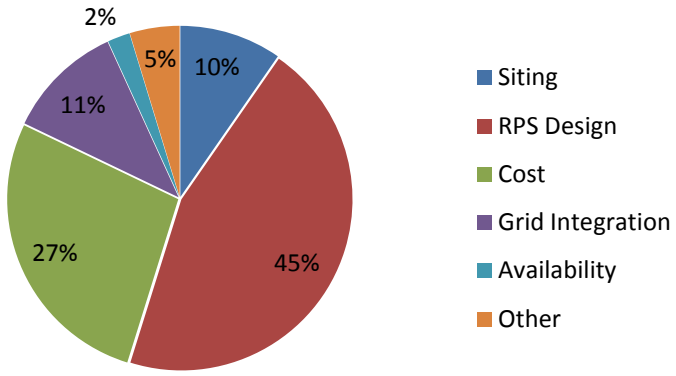
Readying Michigan to Make Good Energy Decisions – Renewable Energy

Executive Summary

The 40 renewable energy questions posted on the Ensuring Michigan's Energy Future website garnered 425 responses. The comment summary pie chart presents an overview of comments received at the website. Many additional renewable energy comments were given at the public energy forums.



Where Michigan Is Today: Michigan's current Renewable Portfolio Standard (RPS) requires electric providers to ramp up their use of renewable energy in order to obtain 10% of their electricity sales from renewable resources in 2015. Those goals are expected to be met in nearly all cases, and the exception has announced plans to wind down service. The RPS has resulted in approximately 1,400 MW of new renewable energy projects operating or currently under development in our state (94% of these new projects are wind energy projects and approximately half are non-utility owned). By the end of 2013, in total, Michigan consumers will have paid approximately $675 million in surcharges supporting this expansion. Due to decreases in renewable energy costs, surcharge collections are expected to be significantly reduced or even eliminated for some electric providers beginning in 2014, because project costs are in some cases essentially equivalent to conventional generation under current conditions.

<u>Comparison of Michigan's Current RPS to Other States</u>

- There are 29 states, Washington DC and 2 territories with renewable portfolio standards. There are 8 states and two territories with renewable *goals*.
- When comparing RPS requirements, there is a simple way of doing so (simply "year" and "number"), which is often used. Michigan's RPS is one of the less aggressive RPS programs when compared to others. With the exception of Michigan and Wisconsin, all other states with renewable energy portfolio standards include targets higher than 10%.
- This type of simple comparison does not take into account differences in the way renewables are defined, the percent of renewables already in a state's supply portfolio, whether the requirement is uniformly mandated, the annual rate of increase to meet the requirement, or the percent of RPS in comparison to load growth.
    - There is no single scale now broadly available that attempts to "normalize" and compare these different RPS standards in apples-to-apples ways.
    - In 2008, when the RPS took effect, Michigan had a very low percentage of renewables in its portfolio (assuming more traditional definitions of renewable power that would exclude nuclear, unlike some states including Ohio). It did choose to apply the standard uniformly (unlike Illinois, for example), and it mandated building new generation even if overall demand for electricity was falling.

Technical Feasibility of Increased Renewable Energy Generation

- In the scenarios discussed in the report, from a technical perspective, it would be possible to meet increased RPS targets of as much as 30% (or perhaps higher) from resources located within the State.
- Michigan is part of two multi-state markets, so from a purely technical perspective, Michigan utilities could build or purchase renewable energy generated in a very large geographic area. However, depending on the amount of energy needed, improvements in infrastructure to move that energy could be necessary. Therefore, there is no scenario in which, as a purely technical matter, even very aggressive renewable energy goals could not be met, but more aggressive goals increase the potential need for additional infrastructure improvements.
- Non-technical factors could limit the amount that is available in-state, or could restrict the ability to require generation from in-state regardless of technical feasibility. Two of those factors are legal in nature.
    - From a legal perspective, Michigan's local governments address siting of all types of electrical generation, including renewables, so local governmental rules restricting such items could reduce the available sites.
    - Also as a legal matter, Michigan's current RPS limits on where renewable energy could be located was characterized as unconstitutional in a federal circuit court of appeals decision issued on June 7, 2013. To date, no party has directly challenged the constitutionality of Michigan's current law.

Cost

- The most commonly cited cost estimates for renewables come from the Energy Information Administration's (EIA) levelized cost data from its Annual Energy Outlook 2013 for renewable and conventional generation.
- Under the current RPS, overall costs have been calculated using levelized cost data methods similar to those used by the U.S. Energy Information Administration.
- During the years Michigan's RPS has been in place, the price of the lowest-cost renewable resource, wind, has declined from over $100 per MWh in 2009 to $50 - $60 per MWh now. The predominant reason for the drop is the significant increase in wind farm capacity factors from the high 20s in 2008 to the mid-40s more recently.
- EIA reports current levelized costs for other generation characterized as renewable under Michigan's current RPS:
    - Wind - $87 per MWh
    - Hydro - $90 per MWh
    - Biomass - $111 per MWh
    - Solar - $144 per MWh
    - Wind (Offshore) - $222 per MWh
- EIA's reports current levelized costs for some generation not characterized as renewable under Michigan's current RPS:
    - Natural gas conventional combined cycle plant is $67 per MWh.
    - Advanced nuclear is $108 per MWh.
    - Advanced coal with carbon capture and sequestration is $136 per MWh.
- Even the entity that develops these estimates notes that levelized cost estimates are not the only way to estimate costs and does not attempt to quantify other costs and benefits that may be applicable. For instance, the EIA has noted that comparing costs only on a levelized basis does not reflect the system

value and operational profiles, and others have noted that costs/benefits of reduced emissions may not be reflected. Assumptions regarding the costs/benefits of these and other factors can often lead to disputes regarding the "true cost" of renewables. The report discusses alternatives to levelized cost estimates, none of which have been widely adopted to date.

- Another reason cost estimates of renewables vary is because different estimates may use a different basis for comparison. For instance, if renewable generation is compared to replacing existing generation, it will often appear more expensive. However, if renewable generation is compared as an alternative to building new types of generation, it will often appear to be less expensive.
- Many assumptions regarding future tax treatments, carbon regulations, need for building additional supporting generation and the expected rate of technical improvements can also change cost estimates.
    - One of the most important variables that accounts for different cost estimates for solar and wind generation in the future is estimated fuel costs for other types of generation. Approximately half of the renewable energy in Michigan under the current RPS will come from contracts with prices locked in for 20 years. These prices are not subject to fuel or market price volatility, like other types of generation ranging from biomass to coal to natural gas.
    - The higher the future cost of various fuels is projected to be, the better renewable energy costs will be estimated to be in comparison. Thus, recent estimates of very low natural gas prices are key in the estimated levelized cost of new natural gas generation; usually lower than that of the least expensive renewable, onshore wind.

<u>Grid Reliability (Integration & Generation Diversity)</u>

- Broadly speaking, there is agreement that a diverse generation supply portfolio is a way to minimize risk.
- In general, Michigan's grid reliability is assured by transmission system operators (MISO and for some of Michigan's southwest, PJM), who work with local operators, who in turn work with the utilities who provide retail power.
- To date, the MISO system portfolio has added more wind power than any other renewable resource. MISO reports that to date, wind has not been a factor in any system-wide reliability problems and has not resulted in any significant reliability concerns, due in part to its ability to manage the system to provide flexibility when resources (both renewable and non-renewable) do not behave as predicted.
- It is difficult at this time to calculate the additional costs that have been undertaken to assure that reliability vs. general reliability. MISO reports that it is not aware of backup capacity costs specifically attributable to the intermittent nature of wind power. However, there has been significant transmission built and planned that has helped facilitate the introduction of wind power where it might not otherwise have been supported. An example of this is the large build in the Michigan Thumb.

<u>Various Scenarios for Comparison Sake</u>

- For purposes of comparison, the report describes a number of possible scenarios for various increased renewable portfolio standards in various years. All scenarios are reliant on a number of assumptions that could change outcomes.
- In order to work in a context familiar to policy makers, the scenarios assume a continuation of PA 295 policies as a general matter, and assumed electric demand growth of between 0% and 1.2% (both scenarios were run to show the range of impact). Additional key assumptions included:

    - Renewable energy costs would be at EIA's current average estimates, however, given Michigan's recent experience with wind contracts coming in at lower prices than EIA estimates, this assumption is considered to be conservative.
    - Costs would be capped at current limits on monthly surcharges (not at current charges, which are typically lower); and an additional scenario considered reducing current surcharge caps by 50%.
    - Current renewable generation costs relative to each other would continue (i.e., wind would continue to be less expensive than solar).
- Under these assumptions, all evaluated scenarios (ranging from 15% by 2020 to 30% by 2035) are achievable.