Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

IN-STATE VS. OUT-OF-STATE
WHAT DO WE PAY AND WHAT DO WE GET?
A conversation on New Jersey energy policy

April 4, 2023
War Memorial, Trenton, NJ

Lyle Rawlings, P.E.
President
Mid-Atlantic Solar & Storage Industries Association
lyle@advancedsolarproducts.com

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Topics:

1. The Energy Master Plan and Integrated Energy Plan
2. Studies of the Value of Distributed Solar in NJ
3. Incentives that Circle Back Directly to Participants (and the public)

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Chevy Spark

Nissan Versa

Honda Fit

Hyundai Accent

Toyota Yaris

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

It's OK to pay more for something that's worth more.

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

The Energy Master Plan and Integrated Energy Plan

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Overarching Strategies Guiding the Energy Master Plan

Strategy 1: Reduce Energy Consumption and Emissions from the Transportation Sector
Strategy 2: Accelerate Deployment of Renewable Energy and Distributed Energy Resources
Strategy 3: Maximize Energy Efficiency and Conservation and Reduce Peak Demand
Strategy 4: Reduce Energy Consumption and Emissions from the Building Sector
Strategy 5: Decarbonize and Modernize New Jersey's Energy System
Strategy 6: Support Community Energy Planning and Action with an Emphasis on Encouraging and Supporting Participation by Low- and Moderate-Income and Environmental Justice Communities
Strategy 7: Expand the Clean Energy Innovation Economy

2.3 Maximize local (on-site or remotely-sited) solar development and distributed energy resources by 2050

2.3.3 Maximize solar rooftop and community solar development in urban and low- and moderate-income communities using the local workforce

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Continuing deployment of in-state renewables and distributed energy resources, above current goals, is consistent with a least-cost path to meeting 2050 targets. (p. 17)

While there are benefits to encouraging access to distant renewable energy generation, such as greater geographic diversity and lower cost, there are also myriad ancillary benefits to in-state renewable energy generation and DER. Local renewable generation produces jobs and investments, and locally-sited DERs, if optimally deployed, may avoid or postpone transmission or distribution investment, lower electricity congestion and locational marginal prices, and increase fuel diversity and system resiliency. Further, in-state renewable energy generation produces ongoing, local jobs in innovation-centered STEM careers such as planning, installation, maintenance, and operations

New Jersey could most cost-effectively meet its electricity demand by building 32 GW of in-state solar, 11 GW of offshore wind, and 9 GW of storage. The modeling showed that while it was cost effective to increase transmission from 7 GW to 9 GW to benefit from a certain amount of lower-cost out-of-state clean resources, it was most cost effective to meet remaining demand with in-state resources rather than build additional transmission.

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

New Jersey's Energy Master Plan
Least Cost Scenario

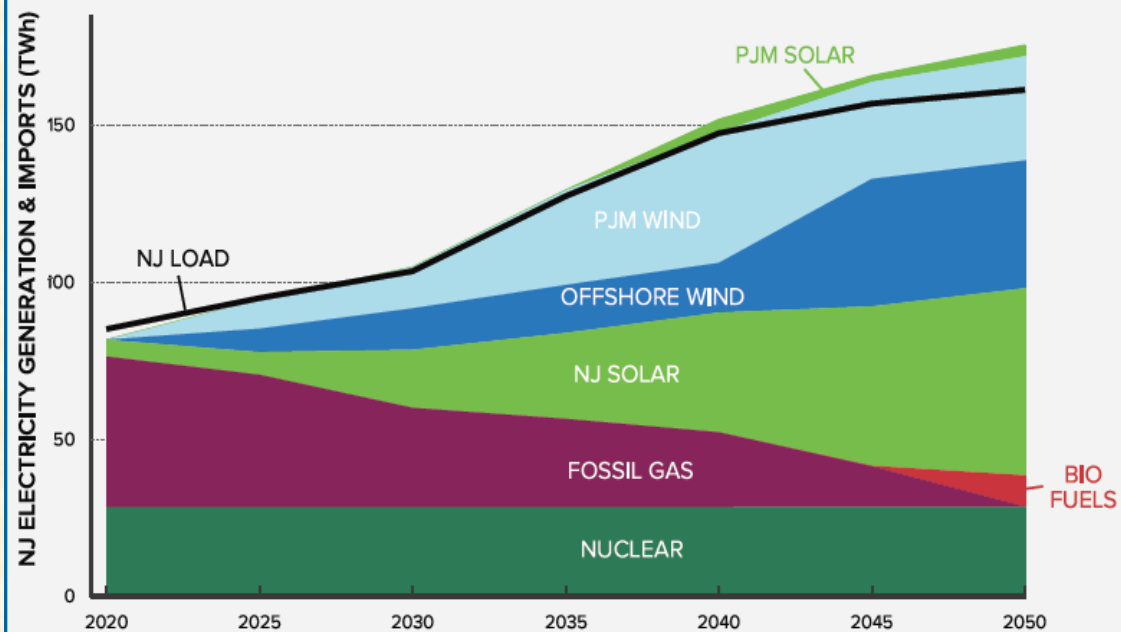
FIGURE 16.

Supply Sources to Meet New Jersey's 100% Clean Energy Requirement in 2050

6%	16%	34%	23%	2%	19%
Biogas	Nuclear	New Jersey Solar	Offshore Wind	Out-of-State Solar	Out-of-State Wind

FIGURE 8.

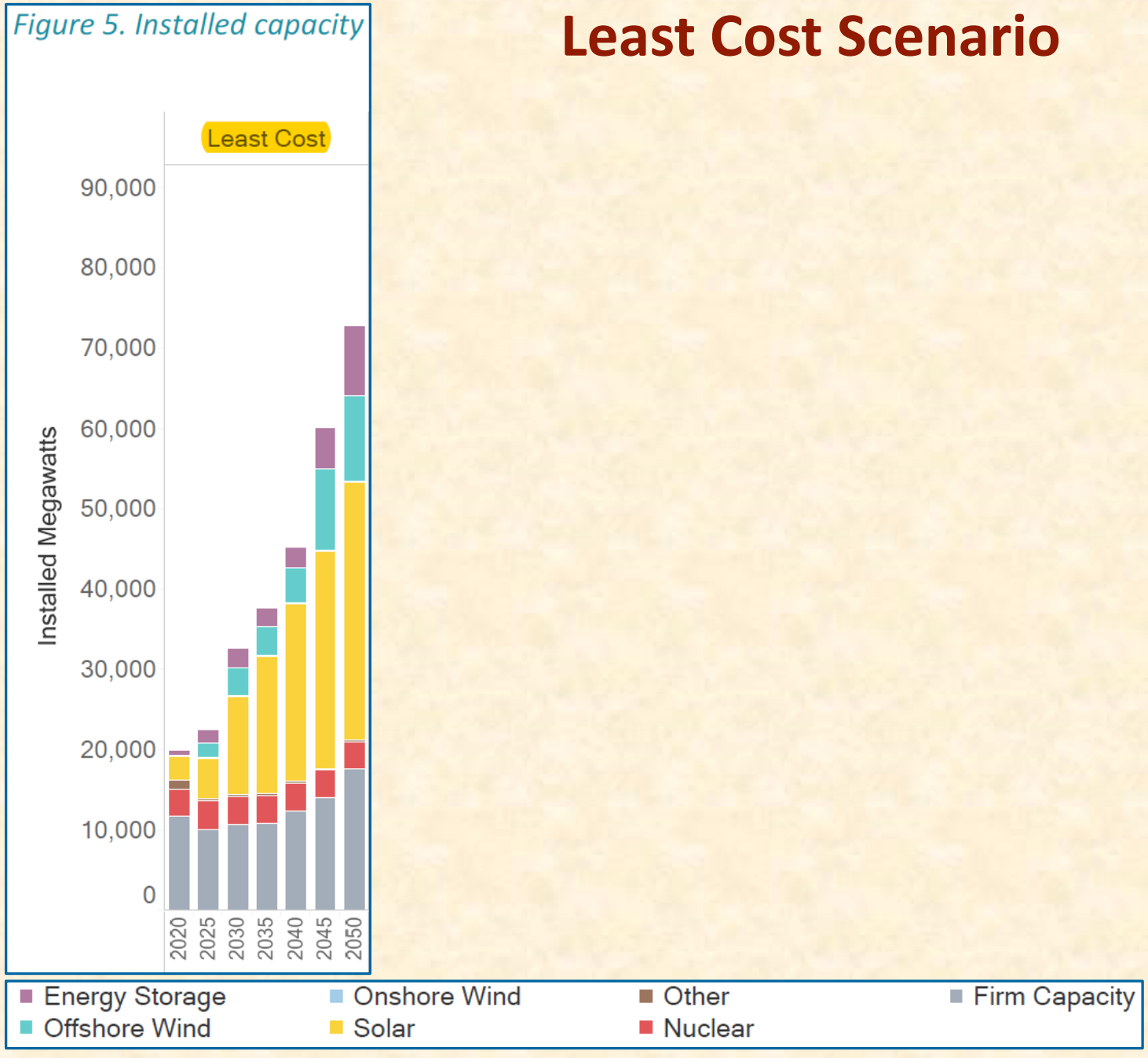
Electricity Generation, Least Cost Scenario



MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

New Jersey's Energy Master Plan
Least Cost Scenario

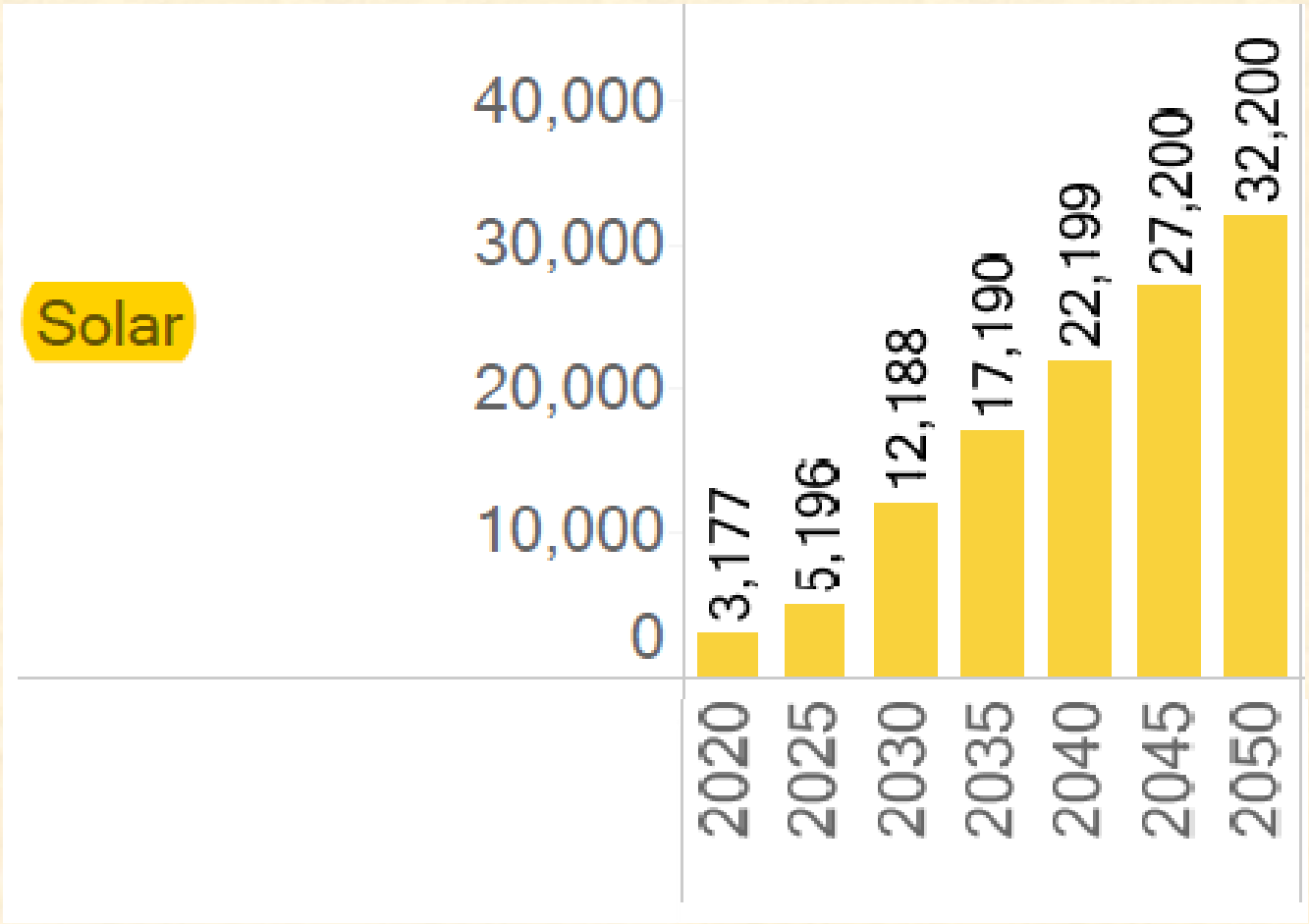
Figure 5. Installed capacity



MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

New Jersey's Energy Master Plan
Least Cost Scenario

Solar Growth By Year



MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Studies of the Value of Distributed Solar in NJ

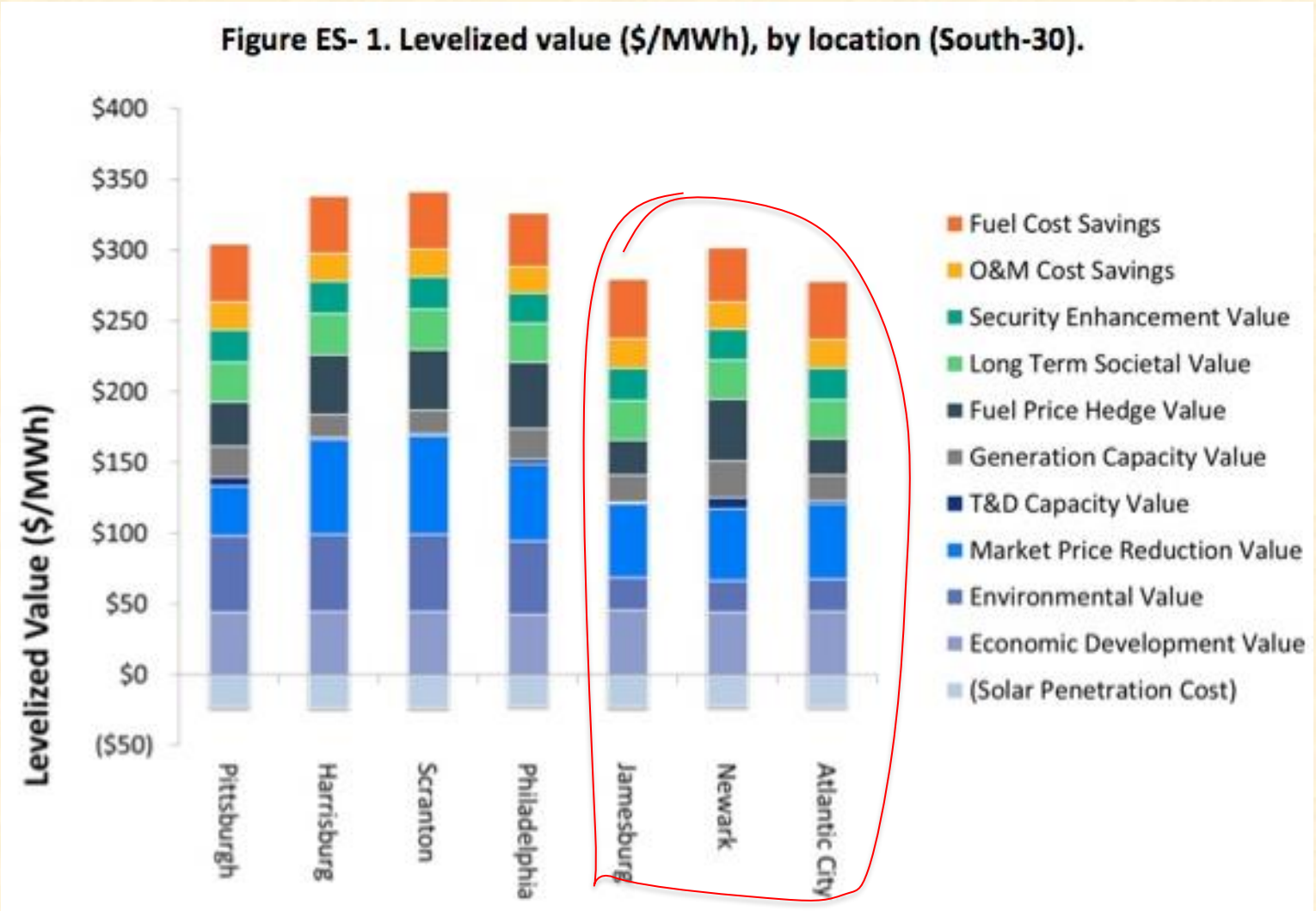
MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

EMP 2.1.6 Develop mechanisms to compensate distributed energy resources for their full value stack (p. 101)

The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania – Clean Power Research, 2012

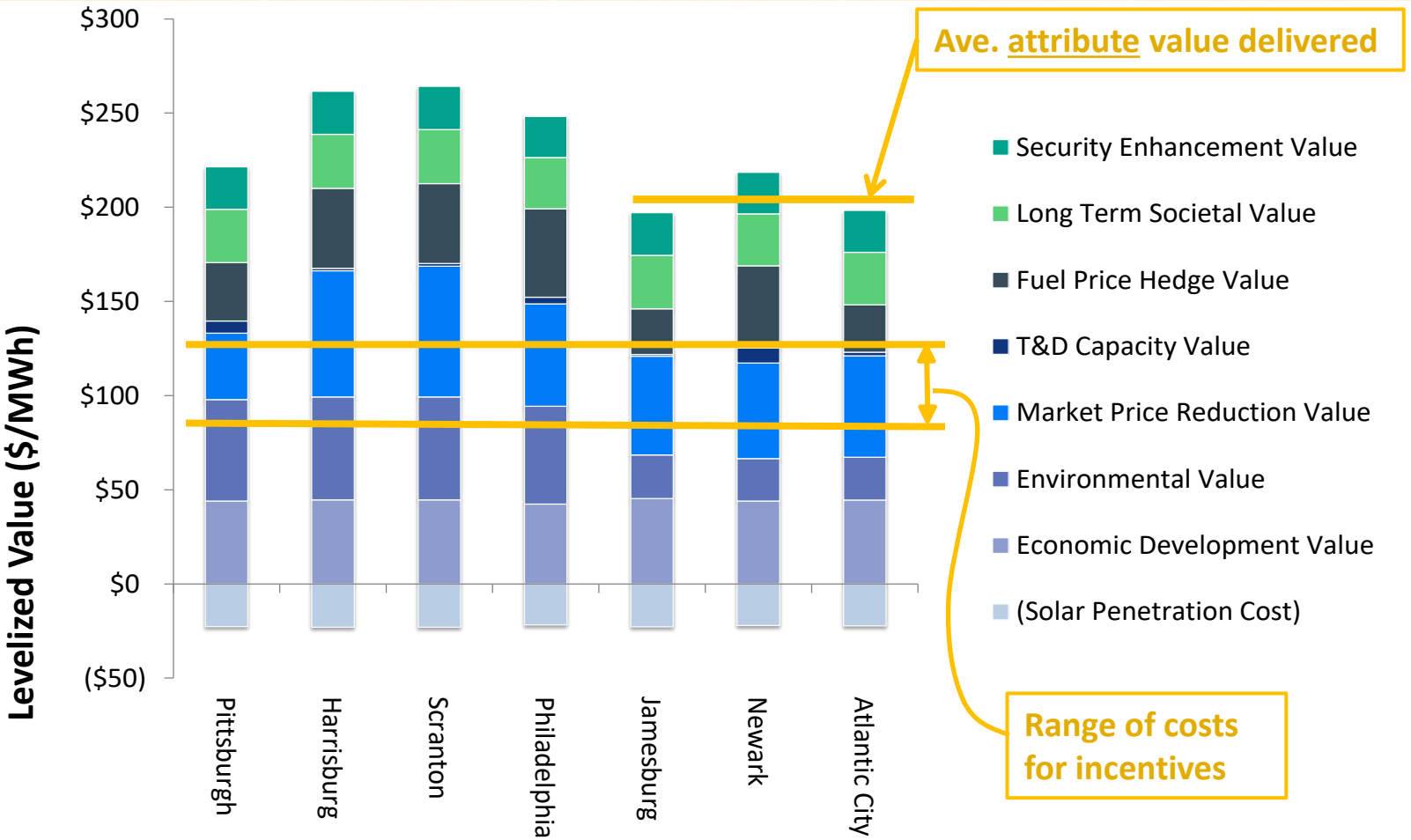


The average value of solar as bundled energy + attributes was $264/MWH in New Jersey (net of costs for grid upgrades).

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

EMP 2.1.6 Develop mechanisms to compensate distributed energy resources for their full value stack (p. 101)

The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania – Clean Power Research (continued)



The average value of solar for attributes only was ~$183/MWH in New Jersey (net of negative value for grid costs).

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

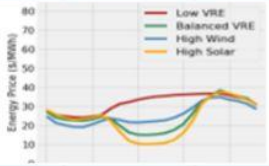
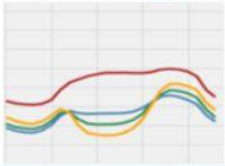
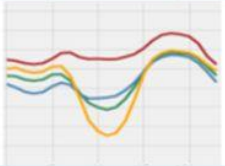
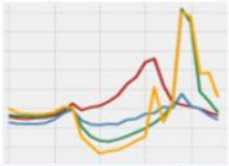
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Impacts of High Variable Renewable Energy Futures on Wholesale Electricity Prices and on Electric-Sector Decision Making – Lawrence Berkeley National Laboratory

This federal study measured the effect of 40-50% solar & wind by 2030 for four of the nations largest ISO's. Unfortunately, PJM was not studied, but NYISO was, covering a region adjacent to New Jersey that has similar characteristics. Lending support to a part of the CPR study for New Jersey, it found that **a solar-heavy scenario for 40% to 50% solar & wind by 2030 would lower wholesale prices in NYISO by 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		

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Incentives that Circle Back Directly to Participants (and the public)

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Number of NJ Solar Projects by Type of Beneficiary as of February, 2023

Type of Beneficiary	Number of Projects
Schools	942
Universities	78
Local & State Government	426
Non-Profits, Charities, Houses of Worship	815
Farms	205
Business Locations	6,421
Residential	162,068
Special Needs Housing	60

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Number of NJ Solar Projects by Type of Beneficiary as of February, 2023

Type of Beneficiary	Number of Projects
Schools	942
Universities	78
Local & State Government	426
Non-Profits, Charities, Houses of Worship	815
Farms	205
Business Locations	6,421
Residential	162,068
Special Needs Housing	60

Already providing revenue to:

1/3 of all public schools in NJ + 120 private schools

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION

Mid-Atlantic Solar & Storage Industries Association

Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

MSSIA Analysis of Savings to School Participants in ADI Program vs. Incentives paid

- No. of Schools in sample — 40 (in six districts)
- Total ADI incentives per school over 15 years (average) — $ 665,000
- Total savings per school over 25 years (average) — $1,006,000
- Total savings per school over 30 years (average) — $1,274,000
- Total revenue per dollar of ADI Incentive – 25 year — $1.51
- Total revenue per dollar of ADI Incentive – 30 year — $1.92
- IRR – 25 year — 10.6%
- IRR – 30 year — 12.2%

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

Number of NJ Solar Projects by Type of Beneficiary as of February, 2023

Type of Beneficiary	Number of Projects
Schools	942
Universities	78
Local & State Government	426
Non-Profits, Charities, Houses of Worship	815
Farms	205
Business Locations	6,421
Residential	162,068
Special Needs Housing	60

By 2031,
ALL public schools in NJ

By 2035,
1,680 Gov't. locations

By 2035,
~640,000 homes PLUS
Community Solar

MSSIA
MID-ATLANTIC SOLAR & STORAGE INDUSTRIES ASSOCIATION
Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

New benefits from new programs and technologies:

1. Community Solar

Up to 475,000 low-income households by 2035 (over 50% of total low-income households)

2. Microgrids

Clean, resilient power to serve critical community needs – important in a warming planet

Mid-Atlantic Solar & Storage Industries Association
Rutgers Eco-Complex, Suite 208-8
1200 Florence-Columbus Road, Bordentown, NJ 08505 | coordinator@mssia.org

IN-STATE VS. OUT-OF-STATE
WHAT DO WE PAY AND WHAT DO WE GET?
A conversation on New Jersey energy policy

April 4, 2023
War Memorial, Trenton, NJ

Lyle Rawlings, P.E.
President
Mid-Atlantic Solar & Storage Industries Association
lyle@advancedsolarproducts.com