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MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

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MSSIA Annual Meeting

New Jersey Report:

OVERLAPPING CRISES FOR NJ SOLAR INDUSTRY

June 30, 2022

Lyle Rawlings, P.E.
President

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Topics:

1. TREC Extensions
2. Infrastructure/Interconnection
3. BPU long-term intentions

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1. TREC extensions:

- **MSSIA targeted efforts include:**

+ **Legislature: amend S2732 or new bill**

+ **Governor's Office: seek support for relief**

+ **BPU: seek (a) relief, (b) specific criteria, (c) recognition of global supply chain issues and pandemic-related governmental delays**

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1. TREC Extensions

Potential Allies:

1. New Jersey Association of School Board Officials (NJASBO)
   Many school districts at risk, banding together
2. Towns at risk
3. State Agencies at risk
4. Influential Consultants

There may be issues with different treatment for public vs. private clients

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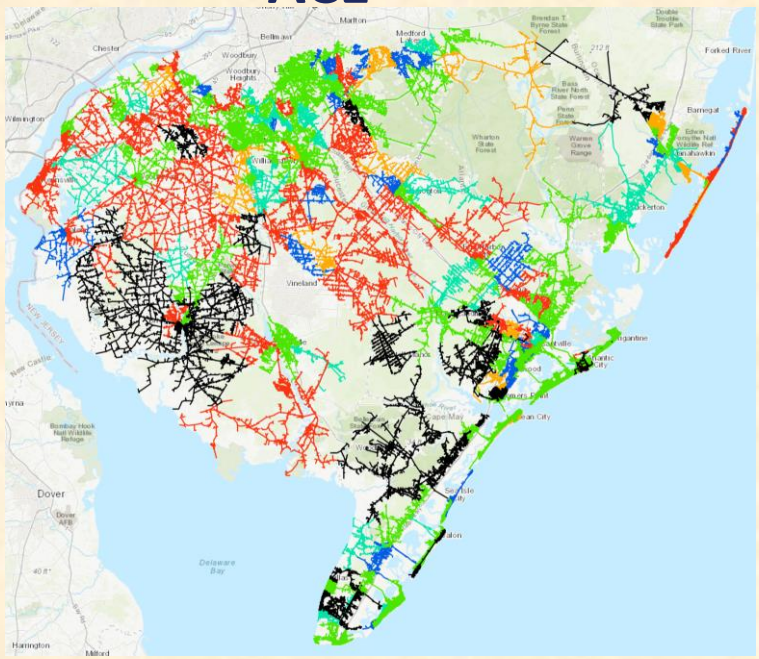
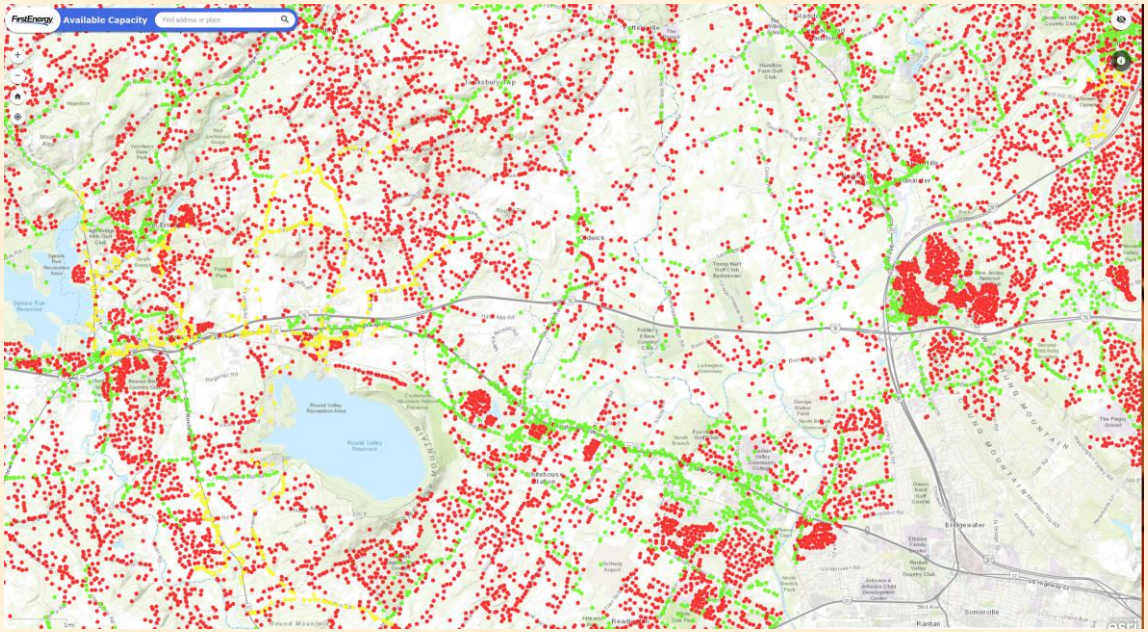
2. Infrastructure/Interconnection

ACE



JCP&L



PSE&G

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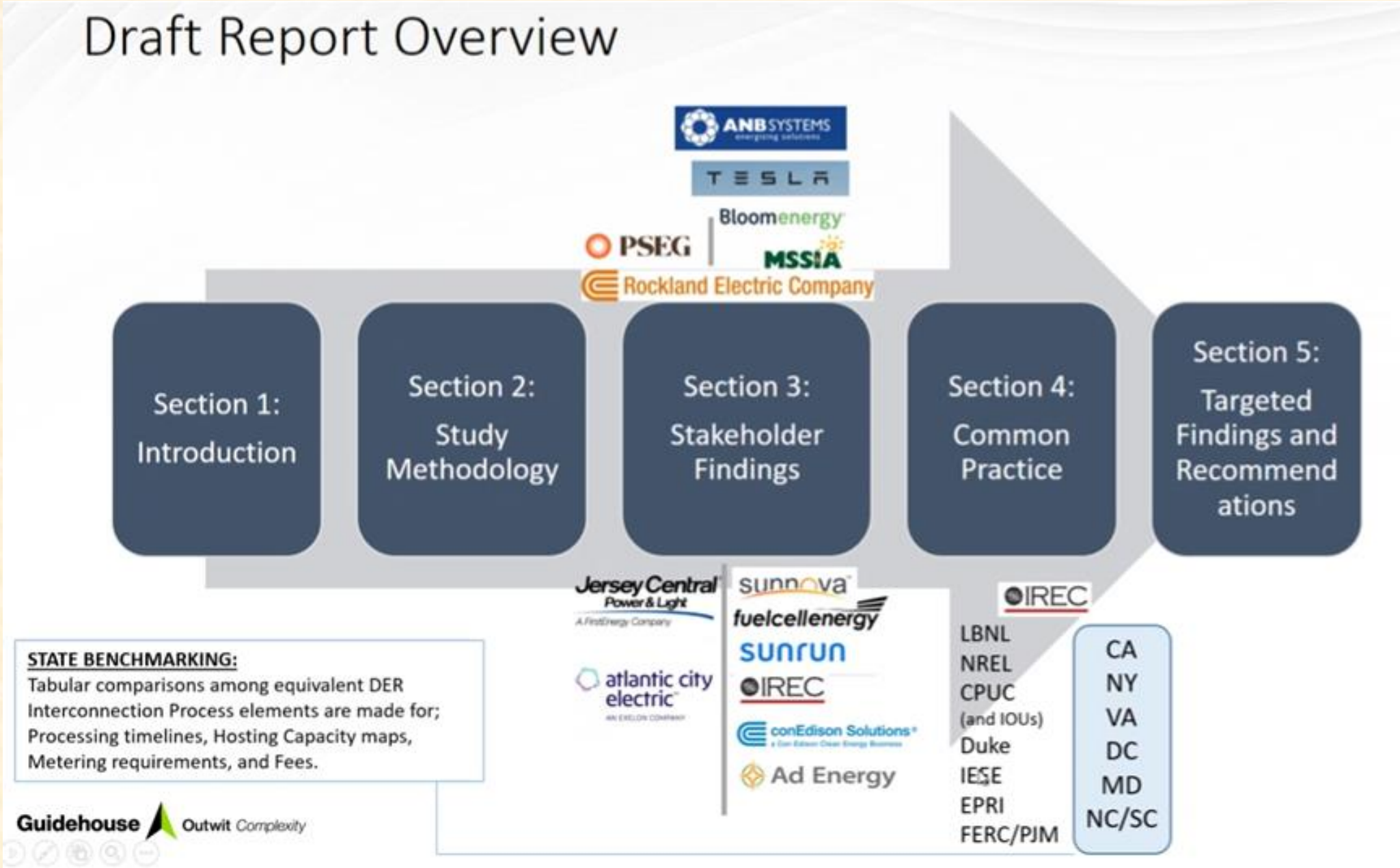

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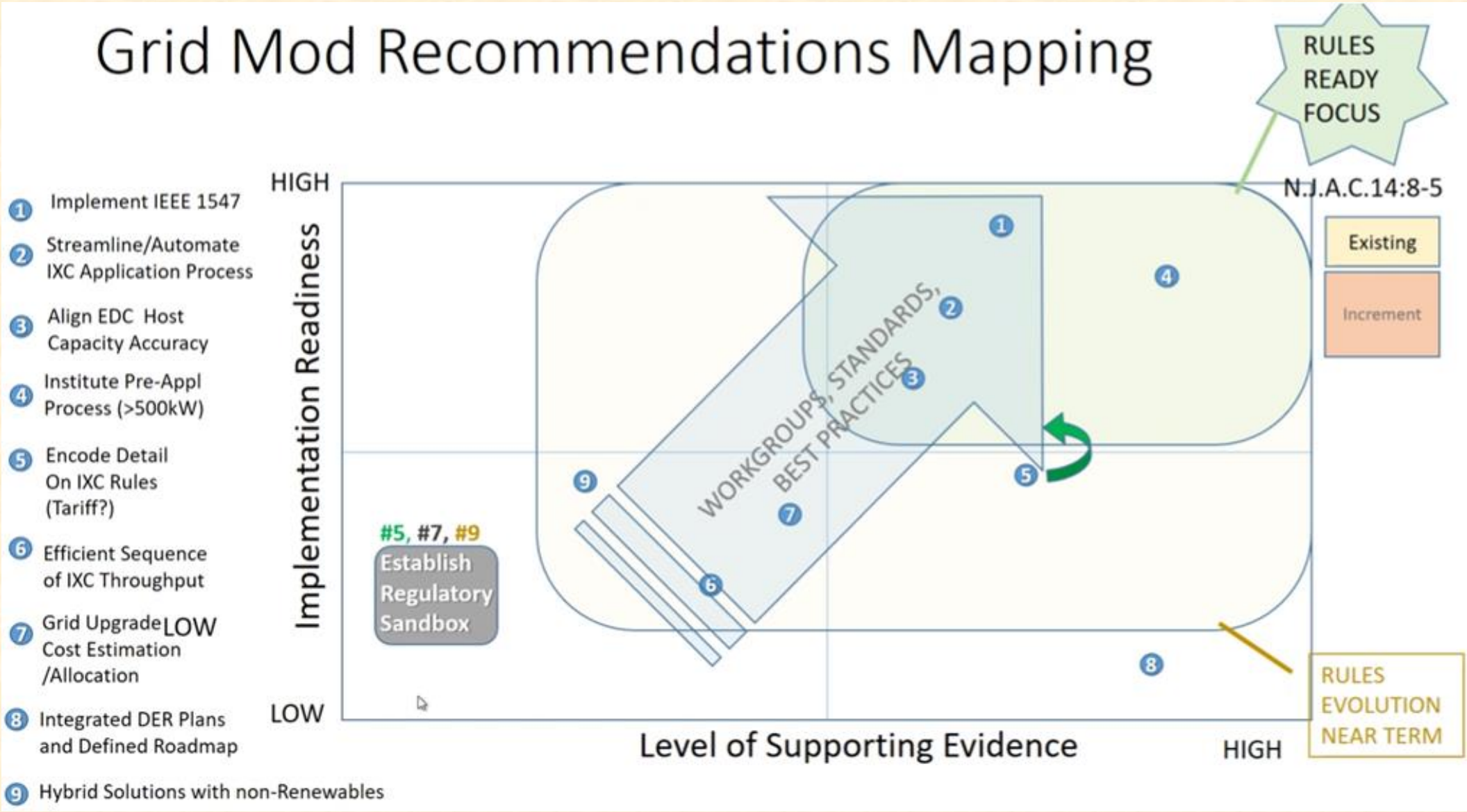

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2. Infrastructure/Interconnection

Low-Hanging Fruit to Re-open Circuits:

1. Allow reverse flow through substations

2. Use the reactive power capabilities of solar inverters

3. Utilize batteries connected to PV systems

4. Utilize predictive services to control ramp-down of PV systems

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2. Infrastructure/Interconnection

Low-Hanging Fruit – Detail:

1. Allow reverse flow through substations

Substations can handle reverse flow (solar power input momentarily exceeding the load on the substation and flowing back into the sub-transmission or transmission system). Usually minor changes to the substation's control system is all that is necessary to greatly increase the amount of solar power that can be connected to the substation, compared to the current restrictions.

2. Use the reactive power capabilities of solar inverters

All solar inverters already have a built-in capability that is extremely potent – the ability to provide controllable reactive power services. When reactive power can be deployed in a controllable fashion in a circuit, it can be used to stabilize voltage (it's called volt-VAR control). MSSIA members have seen the hosting capacity of circuits more than double with the deployment of even a small fraction of a solar project's controllable reactive power capability. These capabilities can also be used to solve distribution system issues that are unrelated to solar power. For years now, New England ISO has required every PV project over 5 MW to activate its ability to provide this service.

3. Utilize batteries connected to PV systems

Batteries can provide several different types of power smoothing services that can help preserve a stable and resilient grid. With the current interconnect regulations, however, batteries are not allowed to be used to increase the hosting capacity of distribution circuits. The Clean Energy Act required the development of large amounts of grid-connected battery power in order to enable the transition to renewable energy. They should be allowed to perform that function.

4. Utilize predictive services to control ramp-down of PV systems

Today highly granular satellite weather data is available. This data is already used widely in many parts of the country, and elsewhere around the globe, for very accurate, short-term forecasting of changes in PV power systems' output. These services are used routinely to ensure gradual ramp-down of PV systems so that no harmful voltage fluctuations are caused.

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3. BPU Long-Term Intentions

APPROACH

Step 1: Key Scenario Assumptions - 2030

	Current Policy Pathway	EMP Achievement Pathway	Ambitious Pathway
Energy Efficiency			
Reduction in energy use	Cumulative: 9% electric and 5% gas use reduction compared to 2020. Annual average YoY: 1% for electric, 0.5% for gas	Cumulative: 12% electric and 7% gas use reduction compared to 2020. Annual average YoY: 1.3% for electric, 0.7% for gas	Cumulative: 12% electric and 7% gas use reduction compared to 2020. Annual average YoY: 1.3% for electric, 0.7% for gas
Transportation Electrification			
Light duty EV share in 2030	30% of sales, 10% of stock (467K electric vehicles on the road)	85% of sales, 29% of stock(*) (1.3M electric vehicles on the road)	85% of sales, 29% of stock (*) (1.3M electric vehicles on the road)
Medium duty EV share in 2030	20% of sales, 4% of stock	65% of sales, 13% of stock (*)	65% of sales, 13% of stock (*)
Heavy duty EV share in 2030	13% of sales, 2% of stock	43% of sales, 7% of stock (*)	43% of sales, 7% of stock (*)
Building Decarbonization			
Reduction in natural gas use	Natural gas demand declines at 0.2% YoY rate from 2020 to 2030	Natural gas demand declines at 2.4% YoY rate from 2020 to 2030	Natural gas demand declines at 3% YoY rate from 2020 to 2030
Energy			
RPS Class I renewables	50% by 2030	50% by 2030	58% by 2030
Nuclear	~3.5 GW	~3.5 GW	~3.5 GW
Solar	12 GW (after 2026, continue adding same annual quantities under SuSI)	12 GW (after 2026, generic PJM solar purchases rather than through SuSI)	14.5 GW
Storage	2 GW	2.5 GW	2.5 GW
Offshore wind	3.7 GW	3.7 GW + 1.2 GW (3rd solicitation)	3.7 GW + 1.2 GW (3rd solicitation)

Note: Technology efficiencies and prices do not change across scenarios.

(*) These market shares are not Brattle projections of the likely EV adoption in 2030. They reflect meeting the 330K EV goal s in 2025 as is modeled in the EMP least cost scenario and extension of the same trajectory to 2030.

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4. Solar panel recycling / disposal

- Lyle Rawlings was appointed by Gov. Murphy to the New Jersey Solar Panel Recycling Commission.
- The Commission is led by NJ DEP, and has representation from recycling providers and academia.
- DEP and others on the Commission are advocating that the Commission recommend requiring that solar panels be recycled, or disposed of as "Universal Waste". Both are expected to be more costly than disposal in ordinary landfills.

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Appendix:

Costs, Benefits, and Affordability of a Clean Energy Future In New Jersey

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Can we afford a clean energy future?

MSSIA Mini-study on the affordability of electric power in NJ relative to other states:

Rates: **New Jersey ranks 10th** out of the 50 states and D.C. in rates. All the other states in the Northeast have higher rates than Jersey, except Maine, which is very slightly lower than Jersey.

Bills: (Per Capita Expenditures on Electricity)**: New Jersey ranks 30th** due to its low average usage. Being more *efficient at using* energy helps keep bills low in states like New Jersey and California.

Affordability: (Percent of Personal Income Spent on Electricity)**: New Jersey ranks 45th.** The national average percent of personal income spent on electricity is 0.79%. New Jersey's percent of income spent on electricity is 0.61%, placing it near the bottom of all US states and D.C.

Can we afford a clean energy future?

DOE Solar Futures Study, September 8, 2021:
"A renewable-based grid will create significant health and cost savings – Reduced carbon emissions and improved air quality result in **savings of $1.1 trillion to $1.7 trillion**, far outweighing the additional costs incurred from transitioning to clean energy. The projected price of electricity for consumers does not rise by 2035, because the costs are fully offset by savings from technological improvements."

Lawrence Berkeley Laboratory, 2018: "Impacts of High Variable Renewable Energy (VRE) Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making"

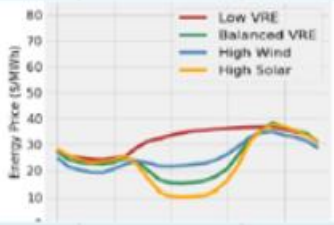
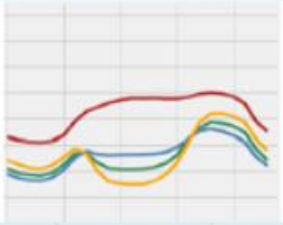
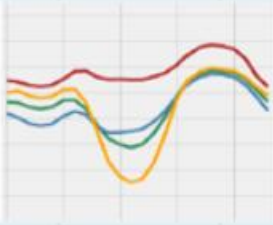
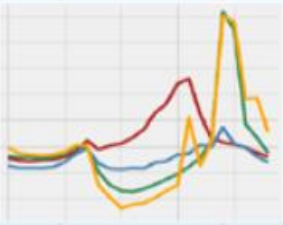
40% to 50% Solar and Wind by 2030 will **reduce wholesale costs in NYISO by 39%**

Impacts of High Variable Renewable Energy Futures on Wholesale Electricity Prices, and on Electric-Sector Decision Making

NYISO – with 40-50% Wind & Solar, Wholesale costs drop 39%

Wholesale Price Effects of 40-50% Wind & Solar

(Wind: 30% wind & 10+% solar | Balanced: 20% wind & 20% solar | Solar: 30% solar & 10+% wind)

Impacts in 2030 relative to baseline with 2016 wind & solar shares	Southwest Power Pool 2016: 18% wind & 0% solar			NYISO (New York) 2016: 3% wind & 1% solar			CAISO (California) 2016: 7% wind & 14% solar			ERCOT (Texas) 2016: 16% wind & 1% solar		
	Wind	Balanced	Solar	Wind	Balanced	Solar	Wind	Balanced	Solar	Wind	Balanced	Solar
Lower Average Prices [$/MWh]	-19%	-21%	-27%	-37%	-38%	-39%	-25%	-23%	-27%	-25%	-17%	-15%
More Hours <$5/MWh In baseline: 0% of all hours	6%	8%	13%	2%	7%	11%	6%	7%	11%	6%	11%	19%
Changes in Diurnal Price Profile red baseline shows 2016 wind & solar shares												
More Price Variability	1.8x	2.1x	2.5x	2.1x	2.3x	2.5x	3.0x	2.9x	3.4x	1x	4.7x	6.6x
Higher AS Prices Regulation Down	5x	6x	9x	2x	2x	3x	3x	3x	3x	2x	3x	4x
Change in Timing of Top Net-Load Hours	Shift from 4pm to 7pm			Shift from 3pm to 5-7pm			No further shift 7pm			Shift from 3pm to 6-8pm		

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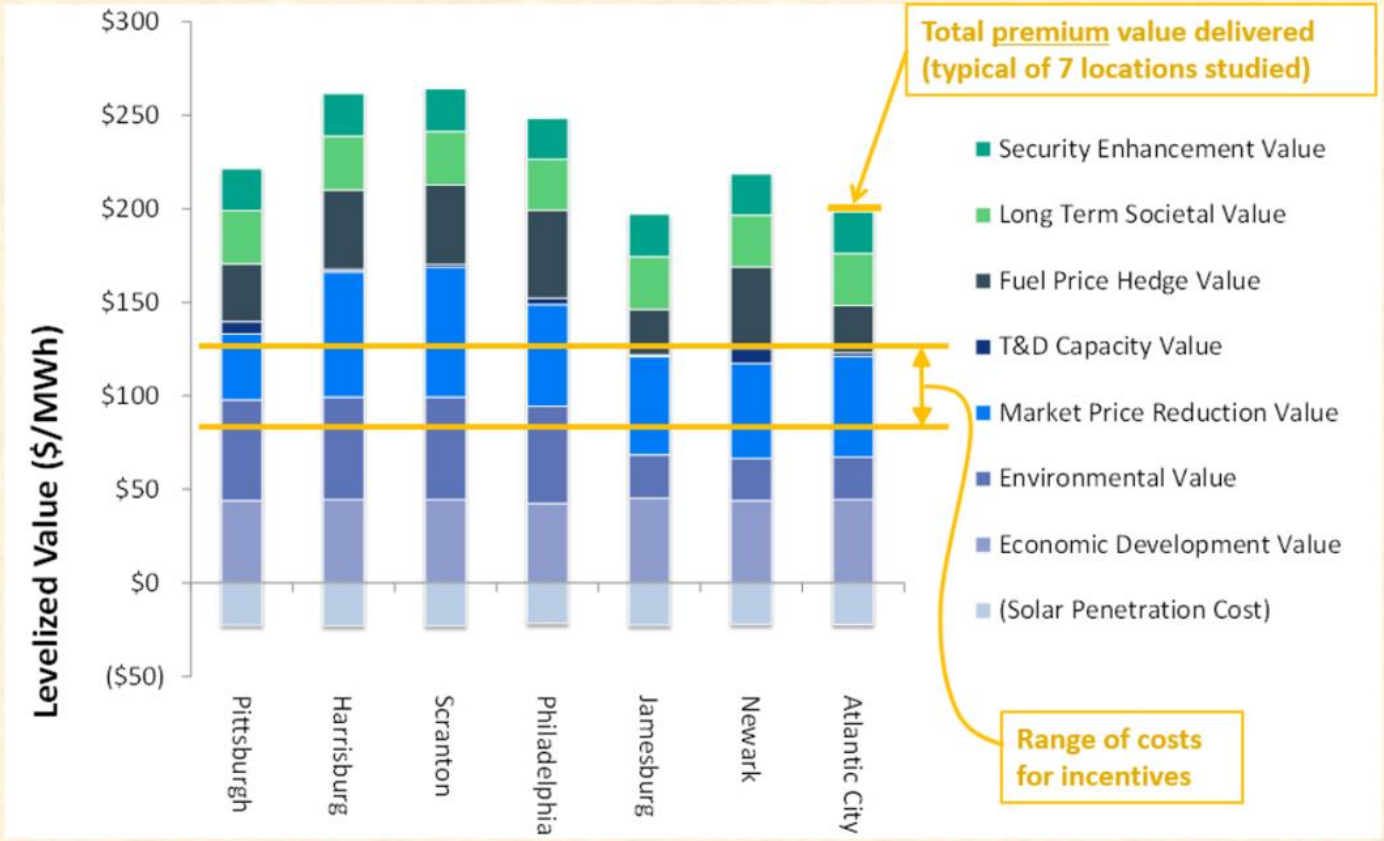
Can we afford a clean energy future?

MSSIA Study, 2012: "The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania" (by Clean Power Research)
The **Attribute Value** of solar power in NJ is **$170 per MWH**

Solar energy is a high-value renewable resource that will play a key role in securing a renewably-fueled future.



The services delivered by solar power in New Jersey are worth more than the incentive payments that are necessary to deliver them (Source: The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania. Clean Power Research, Perez, Norris, & Hoff, Nov. 2012. Commissioned by MSEIA)

Can we afford a clean energy future?

MSSIA Mini-study (ongoing, unpublished*): "Costs, Benefits, and Rate Impacts of Green Energy Programs – 2021 to 2050" Considered the costs of all green energy and EV programs, including associated infrastructure costs, on electric bills. Offsetting electric market benefits and societal benefits were also estimated.

Even without considering any benefits, **electric rates, on average, barely move** relative to 2021 as the cost of renewables drop and older, more expensive incentives gradually drop off.

When the depression of wholesale costs from renewable sources & bill reductions due to energy efficiency are considered, **each year typical residential bills will drop an average of $1.19 (cumulatively, $34.57 by 2050).**

Savings in the social cost of carbon, and savings in the cost of local pollution **provide an additional $6.12 per month savings.** Transportation cost savings due to EV's, jobs & economic growth, health-related costs, and other benefits would provide additional value.

* Study calculations and estimates available. White paper under development.