	14.66
13	Maryland	14.66
14	Pennsylvania	14.40

- Vermont electric utilities own little generating capacity and rely on contracts with independent generators and the ISO-New England grid for power from neighboring states and Canada.
 - With the shutdown of Vermont Yankee, Vermont lost 55% of its electricity generating capacity and the source of more than 70% of its net generation in recent years.
 - Remaining net electricity generation is provided almost entirely by hydroelectric power, biomass and wind which together produced about 1/4 of the state's net electricity generation in 2014. Historically the largest share of out of state electricity has come from Canadian hydroelectric dams.
- With VY's shutdown, more power is coming from the New England grid, which is increasingly relying on natural gas.

Structure of Vermont Utilities

- Vermont is the only New England state that has chosen not to restructure its electricity system -- the state has one investor-owned distribution facility and 16 municipal or cooperative utilities
- In 2012, the state's two largest electric utilities, which serve about 3/4 of all customers, were combined into one entity by Canada's Gaz Metro, which also owns Vermont's sole natural gas utility.
- Vermont's electric utilities pooled their transmission systems in 1956, so all wholesale transmission in the state is operated by a single entity, Vermont Electric Power Co.

New England ISO State of the Grid, January 2015

(iso.ne.com/static-assets/documents/2015/01/stateofgrid_presentation_01212015.pdf)

- New England's power plant fleet is undergoing a major transition.
 - Most power plants developed in the last 18 years use natural gas-- lower prices, lower emissions.
 - Retirements of coal and oil fired units and a nuclear unit.
 - Public policies are encouraging renewable energy--wind and solar-- and energy efficiency; but those additions offset only a small portion of the need for more traditional sources of electricity energy.
- Region is challenged by a lack of natural gas pipeline infrastructure, and is losing non-gas plants, resulting in serious threats to power system reliability.
- Additional energy infrastructure (generation, transmission, gas pipeline, fuel storage) are badly needed.
- Electricity prices are on an upward trajectory until the needed infrastructure is added.

Region is Losing Non-Gas Resources Major Retirements Underway

3,500 megawatts of generation has retired or will retire in coming years:

Brayton Point Station	1,535 MW	4 units (coal and oil)
Salem Harbor Station	749 MW	4 units (coal and oil)
Vermont Yankee Station	620 MW	1 unit (nuclear)
Norwalk Harbor Station	342 MW	3 units (oil)
Mt. Tom Station	143 MW	1 unit (coal)

Several additional retirements are unconfirmed, but “looming”.

Resource Shift Creates Reliability Challenges

- New England's generation fleet is changing rapidly--older, fossil fired units are retiring and reliance on natural gas for power generation is rising.
- ISO-NE must rely increasingly on resources with uncertain performance and availability
 - Intermittent resources (wind, solar) may not produce power at times it is needed most.
 - Natural gas resources lack fuel storage and rely on “just in time” fuel.
 - Coal, oil steam fleet is aging, prone to mechanical problems, subject to increasingly stringent environmental regulations.

Reliable operation of New England power system is challenged by these developments, particularly in winter.

Demand for Natural Gas Has Increased, but Pipeline Infrastructure Has Not

- Unlike electrical transmission, new pipelines will not be built without customers signed up for long-term contracts for capacity.
- Historically, natural gas generators have not entered into long-term contracts for pipeline capacity.
- Gas Local Distribution Companies (LDCs) cannot contract for gas infrastructure expansion beyond the needs of their commercial and residential natural gas customers
- A variety of factors, including economics and legal and regulatory restrictions, hamper private investment in more natural gas infrastructure.
- Public policy goals are driving a second wave of transformation toward more renewables, distributed generation and energy efficiency.

Natural Gas and Renewables--How Does Natural Gas Support Renewable Energy?

- Natural gas and renewable energy have a symbiotic relationship--each facilitates the other.
 - Solar and wind are “intermittent” resources, they are only available when the sun is shining or the wind is blowing.
- Because forecasts often differ from weather actually experienced, it is uncertain how much power renewables will be able to provide the electric grid on any given day.
 - Grid operators need backup sources of power to account for the variability and uncertainty associated with renewable energy.
 - As renewables continue to provide a greater share of electricity, a greater amount of backup capacity from other power sources will be needed.

- Natural gas serves as an ideal backup source of electricity to support renewable energy because of its flexibility and reliability--gas-fired generators can turn and off very quickly--typically in as little as 10 minutes--and thus provide a flexible and reliable power source to accommodate fluctuating weather patterns.
- Natural gas is commonly said to be a “bridge fuel” to renewables, providing an anchor source of electricity as renewable energy continues to grow in scale.

From kindermorgan.com

What is Kinder Morgan?

- It is the largest energy infrastructure company in North America.
- It owns an interest in or operates approximately 84,000 miles of pipelines that transport products like natural gas, gasoline, CO₂, and crude oil.
- It also owns or operates 165 terminals that store or handle refined petroleum products and materials like petroleum, coke and coal.
- It moves about 1/3 of the natural gas consumed in the United States.
- Company is publicly traded on the New York Stock Exchange under the ticker symbol KMI.
- Website is www.kindermorgan.com.

For further information on the Northeast Direct Pipeline, go to kindermorgan.com/business/gas_pipelines/east/neenergydirect/)

What is FERC and What Does It Do?

- The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas and oil.
- It also reviews proposals to build interstate natural gas pipelines as well as licensing hydropower projects.
- It regulates transmission and wholesale sales of electricity in interstate commerce and regulates transmission and sale of natural gas for resale in interstate commerce.
- FERC does **not** regulate retail electricity and natural gas sales to consumers.
- It does not approve physical construction of electric generation facilities.
- It does not regulate local distribution pipelines of natural gas.

Website is www.ferc.gov

What is ISO and What Does it Do?

- It is an organization formed at the direction of FERC. In the areas where ISO is established, it coordinates, controls and monitors the operation of the electrical power system, either within a single US state or encompassing multiple states.
- ISO New England (ISO-NE) operates the region's power grid and wholesale electric markets for Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont.
 - It is an independent, not for profit corporation responsible for keeping electricity flowing across the 6 New England states and ensuring that the region has reliable, competitively priced wholesale electricity.
- ISO-NE has 3 key roles:
 - Overseeing day-to-day operation of the New England Power grid
 - Designing, administering and overseeing the region's competitive wholesale electricity markets
 - Managing the regional power system planning process to ensure that power systems evolves to meet future electricity needs.

Website is www.iso-ne.com

What is VELCO and What Does it Do?

- Vermont Electric Power Co. (VELCO) was formed in 1956 when Vermont's local utilities joined together to establish the first statewide "transmission only" company in order to create and maintain an interconnected electric transmission grid capable of sharing access to hydro power.
 - It currently manages a system that includes 738 miles of transmission lines, 55 substations, switching stations and terminal facilities.
 - Fiber optic communication networks that monitor and control the electric system and serves as a key link to Vermont's high-speed data internet access.
- In 2006, VELCO and Vermont's electric distribution companies formed Vermont Transco, which owns Vermont's high voltage electric transmission system and provides services under applicable tariffs to Vermont's 17 electric distribution utilities and loads throughout New England through ISO-NE.

Website is www.velco.com

Ownership Structure of Vermont Utilities

GAZ METRO L.P.

(Gaz Metro, Quebec Canada acquired Vermont Gas in 1986, Green Mountain Power in 2007 and Central Vermont Public Service Corp. in 2011).



NORTHERN NEW ENGLAND ENERGY CORP.

(NNEEC is an energy company based in Vermont. A subsidiary of Gaz Metro, it is the parent company of Green Mountain Power and Vermont Gas Systems)



GREEN MOUNTAIN POWER

(Provides electricity to over 75% of Vermont)