Renewable Energy Question #24: What has MI done in the past regarding carve-outs for certain renewable sources? What have other jurisdictions done? What are the impacts of such carve-outs on adaptability, affordability, reliability, and environmental protection?

Establishing a carve-out or set-aside requirement for certain technologies under a renewable electricity standard (RES)—either by size, type of renewable energy resource, or ownership structure—has emerged an effective tool for states to accomplish specific economic, resource diversity, or environmental goals. Solar and/or distributed generation carve-outs are the most popular form of carve-outs, with 16 states having established them as part their RES policy (see Table below). Four states (Arizona, Colorado, Illinois, and New Mexico) have set minimum requirements for distributed generation by limiting the size of the renewable energy project. Two states (Colorado and New York) have minimum requirements for customer-sited renewable generation. Six states (Delaware, Illinois, Massachusetts, Oregon, and Pennsylvania) have requirements for solar photovoltaic. And, eight states (Maryland, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina and Ohio) have minimum targets for all forms of solar.

In addition to solar, several other renewable energy technologies have been included among some states' carve-out provisions. For example, Illinois, Maine, Minnesota, New Jersey, and New Mexico have established set-aside requirements for wind power (offshore wind in the case of New Jersey). Other technologies that have carve-outs in at least one state include existing hydropower, existing biomass, geothermal, swine waste and poultry litter. The Michigan RES does not have a carve-out for any renewable energy sources.

Carve-outs are proving to be a particularly effective means for stimulating the development of solar PV technologies. According to the U.S. Department of Energy's Lawrence Berkeley National Laboratory (LBNL), from 2005 to 2009, 65 to 81 percent of the annual grid-connected PV capacity additions in the United States outside of California occurred in states with active or impending solar/DG set-aside obligations. Through 2011, solar requirements in RES policies have supported 1,500 MW of solar PV development. And today, 18 of the 20 states with the most total installed solar PV capacity have RES policies in place.

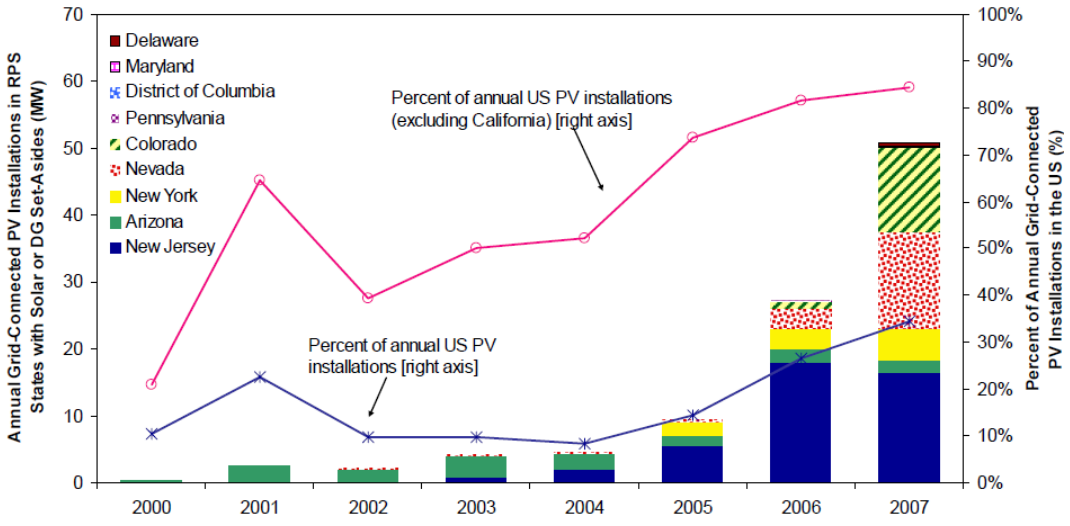


Figure 9. Annual Grid-Connected PV Installations in RPS States with Solar or DG Set-Asides[20]

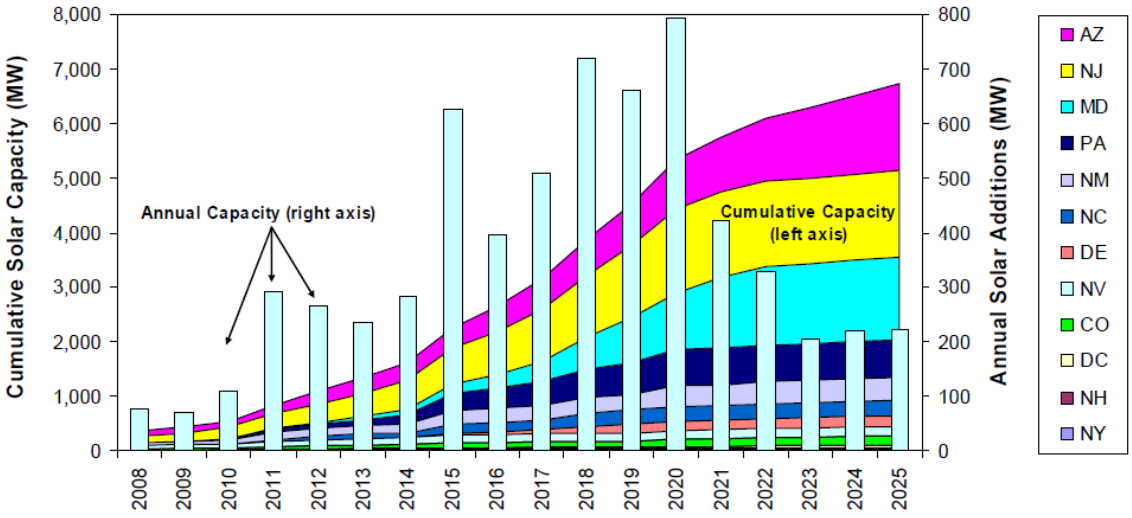


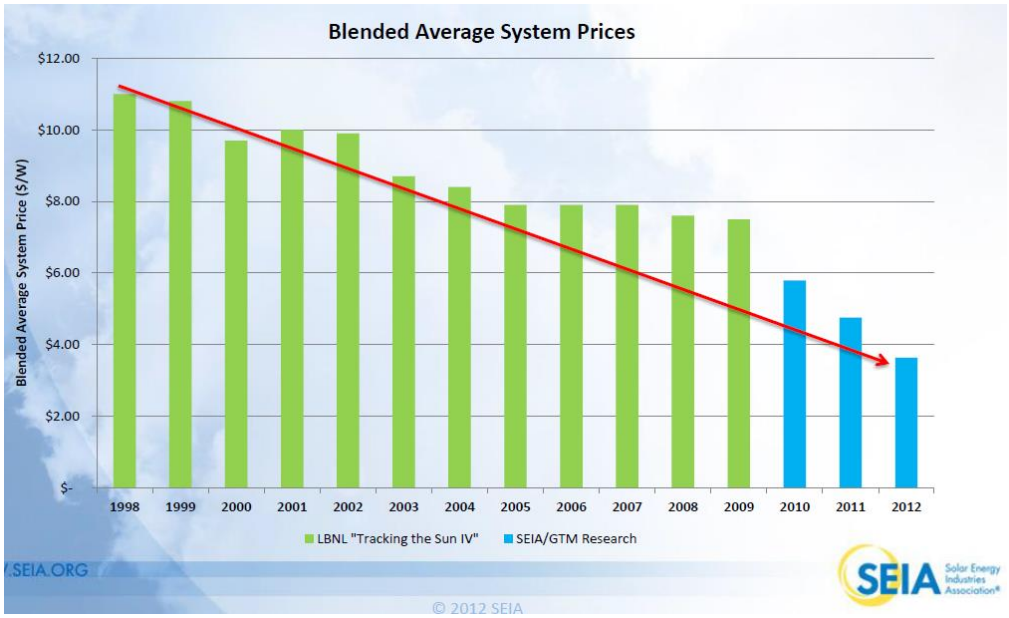
Figure 10. Solar Capacity Required to Meet Existing State RPS Solar and DG Set-Asides[22]

State	Carve-Out or Set-Aside Provision
Arizona	4.5% distributed generation by 2025
Colorado	3% distributed generation by 2020 and 1.5% customer-sited by 2020
Delaware	3.5% photovoltaic by 2026
Illinois	1.5% photovoltaic by 2025 and 0.25% distributed generation by 2025
Maryland	2% solar by 2020
Massachusetts	400 MW photovoltaic by 2020
Michigan	None
Missouri	0.3% solar electric by 2021
Nevada	1.5% solar by 2025
New Hampshire	0.3% solar electric by 2014
New Jersey	4.1% solar electric by 2028
New Mexico	4% solar-electric by 2020 and 0.6% distributed generation by 2020
New York	0.4092% customer sited by 2015
North Carolina	0.2% solar by 2018
Ohio	0.5% solar by 2025
Oregon	20 MW solar photovoltaic by 2020
Pennsylvania	0.5 photovoltaic by 2021

Adaptability: There has not been much research on the impacts of set-aside requirements writ large, but LBNL did release a study in 2010 examining the experiences and impacts of solar carve-outs. LBNL found that solar and/or distributed generation set-asides have played a significant role in the recent growth of the U.S. solar market. And while compliance with solar set-asides has been challenging in some states during the initial years, their achievement has steadily increased over time, and these set-aside provisions are poised to drive significant growth in the U.S. solar market. Furthermore, the presence of carve-outs encourages a more diverse mix of renewable energy technologies. A more diverse power mix is also more adaptable and resilient to sudden changes in market conditions.

Affordability: Solar prices have declined substantially in recent years. According to the Lawrence Berkeley National Lab and the Solar Energy Industry Association, prices have been more that cut in half over the last decade, and declined 27% between 2011 and 2012. Due to these declining costs and the consumer protection

price caps that have been implemented in most states, solar carve-outs have not been overly burdensome for consumers.



Nine states use Solar Renewable Energy Certificates (SRECs) as a market mechanism to meet their solar energy carve-outs, which helps to minimize the cost of these carve-out provisions. Some SREC markets allow a portion of solar projects to be from out of state, while others restrict trading to in-state solar projects. Most states with SRECs have also made provisions for alternative compliance payments, which entities must pay if they are not able to purchase enough SRECs on the market. These essentially set a cap on the prices of SRECs. The price cap for the solar carve-out is higher than the price cap of the broader RES, which incentivizes the development of solar projects. Also, in most states, the price cap for SRECs falls over time to reflect the anticipated fall in the prices of solar.

Reliability: Existing carve-outs for certain renewable energy sources have not had any negative effect on the overall reliability of the power supply. In fact, there is strong evidence to suggest that diversifying the power supply with renewable energy technologies can enhance the reliability of the U.S. electric grid. In addition, grid operators have the tools necessary to integrate both utility-scale and distributed generation technologies reliably onto the power grid today, in much greater quantities than existing carve-outs require. For example, they can integrate solar project over large geographical areas to help smooth out uneven power supply from individual projects. They can also share energy reserves to balance electricity supply and demand over larger areas. Improvements in weather forecasts, including the use of computer models and statistical analysis help to accurately project solar output.

Environmental Protection: Solar energy is a zero emissions resource. It does not emit global warming emissions or other harmful air and water pollutants. In addition, in Michigan and elsewhere, solar systems can be built on existing buildings or on brownfields or other degraded land, which minimizes the land use impact of solar energy.

Resources:

1) Wiser, Ryan, and Galen Barbose. 2012. *Supporting Solar Power in Renewable Portfolio Standards: Experience from the United States*. Lawrence Berkeley National Laboratory. Available at: http://eetd.lbl.gov/ea/emp/reports/lbnl-3984e.pdf

2) Database of State Incentives for Renewables and Efficiency. http://www.dsireusa.org/

3) Solar energy Industry Association. 2013. *U.S. Solar Market Insight 2012 Year-In-Review*. Available at: http://www.seia.org/research-resources/us-solar-market-insight-2012-year-review

4) Bird, Lori, Jenny Heeter, and Claire Kreycik. 2011. Solar Renewable Energy Certificate (SREC) Markets: Status and Trends. National Renewable Energy Laboratory: Golden, CO. Available at: http://apps3.eere.energy.gov/greenpower/pdfs/52868.pdf

5)Union of Concerned Scientists. 2013. *Ramping Up Renewables*. Cambridge, Mass: Union of Concerned Scientists. Online at: http://www.ucsusa.org/rampinguprenewables.