Mid-Atlantic Solar & Storage Industries Association
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MSSIA Annual Meeting

New Jersey Report:
THE FUN NEVER STOPS!!!
February 17, 2022

Lyle Rawlings, P.E.
President

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Topics:

1. Infrastructure – Our No. 1 Issue for 2022
2. The TREC deadline problem
3. Solar panel recycling / disposal
4. Senator Smith Bills

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Topics:

1. **Infrastructure – Our No. 1 Issue for 2022**

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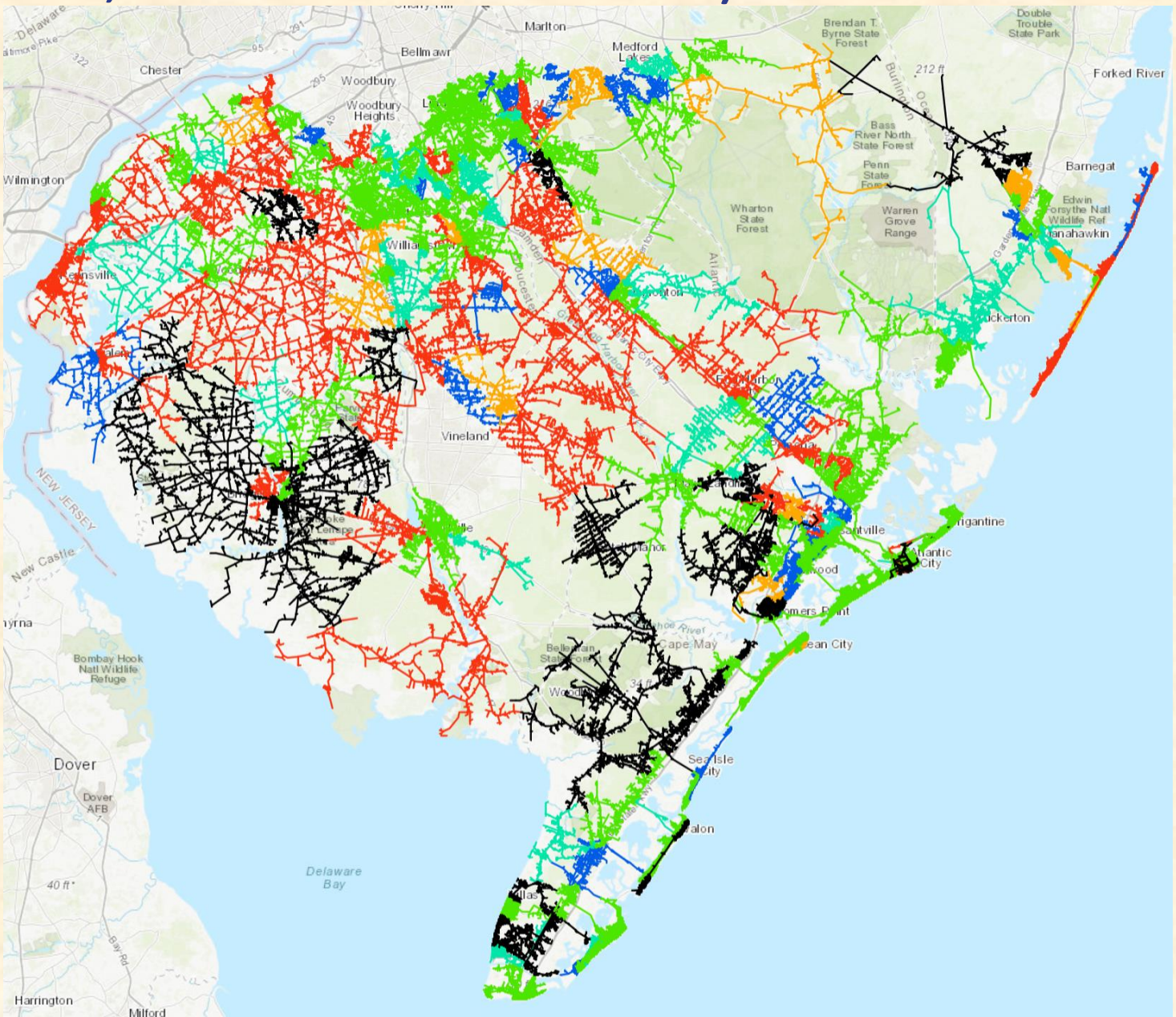
Circuits closing or severely restricted – ACE

(black is closed, red is restricted to <250 KW)



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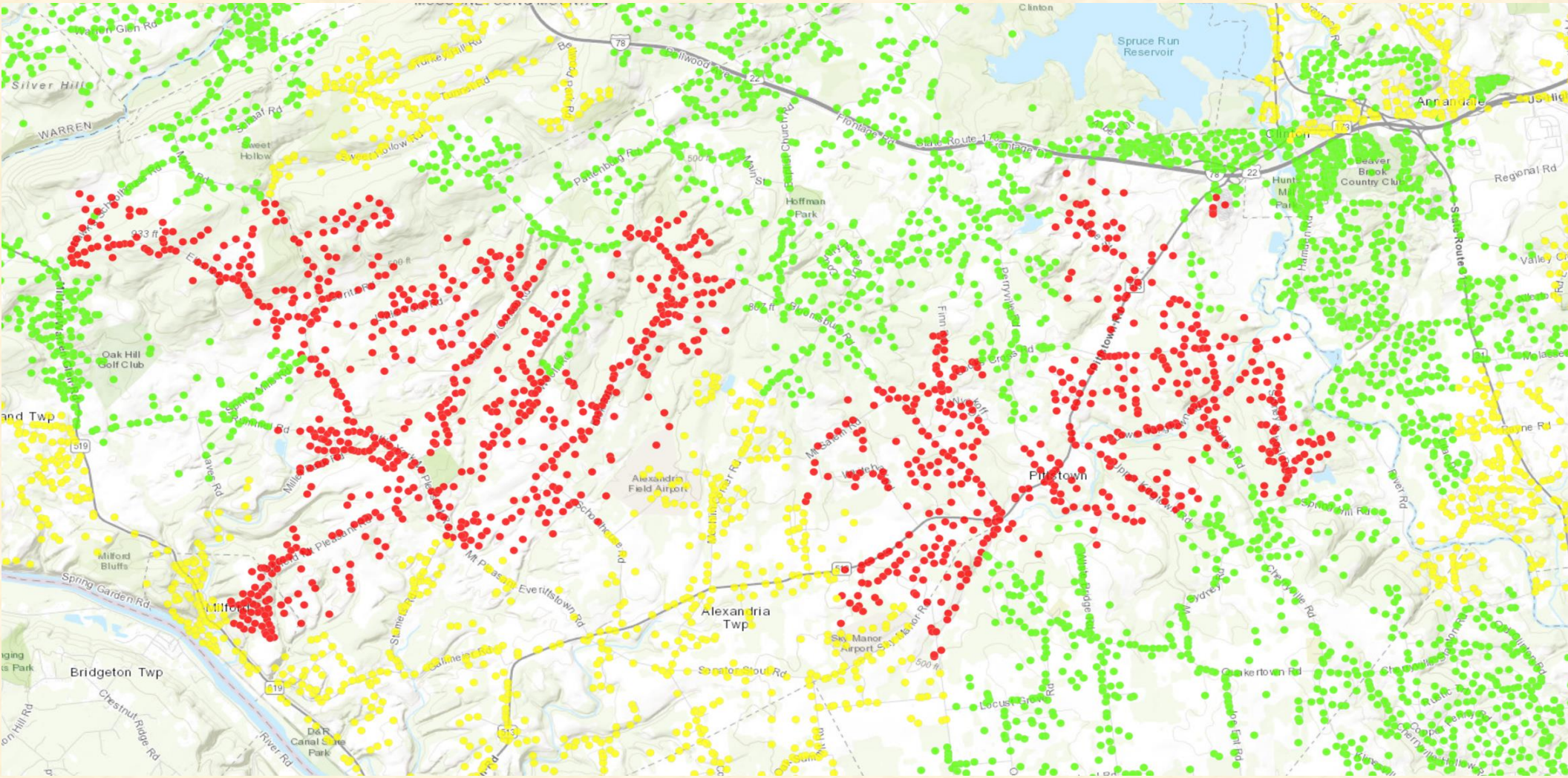
Circuits severely restricted – JCP&L (red is restricted to <100 KW)

Feb. 2020:



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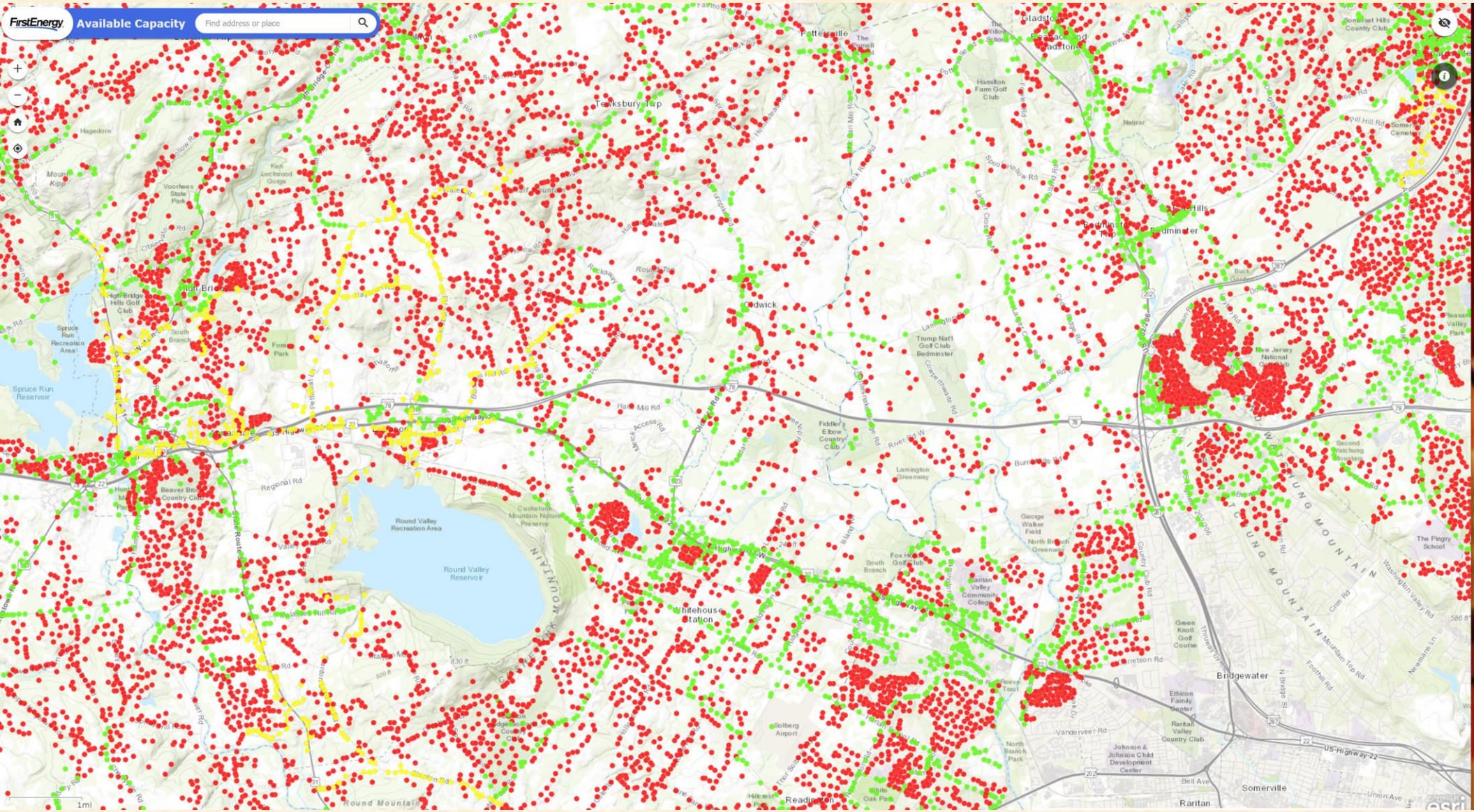
Circuits severely restricted – JCP&L (red is restricted to <100 KW)

Today:



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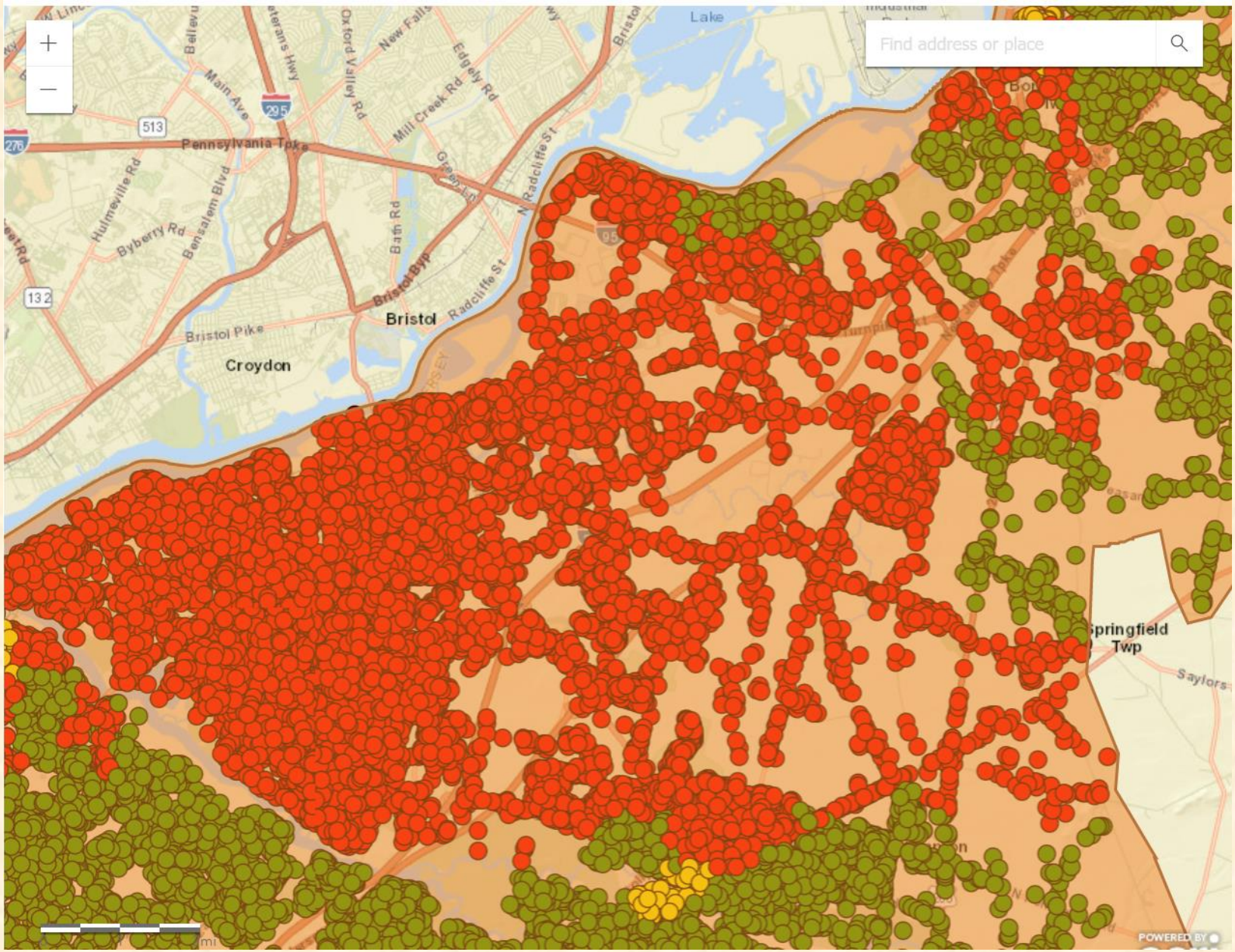
Circuits severely restricted – PSE&G (red is restricted to <100 KW)



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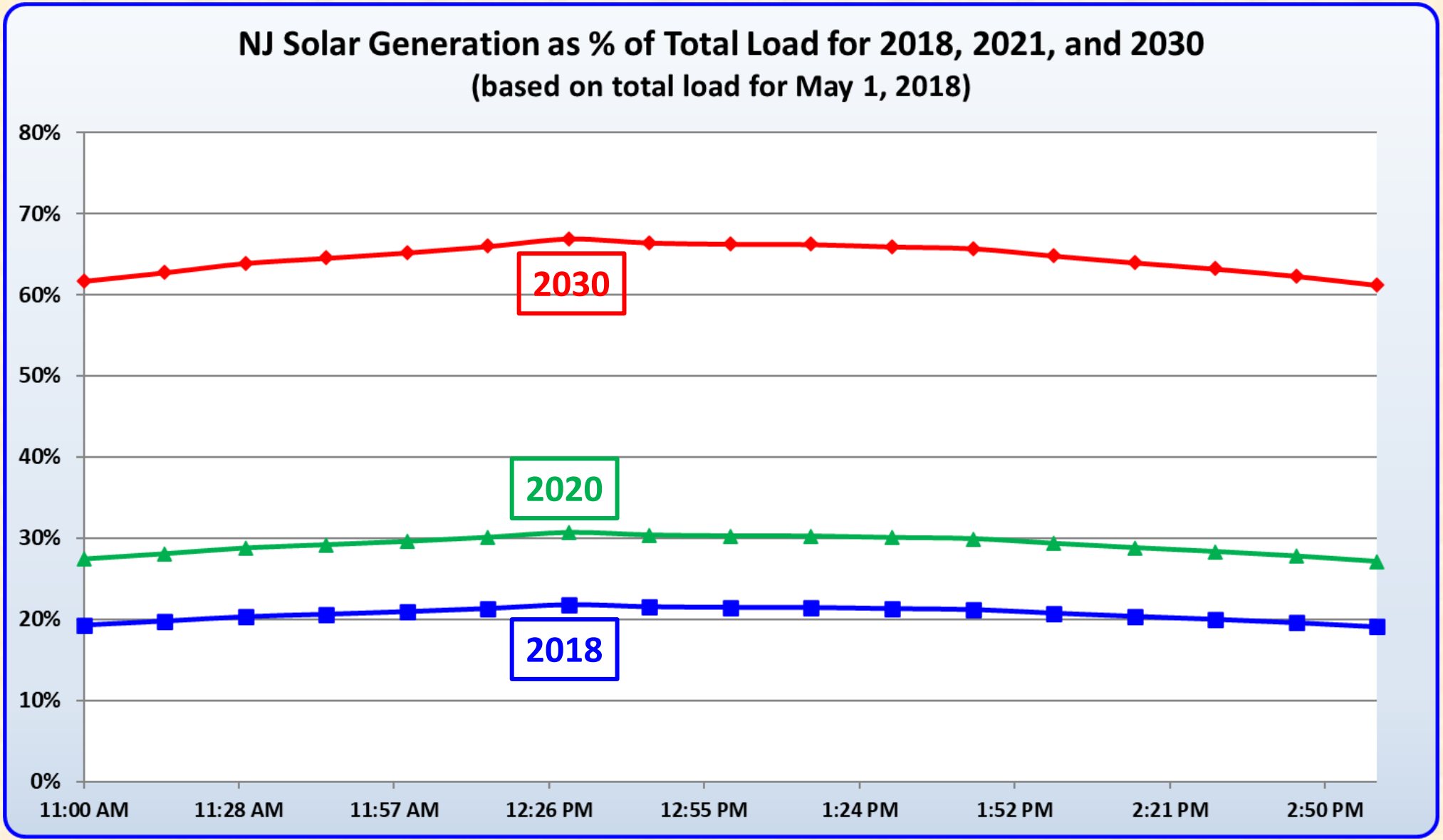
How high could NJ solar generation get as a percent of total load in 2018, 2021, and 2030?



2. The need for multi-stakeholder study to identify, at a high level, optimal pathways for the renewable energy transition

Tools for achieving a transition to renewable energy are many and varied, and some are surprising. Finding the optimal combination of these measures, and in the right amounts, is a multi-disciplinary optimization study.

It is a necessary precursor to approaching the task of making the grid renewable-ready with the lowest cost and highest reliability, and in the least amount of time. Without this level of study, we are "shooting in the dark" when we undertake costly grid modernization measures.

Perhaps the best example of such a study in the U.S. is the Minnesota Solar Pathways study. Commissioned by the Minnesota Dept. of Commerce and led by Clean Power Research, it featured collaboration among governmental agency, renewable energy industry, utility company, and environmental stakeholders.

There were surprising findings regarding the overall cost of a transition to 100% renewables, *and* regarding the best measures to get there.

MN SOLAR PATHWAYS

But New Jersey's characteristics are different…

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11 Important Infrastructure Means & Methods for Renewable Transition

1. **Generation Mix** – How much wind vs. solar vs. other is optimal?
2. **Geographic Mixing** – variations cancel each other out across distances. Crossing time zones conveys additional advantages.
3. **Load shaping and Demand Management –** Load control and real-time pricing tied to the supply vs. load balance
4. **Utilize inverter capabilities** e.g., Volt-VAR control (massive potential for voltage control)
5. **Solar smoothing with ramp-up <u>and</u> ramp-down control –** ramp-up control simply programmed into inverters; ramp-down through highly accurate forecasting
6. **Enable reverse flow through substations** – can often be a change in SCADA
7. **Overbuild and Curtail** solar power – the overbuild can be cheaper than batteries
8. **Storage** (battery, etc.)
9. **Electric Vehicle-to-Grid (V2G)** – utilize the massive capacity that will be available in vehicles when they're plugged in.
10. **Upgrading substations and circuits –** more capacity to move power "uphill"
11. **Complex, system-wide changes in control and transactions**

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11 Important Infrastructure Means & Methods for Renewable Transition

THE LOW-HANGING FRUIT

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8. **Storage** (battery, etc.)
9. **Electric Vehicle-to-Grid (V2G)** – utilize the massive capacity that will be available in vehicles when they're plugged in (~200,000 MWH by 2030).
10. **Upgrading substations and circuits –** more capacity to move power "uphill"
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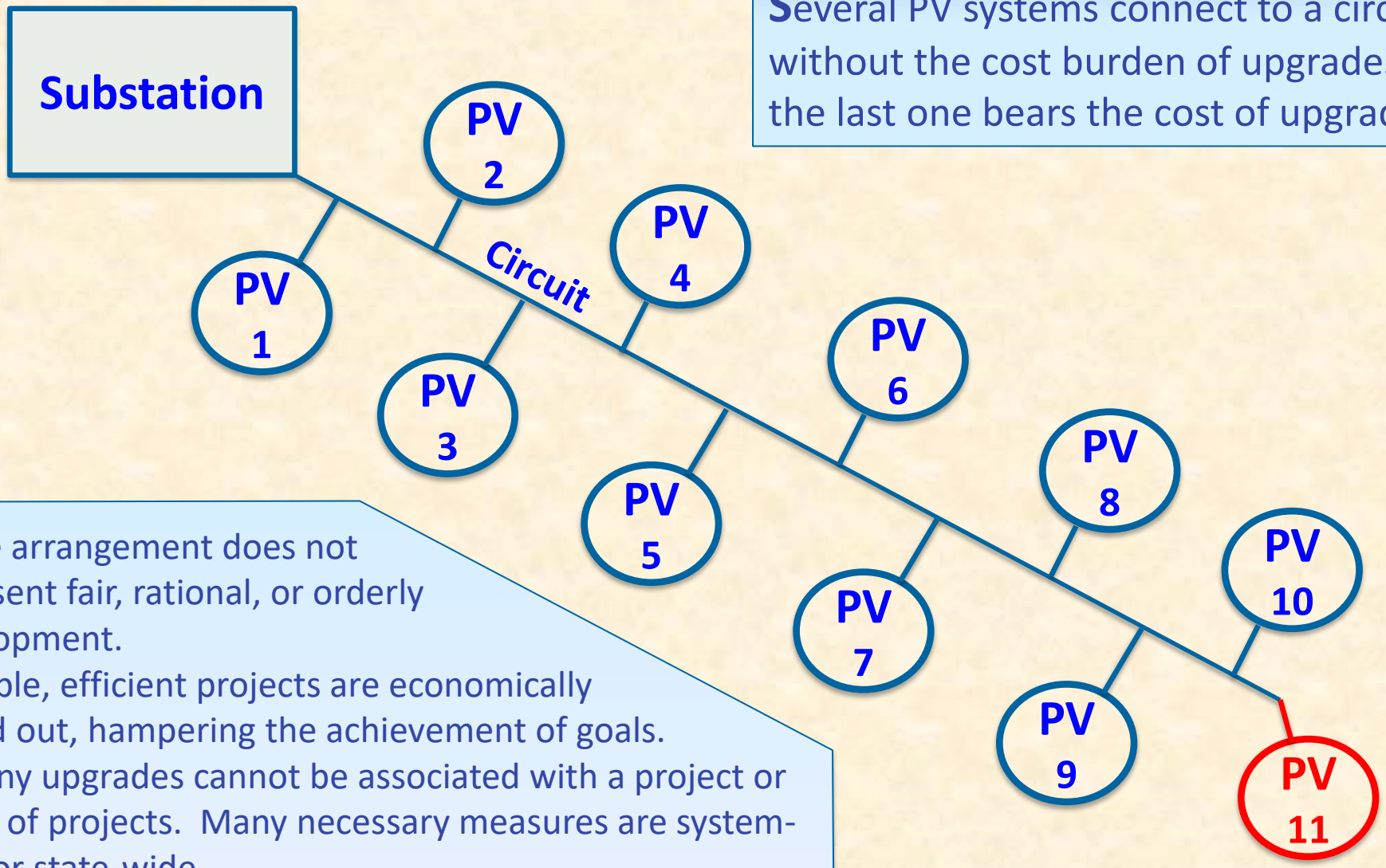
Who Should be Responsible For Grid Modernization?
Currently: Musical Chairs?

Several PV systems connect to a circuit without the cost burden of upgrades, then the last one bears the cost of upgrades.



1. The arrangement does not represent fair, rational, or orderly development.
2. Viable, efficient projects are economically locked out, hampering the achievement of goals.
3. Many upgrades cannot be associated with a project or group of projects. Many necessary measures are system-wide or state-wide.

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Who should be responsible for Grid Modernization?

- Through legislation and regulation, utilities will be made responsible for providing service to Electric Vehicle charging stations. They will make the required investments, and recover the costs through the rate base.

  Why is this the case for the state's EV transformation, but not for its solar transformation?

- Many of the grid modernization measures discussed here are area-wide or system-wide or state-wide measures. Most are the natural role of utility companies.

- The state is already behind in making the grid ready for renewables. Without entities who have the capabilities, resources, and financial wherewithal to do the work, who are positioned and ready, the development of renewables will be delayed or halted.

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Topics:

2. The TREC deadline problem:

- Guidance from staff indicates that petitions can be filed and will be considered, but the bar will be set higher than in the past. Projects at an advanced state of completion will be considered more favorably.

- In two successive BPU meetings, petitions for extensions were disapproved, but the door was left open to try again when the project is more complete.

- Much agitation and advocacy still going on for a blanket extension.

Topics:

3. 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.

Topics:

4. Senator Smith Bills, 1 of 4: "Old Bills" to be re-introduced

- **Energy Master Plan goals** (S****/A****) (Smith) – Codifies certain energy goals related to the 2019 new Jersey Energy Master Plan (needs to be reintroduced in Senate).

- **Fossil fuel plants** (SCR17) (Smith) – Amends the Constitution to prohibit the construction of new fossil fuel power plants.

Topics:

4. Senator Smith Bills, 2 of 4: "New" Bills

- **Interconnection** (S431) (Smith) – Directs the BPU to update the interconnection standards for Class I renewable energy sources and develop a fixed fee structure for interconnection costs.
- **Rate Counsel** (S430) (Smith) – Requires Division of Rate Counsel to consider environmental impacts of proposed rate or service measure when representing public interest in certain proceedings and appeals.
- **Legacy SRECs** (S439) (Smith) – Directs BPU to establish process to maintain supply and demand for solar renewable energy certificates.
- **Energy storage** – Legislation to develop an incentive program for diverse energy storage facilities (still being drafted).
- **Energy storage zoning** (S1173) (Smith) - Establishes limits on zoning restrictions for certain electric battery storage equipment installation.

Possibly – Property tax exempti0n for Community Solar

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Topics:

4. Senator Smith Bills, 3 of 4: "New" Bills - Other

- **ZEV fleet conversion** (S429/A1447) (Smith/Kennedy) – Provides corporation business tax and gross income tax credits for purchase and installation of electric vehicle charging stations and for commercial zero emission vehicle fleet conversions.

- **Dedicate SBC revenue** (SCR ***) – Proposes amendment to Constitution to dedicate revenues from societal benefits charge for certain energy-related uses established by law (needs to be reintroduced in Senate).

- **ZEV Trucks** (S432) (Smith)– Establishes certain State goals for sale of zero-emission medium-duty and heavy-duty trucks, and certain off-road vehicles and equipment.

- **Electric public transit** (S433) (Smith) – Requires all motorbuses purchased for public transportation service to be electric-powered by 2035; makes annual appropriation of $82 million.

- **School sustainability** (S434) (Smith) – Requires school districts to include environmental sustainability plan in long-range facilities plan.

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Topics:

4. Senator Smith Bills, 2 of 3: "New" Bills - Other

- **Electric bus financing –** Legislation directing the I-Bank to establish an electric bus financing program, and allowing schools to use performance and operational savings from the EV buses to repay the loans (drafted; to be introduced early next session)

- **GWRA –** Legislation amending the "Global Warming Response Act" to authorize the DEP specific authorization to regulate carbon and other greenhouse gases to meet the act's carbon reduction goals (still being drafted).

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Appendix:

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

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

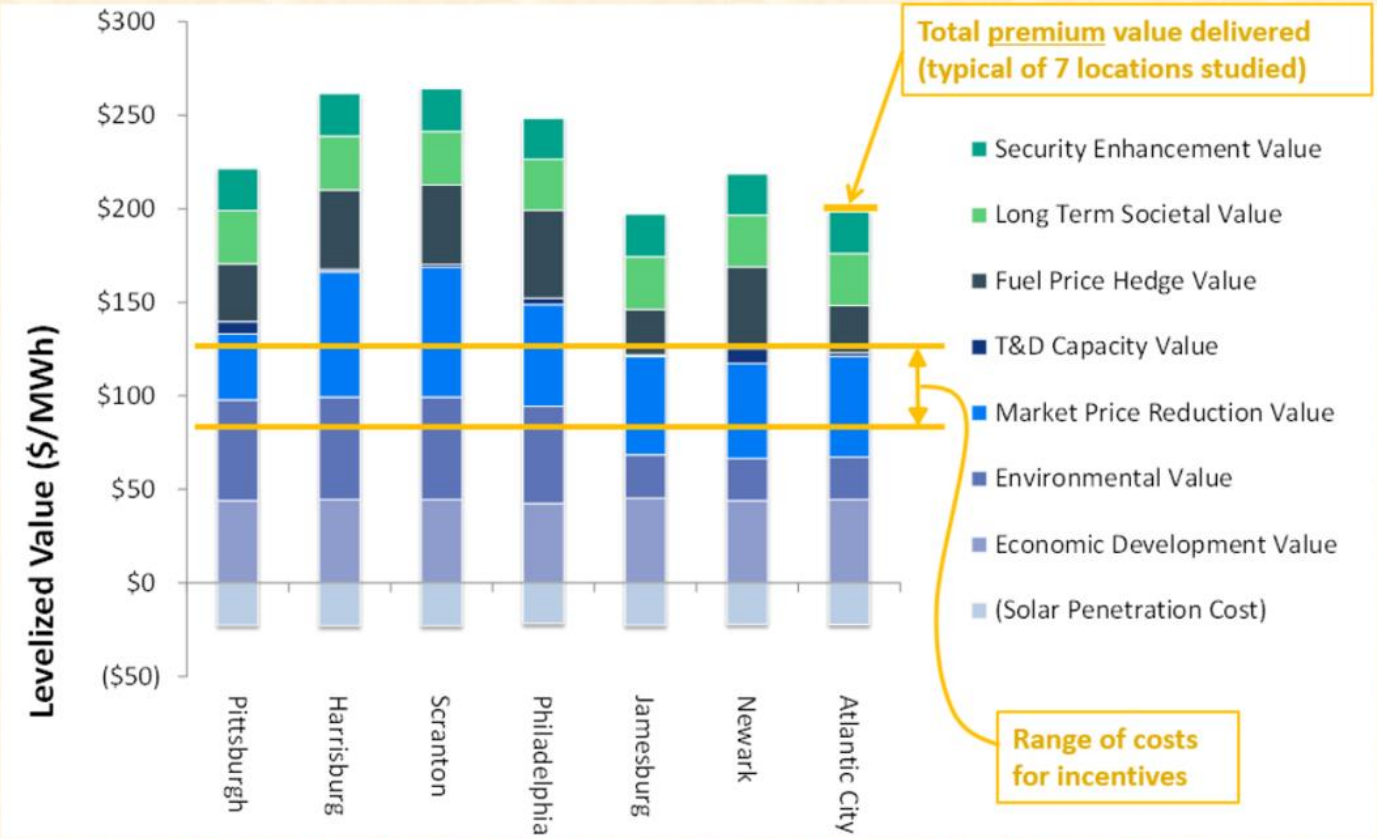
(Wind: 30% wind & 10+% solar | Balanced: 20% wind & 20% solar | Solar: 30% solar & 10+% wind)

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		

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)

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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.