



Solar & Battery Storage in Philly

*Leveraging public and private resources
to reduce poverty, create jobs and fight
climate change*

*PhAMAS
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Emily Schapira, *Executive Director*

eschapira@philaenergy.org · P: 215-686-4483



Content

- About PEA
- About the Energy Campaign (and other project sectors)
- Solarize Philly
 - LMI financing vehicle
- PJM regional solar data and projections
- Highlighting two major projects
 - SEPTA (3.1 MW on four Philadelphia transit centers)
 - Navy Yard solar, NG peaker plant, battery storage

About Philadelphia Energy Authority

- Independent municipal authority established in 2010 to support the City on energy affordability and sustainability
- Launched **Philadelphia Energy Campaign** in partnership with City Council President Darrell Clarke (February 2016)
- **Key Concept: Energy as a vehicle for impact**
 - Driving a clean energy economy, bringing new economic development to Philadelphia
 - Creating jobs equitably and locally
 - Reducing poverty through expense reduction, job creation and neighborhood stabilization
 - Addressing climate change, and improving public health



Philadelphia Energy Campaign

- **\$1 billion investment over 10 years** in energy efficiency and clean energy projects, leveraging public and private dollars
- Will create **10,000 jobs**, reduce expenses and preserve housing for **25,000 households**, cut utility costs and improve business stability for **2,500 small businesses**
- Backed by the City's commitment to uphold the Paris Climate Accord and transition to 100% renewable energy.
- **Key Concept: Scaling Up**



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MUNICIPAL BUILDINGS



- \$225 million pipeline over next 5 years, includes (infrastructure investment vs. cash flow models):
 - Philadelphia Museum of Art Energy Performance Contract (25% savings)
 - Renewables PPA RFP in selection now (up to 40% of City electric spend, 280,000 MWh/year)
 - LED Streetlighting and Smart City tech
 - Public Safety and Prisons Complex
- Supporting Mayoral energy and climate commitments
 - Remaining committed to Paris Climate Accord
 - 100% renewable electricity by 2030
 - 80% carbon reduction by 2050





- **Energy Performance Contracting:**
3-school pilot targeting 30%+ energy reduction and capital projects included
- **Capital Planning:**
Financing up to \$345M in deferred repairs through Guaranteed Energy Savings



In March, PEA joined the District at Lankenau High School to announce the energy performance contracting pilot.

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AFFORDABLE / LMI RESIDENTIAL



- Multi-Family Affordable Energy Retrofit Pilot
 - \$265k pilot Phase 1 complete for 200 units, planning ~\$2M Phase 2
 - Recently won Smart 50 award from Smart Cities Connect
- City Council Housing Preservation Initiative
 - \$40M loan program and \$60M to clear waitlists for City's Home Repair programs, which now include energy standards
- PHA \$50M Energy Performance Contract



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SMALL BUSINESS



- Year 1 Pilot with Penn State**

55 audits, 35+ proposals, deep retrofit focus (30%+ savings), ~15% close rate

- Year 2 pilot with Lime Energy**

Opening March 2018, focus on West Philly, includes corner stores, restaurants, auto mechanics and laundromats



Fiesta Pizza



Olivares Food Market



Sue's Produce



El Soto Deli



A group buying program for all Philadelphians to go solar at home

- Making solar easy and affordable
 - Free solar assessment
 - Discounted pricing
 - Consumer protections
- Driving the residential solar market
 - \$3 million invested in 885 kW of rooftop solar
 - 2,200 sign-ups, 186 signed contracts in Phase 1
 - 14 new solar jobs created, half went to minorities or women
 - 18 students trained in solar installation



Key Goals

- Grow an inclusive, equitable solar market in Philadelphia that allows all residents to participate in the clean energy economy
- Create a scalable financial vehicle to access private investment in LMI solar
- 20% LMI participation in Solarize Philly
- 1,000 LMI solar households by 2026



Solarize Philly LLC Pilot – Spring 2018

- 45 participating LMI households, 203 kW, \$638,000 investment
- **Key contributions needed for pilot (Spring 2018):**
 - \$300,000 tax equity investment, ROI to P3 partner: 12.48%
 - \$338,000 in loan funds at 3% interest rate
 - \$64,000 donation required for loan loss guarantee fund
- **Future opportunity (through 2026)**
 - 1000 participating LMI households, 4.5 MW, \$14.2M investment
 - \$6.7M in tax equity
 - \$7.5M in loans
 - \$280,000 loan loss reserve required

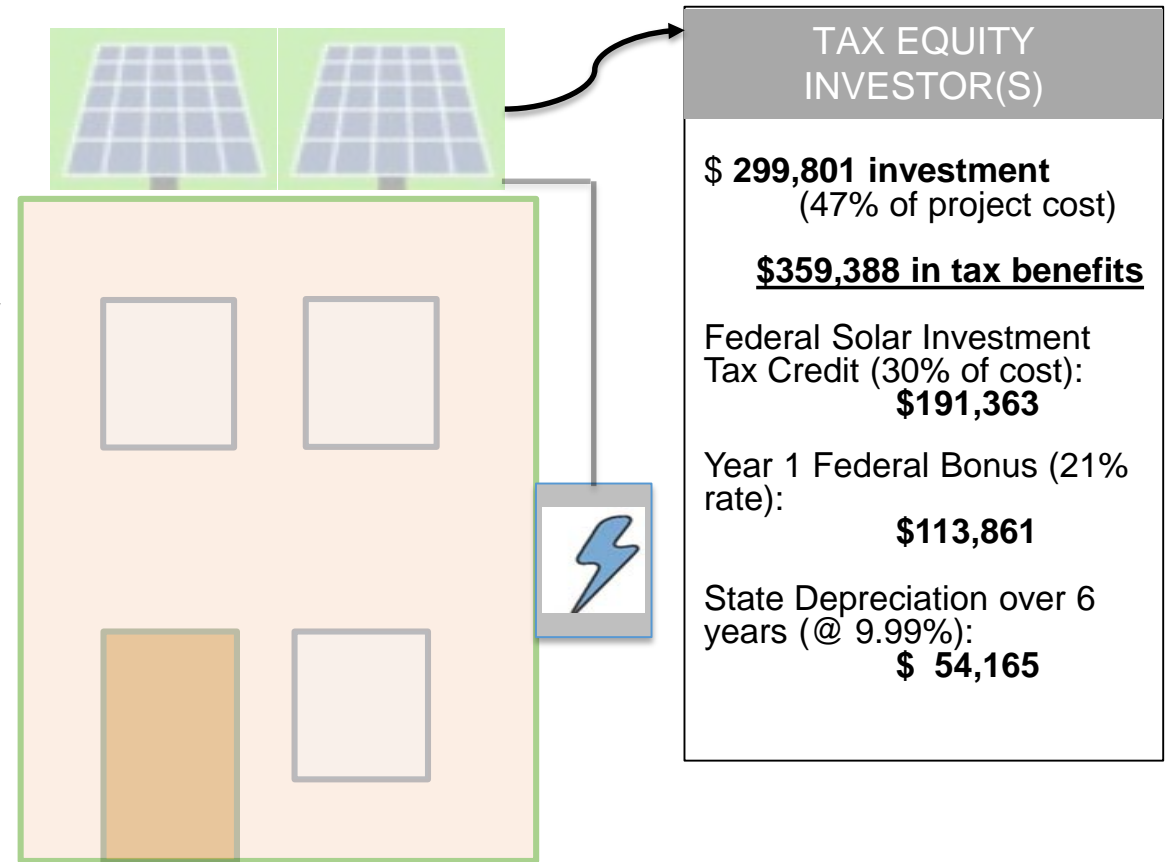
LMI Solar Pilot: Tax Equity Investment

PEA seeks tax equity investment of **\$299,801** from tax equity investors for approximately 47% of the total installation cost for the LMI Solar Pilot.

Tax equity investors would **monetize three significant tax benefits**, with a total estimated value of \$359,388 for a **return on investment of 12.48%***:

- Federal Investment Tax Credit
- Year 1 federal Bonus Depreciation, and
- 6 Years of PA depreciation deduction.

*Depreciation benefits assume a 21% federal corporate tax rate and a 9.99% Pennsylvania corporate tax rate, and include a preliminary analysis of the 2018 federal tax changes



Workforce Development

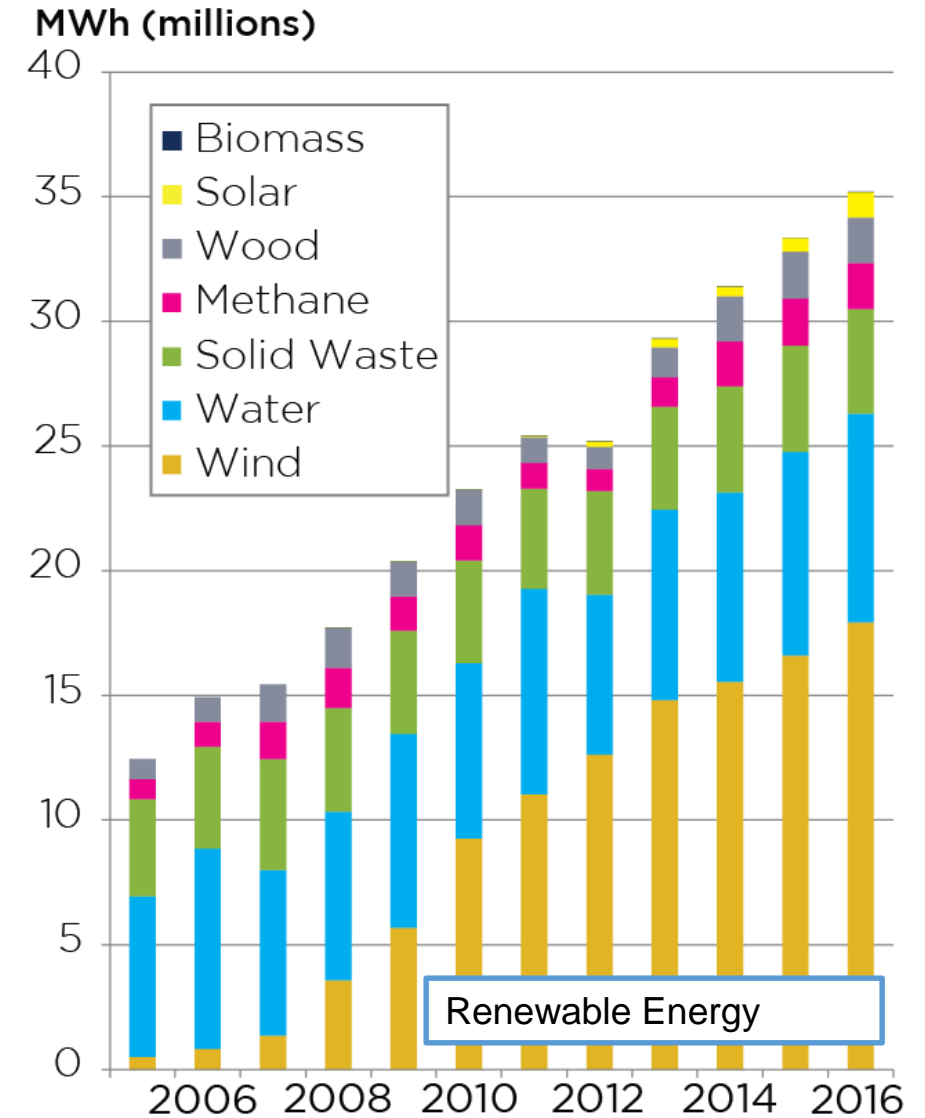
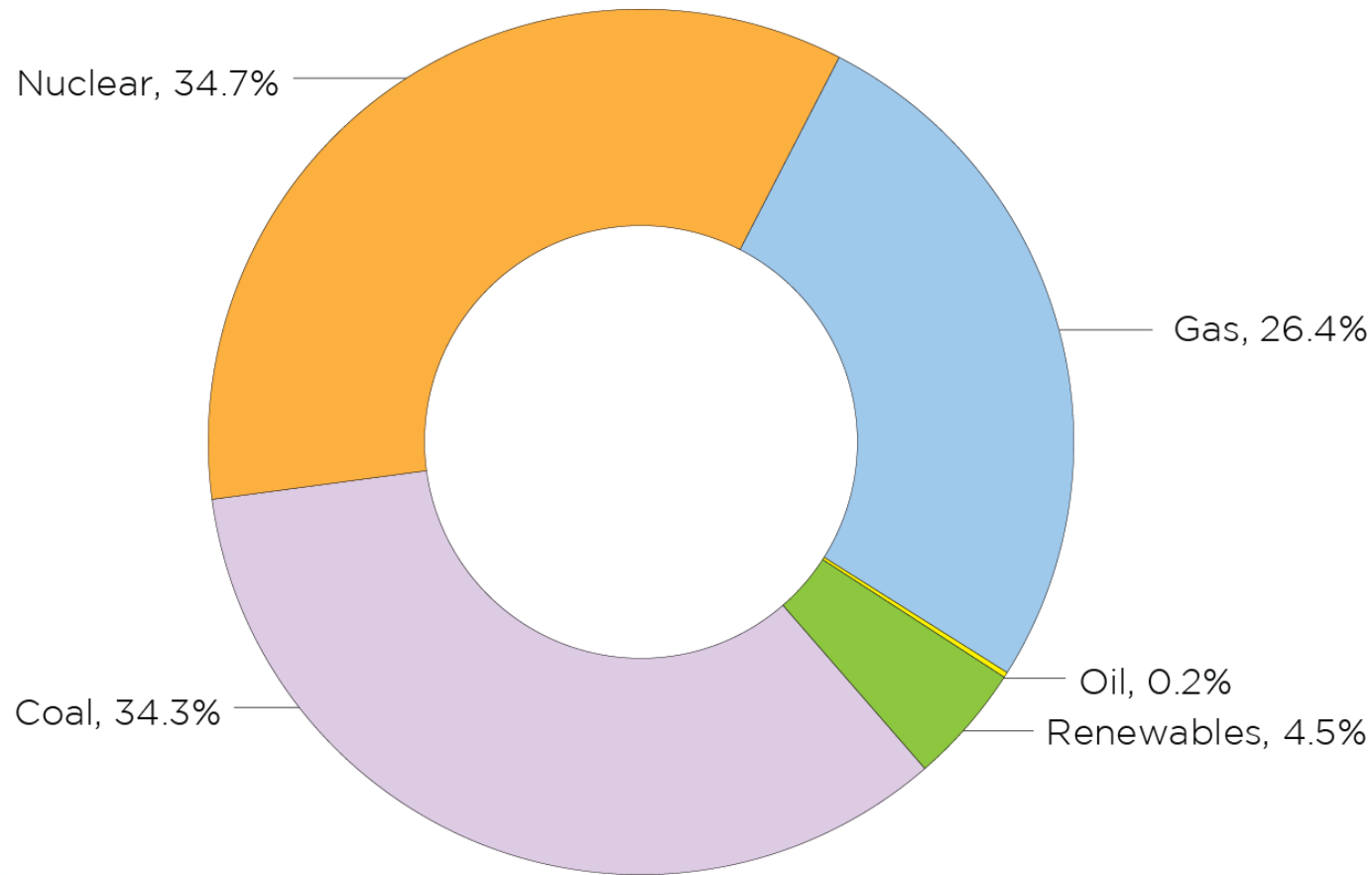
- “Find Your Power” summer energy training + School Year CTE program
- Sparked creation of other training programs (ECA, OIC), job pipelines and mentoring partnerships (e.g. Fund for School District of Philadelphia, Philadelphia Education Fund)
- Job creation milestones on track (first jobs report will be released in February 2018)



Find Your Power students at the Crane Arts solar array

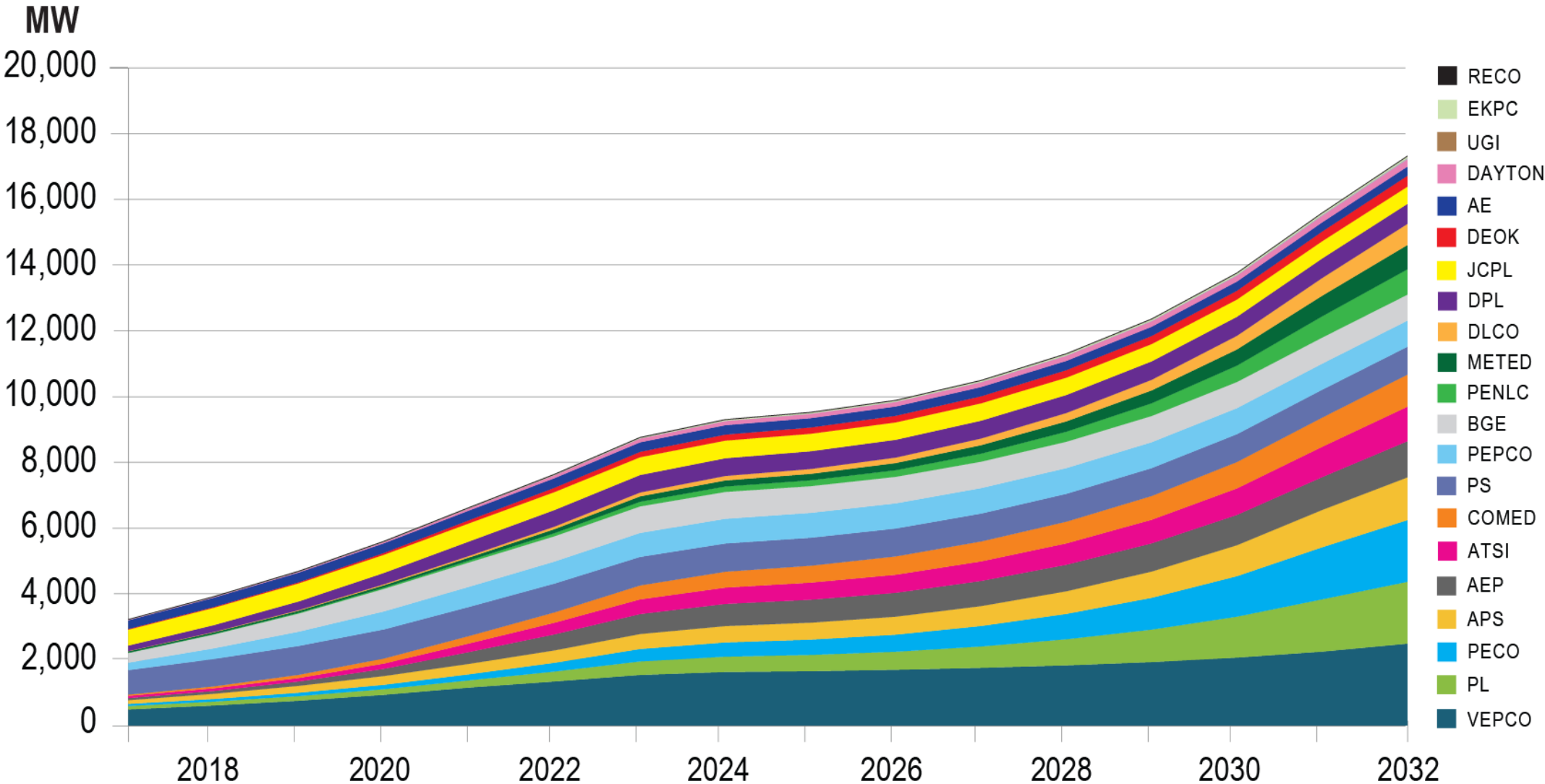
Percentage of Renewable Energy is Small but Growing

PJM Generation Mix – 2016 Annual Energy

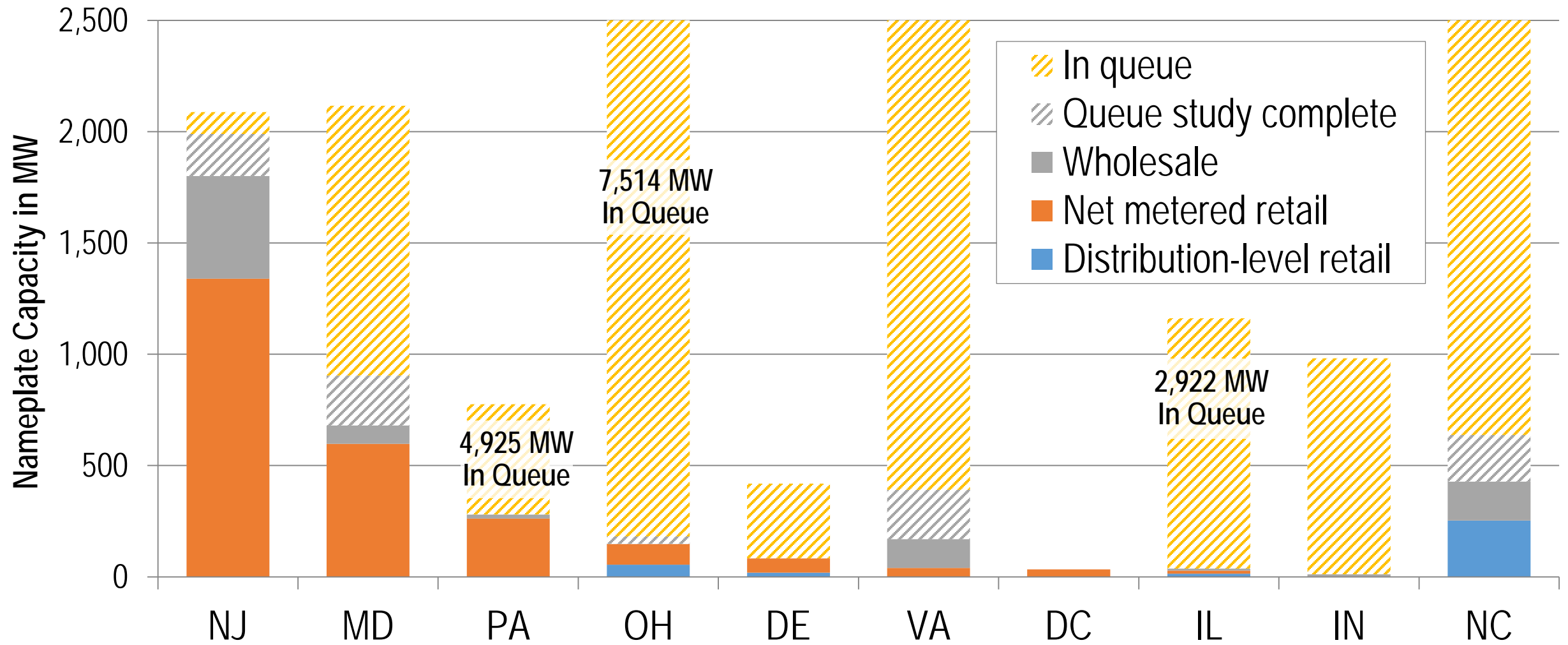




IHS Solar Forecasts



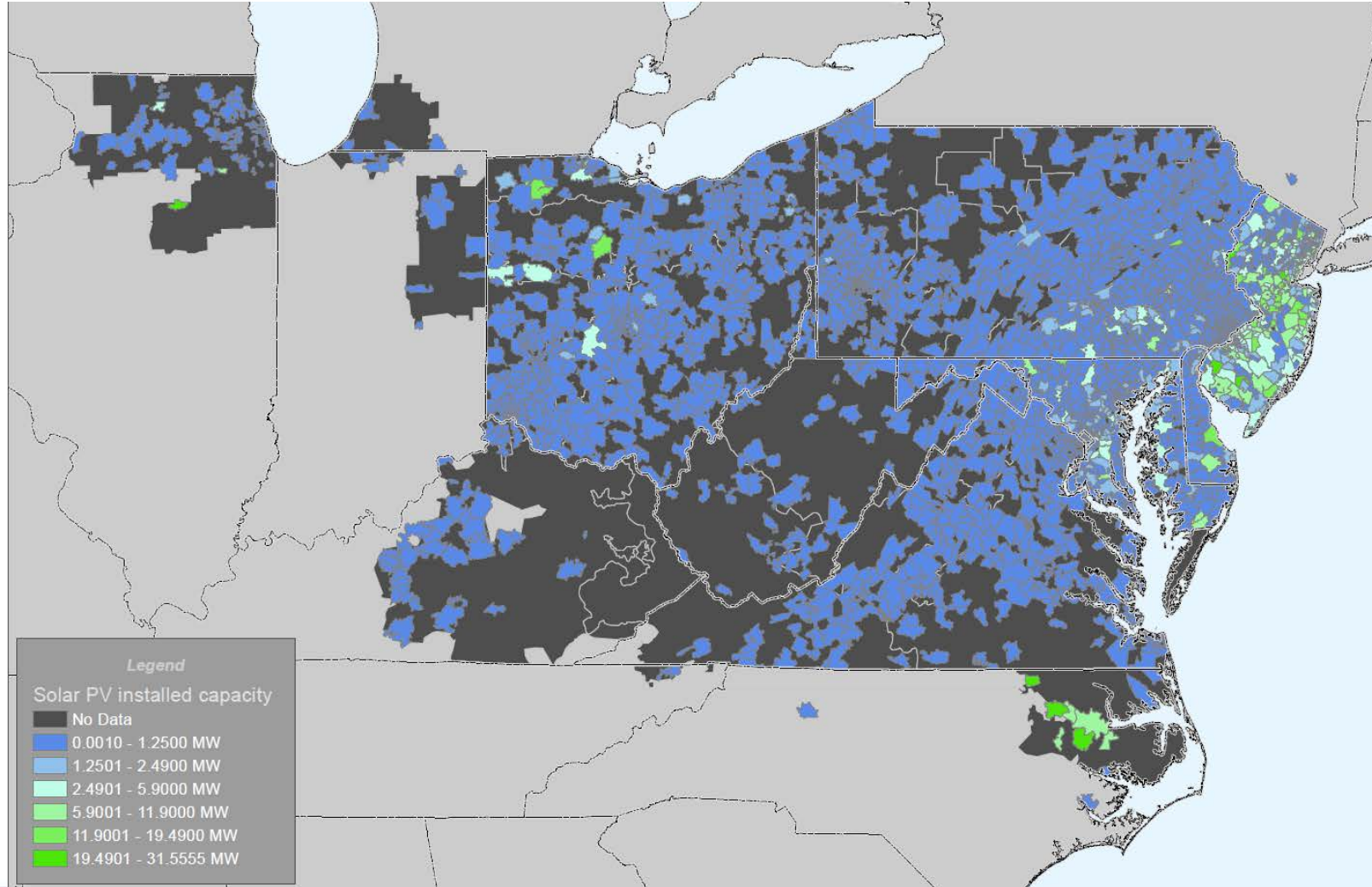
Solar Capacity in PJM by State



Note: Graph includes data only for the portion of each state inside PJM.

~80% of installed solar PV is retail, not wholesale

Solar PV by Zip Code



Alternative Technology Providing Services to the Grid

Frequency Regulation

287 MW of Batteries
25 MW of Demand Side
Resources

~ On Average **33%**, as high as
45% of our Regulation
Requirement is provided by
alternative technologies.

Synchronized Reserves

532 MW of Demand Side
Resources capable of providing
synch reserve in 2016 YTD

6.5% of synch reserve actually
provided by Demand Side
Resources in 2016 YTD

The Navy Yard – Solar, Peakers and Batteries

- Philadelphia Navy Yard: one of the largest private microgrids in the US
- Added 10 MW substation to pull in PECO power
- 6 MW NatGas fired peaking plant (peak shaving)
- 3-10 MW batteries coming online in 2018
- First community solar project in PA – 400 kW

SEPTA Solar + WESS

- 3.1 MW, construction in 2018
 - 2nd largest in the City
 - Increase total installed capacity by nearly 30%
- Wayside Energy Storage System (WESS)
 - 8.75MW energy storage
 - Captures & stores electricity generated from braking trains

2ND & WYOMING

3,500 + solar panels
200,000 + sq ft
1.29 MW



CALLOWHILL

3,000 + solar panels
200,000 + sq ft
955 kW



ROBERTS

450 + solar panels
23,900 sq ft
154 kW



FERN ROCK

1,900 + solar panels
190,000 sq ft
730 kW



PHILADELPHIA
ENERGY AUTHORITY