Pennsylvania Update

MSSIA – 1st Qrtly Mtg

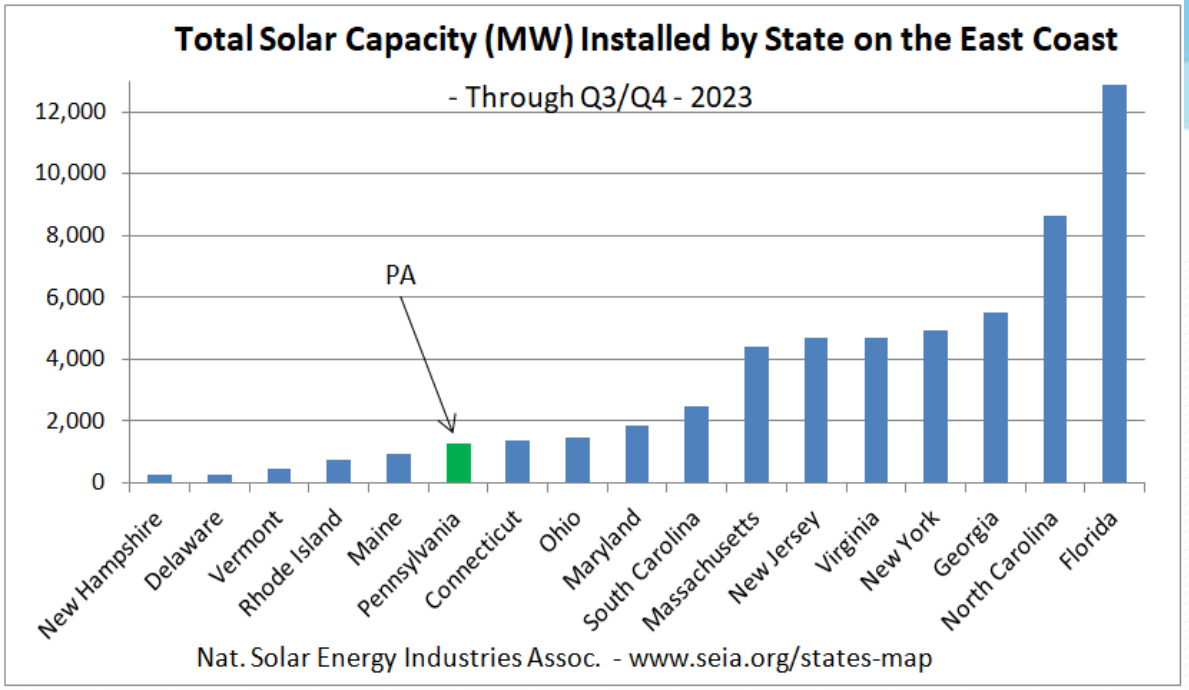
February 22, 2024

Ron Celentano , VP - Pennsylvania

Solar Update Highlights in PA – 2/22/2024

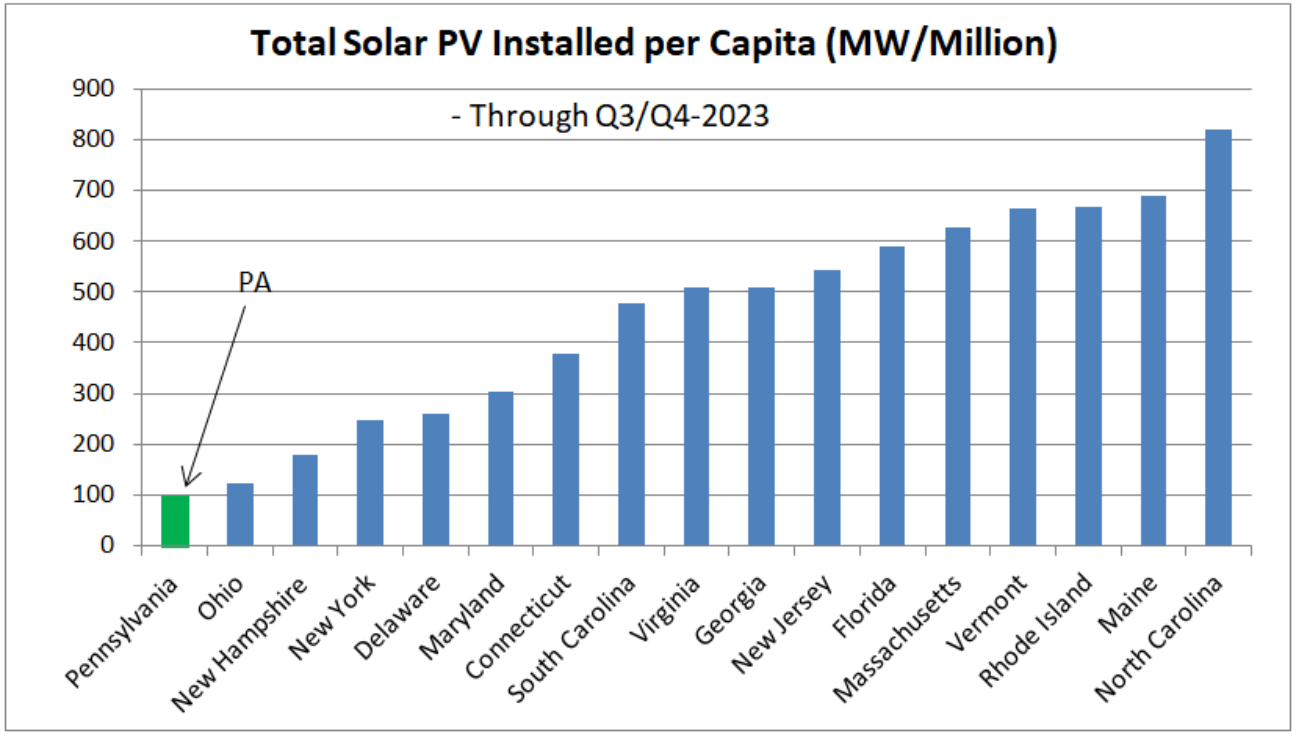
- Current in-state solar PV capacity in PA is **1,336 MW_{DC}**, from a total of 53,778 systems, as of 2/21/2024.
- PJM Queue for PA – 23.1 GW (502 applications: Active, Engineering/Procurement, and Under Construction-including in partial service), of which 14 projects totaling 577 MW are under construction with some in partial service.
- Nine grid-scale projects totaling 246 MW_{AC} came online in 2023.
- Hearings on expanding the AEPS (HB1467) in Dec, 2023, and community solar (HB1842) in Feb, 2024
- Senator Boscola introduced SB1040, AEPS Lite; also includes net metering reform and expansion of virtual meter aggregation
- MAREC study on the AEPS bills SB230/HB1467 released in Feb, 2024, which was conducted by Gabel Assoc.
- Governor Shapiro releases 10-Year Economic Development Plan and Budget Address – Nil on expanding the AEPS and solar
- ICF Presentation to PA Climate Change Advisory Committee – Recommendations to expand AEPS 30x30, but with carbon sequestration
- Net metering reform concerns, merchant generator explosion, cost shift myths, etc.
- Interconnection Working Group starting to form
- Solar & Storage Free Conference at Pennsylvania Convention Center – April 10 & 11, 2024

Solar in Other East Coast States Compared to PA



Solar in Pennsylvania Ranks 22th in the Nation

Wood Mackenzie/SEIA US Solar Market Insight – Qrt 3/Q4, 2023



PENNSYLVANIA SOLAR CENTER

LEGISLATIVE GUIDE TO STATE SOLAR POLICY PENNSYLVANIA 2023-2024

- Including Additional Listing of Memos – PASSIA -

Quick Reference Guide for Key Bills

Guide	Bill #	Prime Sponsors	History
INCREASING RENEWABLE ENERGY GOALS			
Increases Renewable Goals in the AEPS to 30% with 14% Solar by 2030 and Enables Community Solar			
☀	SB 230	Steven Santarsiero (D-Bucks County)	Referred to the Senate Consumer Protection and Professional Licensure Committee, March 15, 2023
	HB 1467	Danielle Friel Otten (D-Chester County)	Referred to the House Environmental Resources and Energy Committee, June 21, 2023
Increases Renewable Goals in the AEPS to 15% with 5.5% Solar by 2032 No Community Solar Mentioned; Revisions to Net Metering			
☁	SB 1040	**Prime:** Sen. Lisa Boscola (D-Lehigh/Northampton Counties)	Introduced 1/12/2024

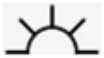
https://pasolarcenter.org/wp-content/uploads/2023/07/PA-State-Solar-Legislative-Guide.2023-2024_updated_07182023.pdf

☀ - Favorable for solar ⛅ - Some possible benefit or PA Solar Center Neutral ☁ - Possibly Unfavorable

PENNSYLVANIA SOLAR CENTER

LEGISLATIVE GUIDE TO STATE SOLAR POLICY PENNSYLVANIA 2023-2024

- Continued -

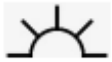
COMMUNITY SOLAR/SHARED SOLAR			
Enables Community or Shared Solar Programs in Pennsylvania			
	SB 550	**Prime:** Rosemary Brown (R-Lackawanna, Monroe and Wayne Counties)	Referred to the Senate Consumer Protection and Professional Licensure Committee, April 13, 2023
	MEMO	**Prime:** Aaron Kaufer (R-Luzerne County) and Joseph Hohenstein (D-Philadelphia County)	Memo circulated on April 10, 2023 *(likely a companion bill to SB 550)*
	HB 330	**Prime:** Perry Stambaugh (R-Perry, Juniata Counties)	Referred to the House Consumer Protection, Technology and Utilities Committee, March 13, 2023
	MEMO	**Prime:** Daniel Laughlin (R-Erie County)	Memo circulated on March 24, 2023 *(likely a companion bill to SB 330)*
	HB 1842	**Prime:** Rep. Peter Schweyer (D-Lehigh County)	Introduced 11/13/2023

 - Favorable for solar  - Some possible benefit or PA Solar Center Neutral  - Possibly Unfavorable

PENNSYLVANIA SOLAR CENTER

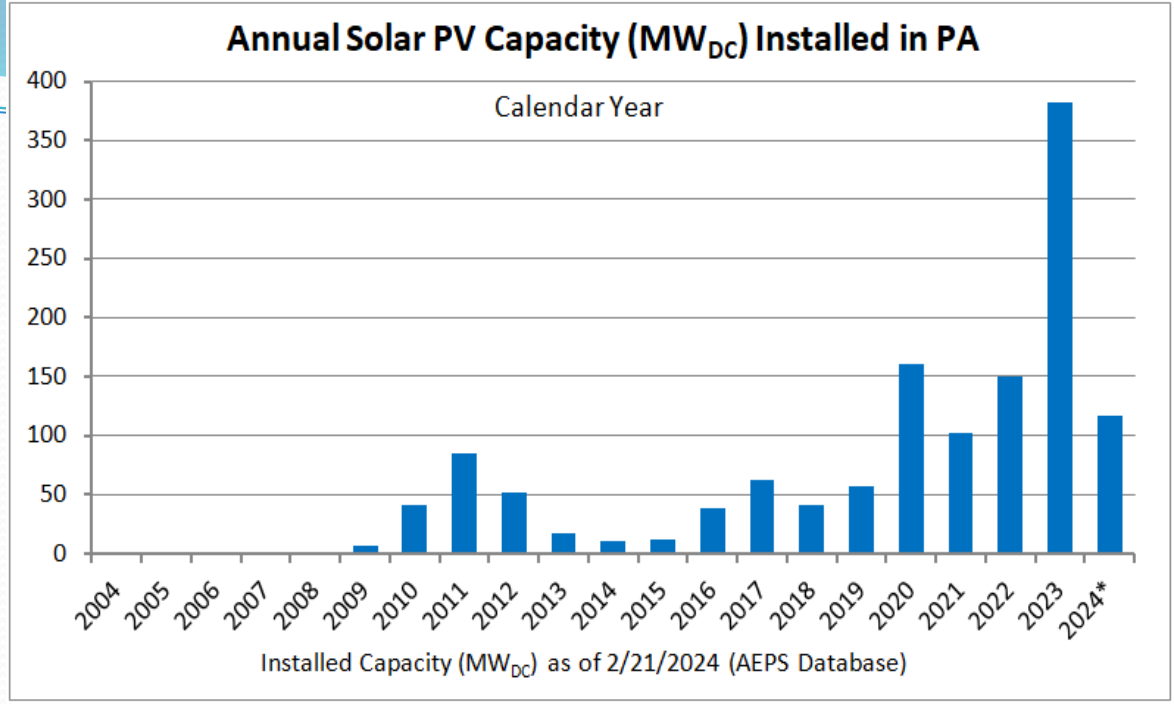
LEGISLATIVE GUIDE TO STATE SOLAR POLICY PENNSYLVANIA 2023-2024

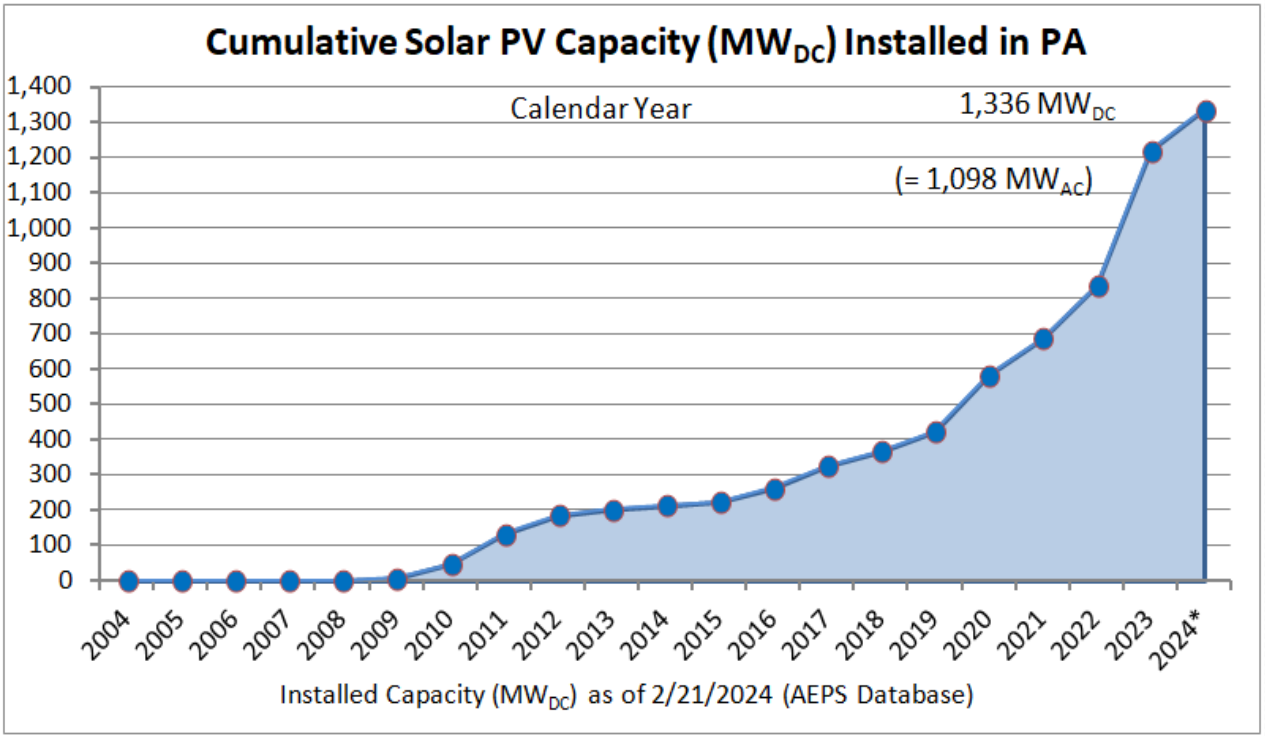
- Continued -

SOLAR FOR SCHOOLS			
Allocates Grant Funding for Schools to go Solar			
	HB 1032	**Prime:** Elizabeth Fiedler (D-Bradford, Philadelphia County)	Final House passage (Y-134; N-69), June 29, 2023. Awaiting action in the Senate.
	MEMO	**Prime:** Vincent Hughes (D-Montgomery and Philadelphia Counties) & Carolyn Comitta (D-Chester County)	Memo circulated on April 13, 2023 *(likely a companion bill to HB 1032)*
DECOMMISSIONING AND BONDING OF SOLAR ENERGY PROJECTS			
Requires decommissioning plans and financial assurances			
	SB 211	**Prime:** Gene Yaw (R-Bradford, Lycoming, Sullivan, Tioga and Union Counties)	Final Senate passage (Y-36; N-13), March 8, 2023. Referred to the House Environmental Resources and Energy Committee, April 25, 2023
	HB 925	**Prime:** Kathy Rapp (R-Warren, Crawford and Forest Counties)	Referred to the House Environmental Resources and Energy Committee, April 25, 2023

 - Favorable for solar  - Some possible benefit or PA Solar Center Neutral  - Possibly Unfavorable

PV Capacity in PA
Annual & Cumulative
As of 2/21/2024

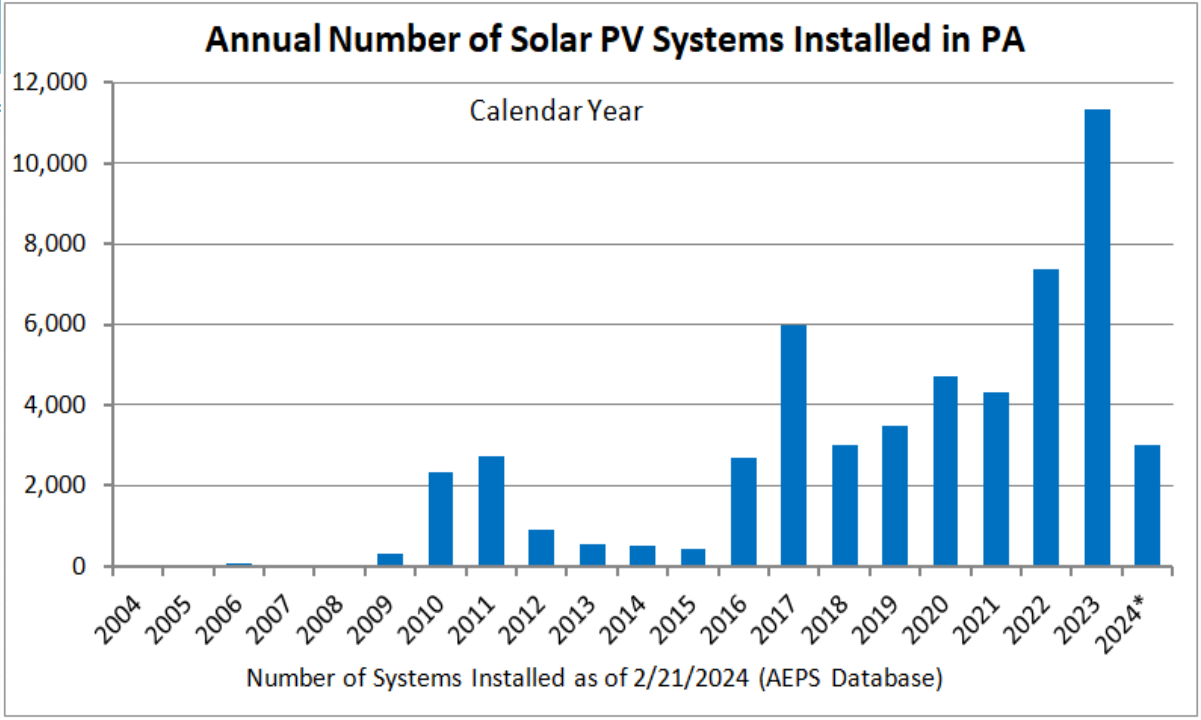


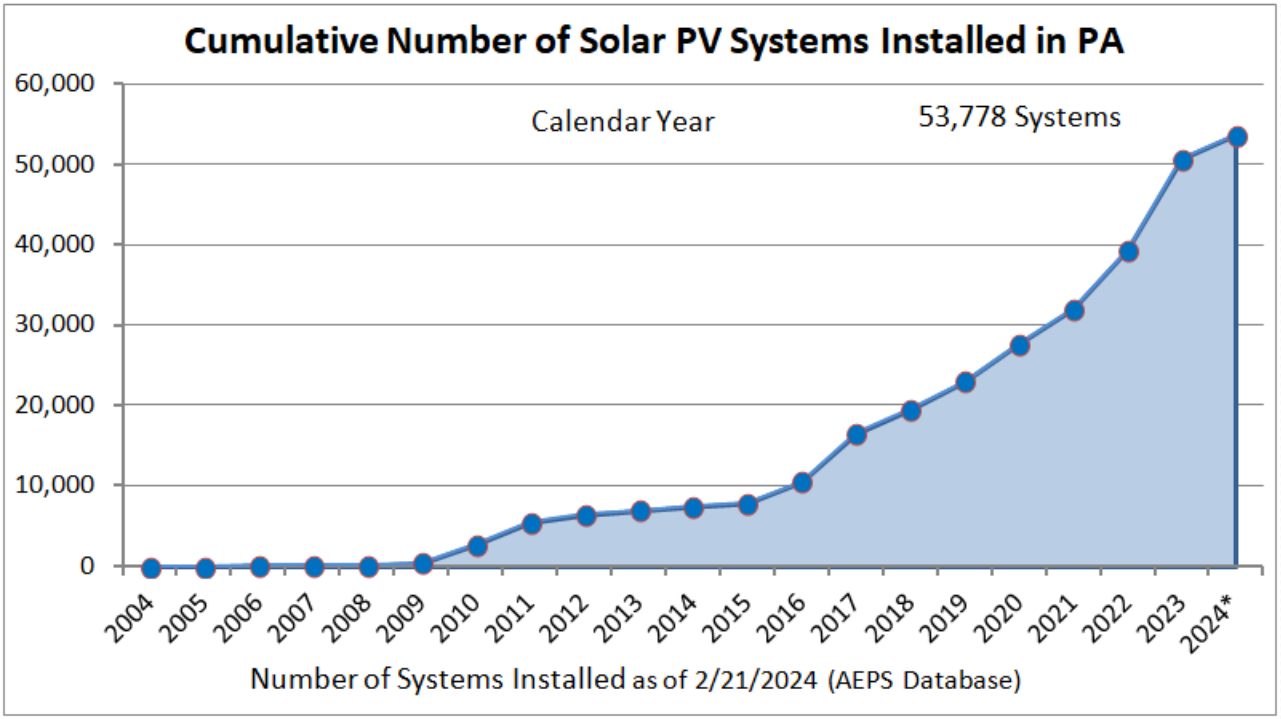


SEIA reports 1,275 MW installed through Qrt 4-2023

Number of PV Systems in PA Annual & Cumulative

As of 2/21/2024





SEIA reports 65,940 systems installed through Qrt 4-2023

Breakdown Of PV Installations in PA

Cumulative PV Installed in PA		
Capacity (DC)	# of Systems	Total MW
≤ 15 kW	44,738	372
> 15 kW to ≤ 250 kW	8,727	250
> 250 kW to ≤ 1 MW	222	108
> 1 MW to ≤ 3 MW	57	90
> 3 MW to ≤ 5 MW	17	63
> 5 MW to ≤ 10 MW	2	14
> 10 MW	15	440
Total	53,778	1,336

* as of 2/21/2024 as per PA AEPS (PUC)

Last Year

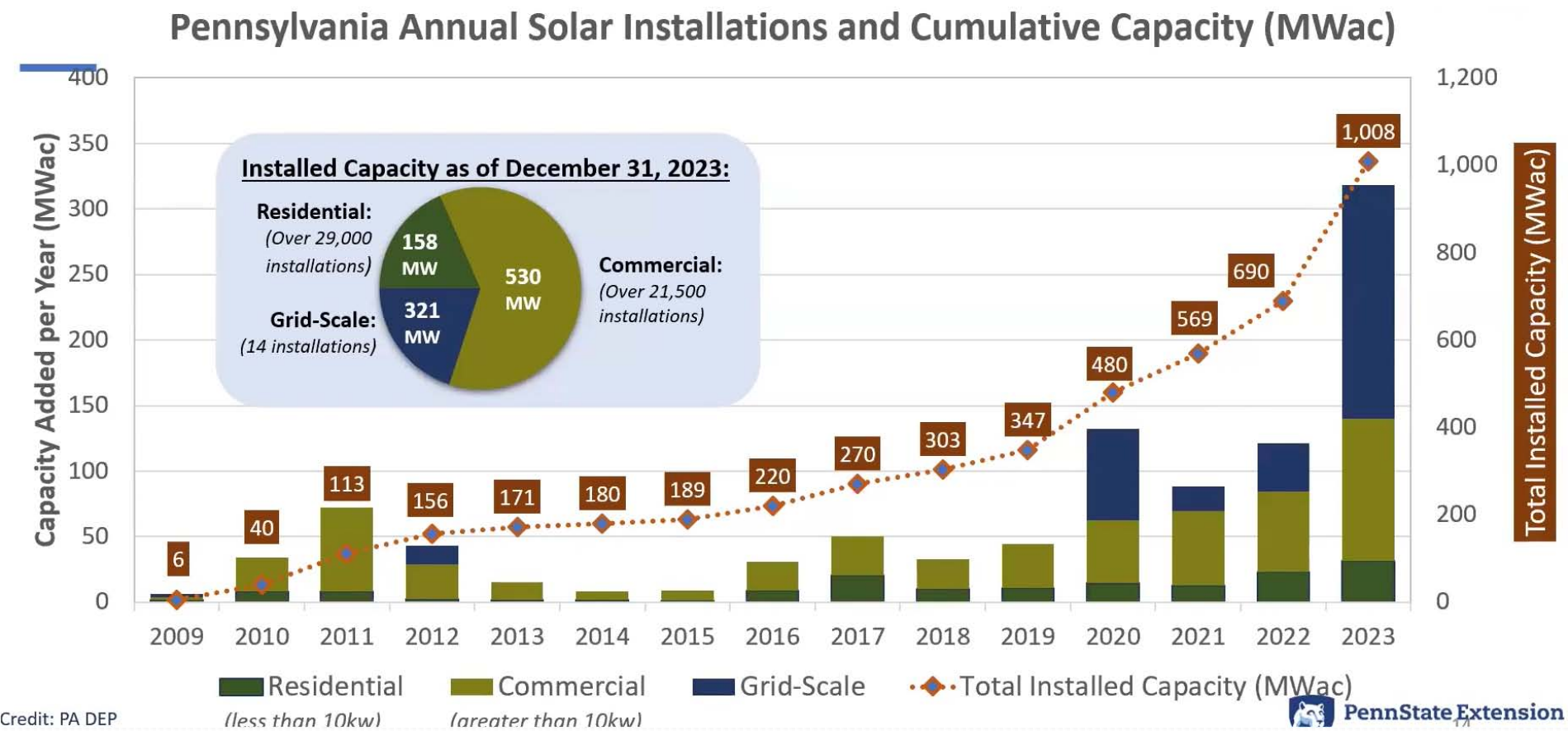
Cumulative PV Installed in PA		
Capacity (DC)	# of Systems	Total MW
≤ 15 kW	28,189	225
> 15 kW to ≤ 250 kW	4,700	153
> 250 kW to ≤ 1 MW	175	86
> 1 MW to ≤ 3 MW	47	75
> 3 MW to ≤ 5 MW	14	52
> 5 MW to ≤ 10 MW	1	6
> 10 MW	6	114
Total	33,132	711

* as of 3/12/2022 as per PA AEPS (PUC)

Since March 2022: 345 MW Grid Scale

> 3 to ≤ 5 MW : 3 Projects, 11 MW
> 5 to ≤ 10 MW : 1 Projects, 8 MW
> 10 MW : 9 Projects, 326 MW

Growth of All PA Solar – 2009 to 2023

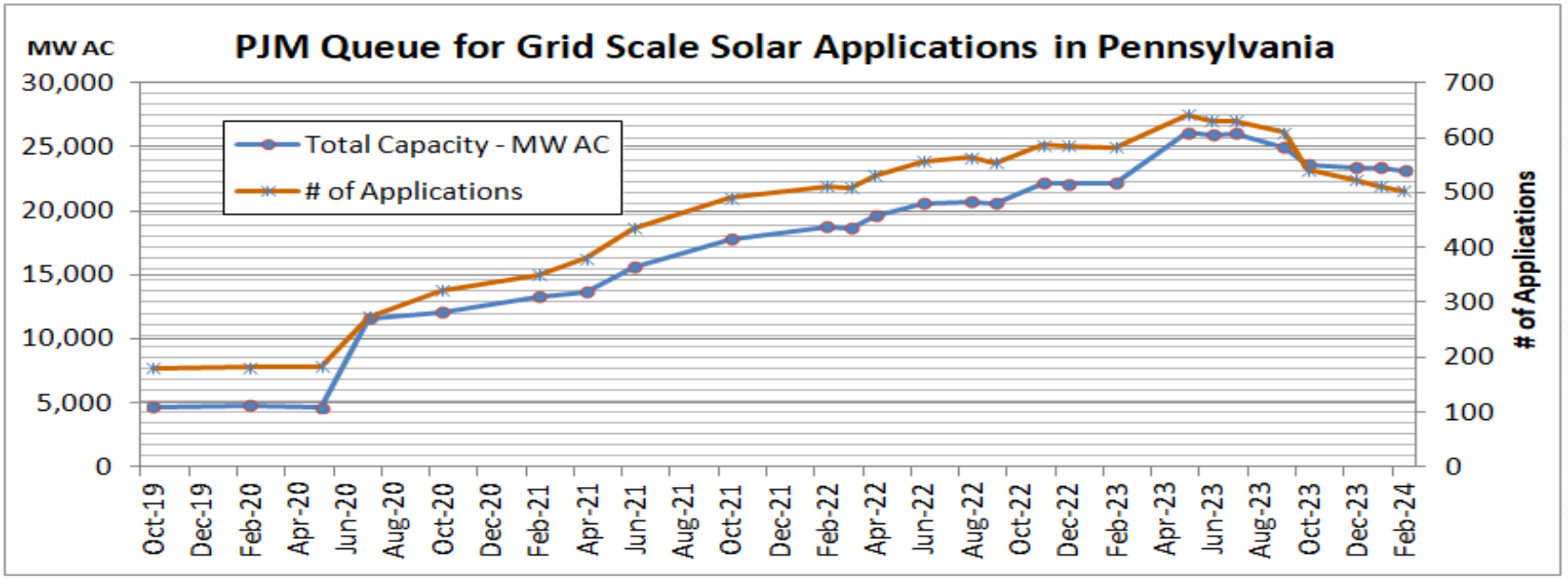


Screenshot from PennState Extension Webinar:
Large-Scale Solar in Pennsylvania: 2024 General Update
https://psu.mediaspace.kaltura.com/media/Large-Scale+Solar+in+PennsylvaniaA+2024+General+Update/1_q39ndwvt

PJM Queue for PA Solar Applications

PJM Queue for PA	As of 2/21/2024				
		Max Facility Output (MFO)			Total Cap
		Total Cap	Capacity Range		IC Queue
Status	# of Apps	AC MW	Min	Max	Position
Active	444	21,198	1.0	300.0	9,849
Engineering/Procurement	44	1,360	3.0	120.0	727
Under Construction	9	217	13.8	80.0	124
Part in Srvc - Under Const	5	360	20.0	150.0	224
Sub-Total	502	23,135			10,924
In Service	24	481	3.3	100.0	196
Grand Total*	**526**	**23,616**			**11,120**

* Total Applications catagorized as "Solar & Storage" = 90



PJM Queue for PA Solar Facilities - Under Construction

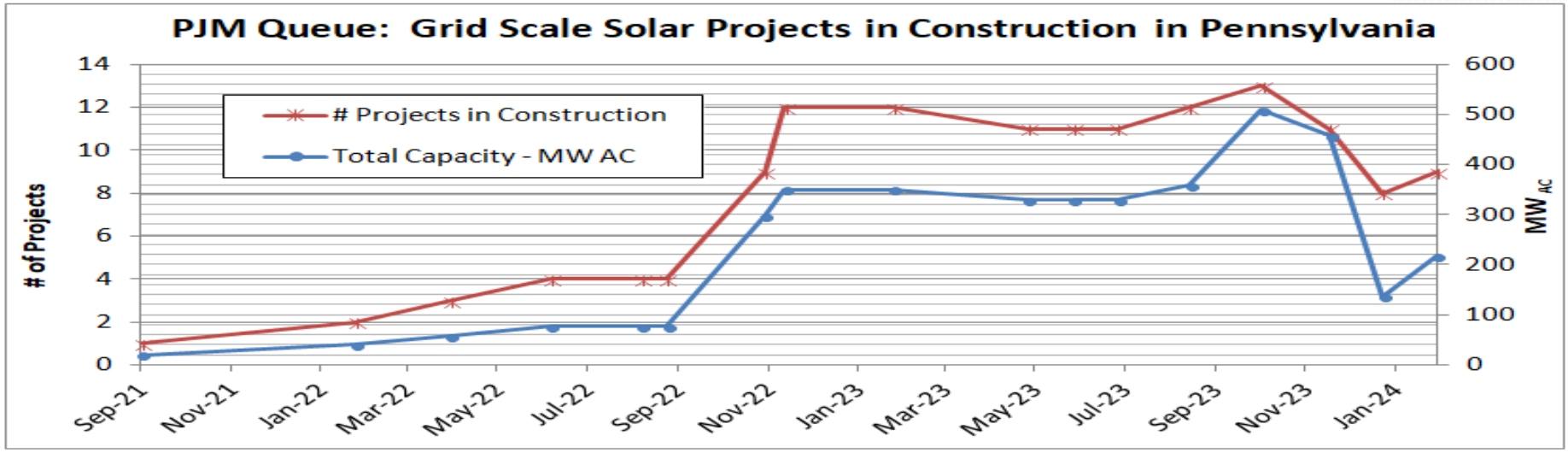
Projects Currently Under Construction - Solar PV Facilities in PA (2/21/2024)

Queue #	Name	Commercial Name	State	County	Transmission Owner	MFO Capacity MW
AE1-185	Hokes-Jackson 69 kV	Cottontail Solar 1	PA	York	ME	20.0
AE1-196	Hokes-Jackson 69 kV II	Cottontail Solar 8	PA	York	ME	20.0
AE2-059	Derry Tap-Derry Bus 69 kV	Cottontail Solar 4 aka East Chil	PA	Northumberland	PPL	20.0
AE2-125	Stahlstown-Ligonier 25 kV	Stahlstown-Ligonier 25 kV	PA	Westmoreland	APS	13.8
AE2-133	Penns Tap-Richfield Tie 69 kV	Penn Solar (Cottontail 6)	PA	Snyder	PPL	20.0
AE2-175	Jackson-Long Pond 69 kV	Swiftwater Solar	PA	Monroe	PPL	80.0
AF1-021	Bethelboro-Connellsville #1 25 k	Pechin Solar	PA	Fayette	APS	14.0
AF1-022	Lake Lynn-Uniontown 25 kV	Gans Solar Farm	PA	Fayette	APS	14.0
AF1-039	Listonburg-Highpoint 24.9 kV	Listonburg Solar	PA	Somerset	PENELEC	15.0
	Total					**216.8**

Partially in Service - Under Construction - Solar PV Facilities in PA (2/21/2024)

Queue #	Name	Commercial Name	State	County	Transmission Owner	MFO Capacity MW
AD1-020	Hunterstown-Lincoln 115 kV	Adams Solar LLC	PA	Adams	ME	100
AD2-009	McConnellsburg 138 kV	Great Cover Solar LLC	PA	Fulton	APS	70
AD2-116	Hokes-Grantley 69 kV	Cottontail Solar 2	PA	York	ME	20.0
AE1-101	McConnellsburg-Texas Eastern 1	Great Cove Solar II	PA	Franklin	APS	150.0
AE2-060	Mifflintown Bus-Mifflintown Tap	Cottontail Solar 5 aka Walker S	PA	Juniata	PPL	20.0
	Total					**360.0**

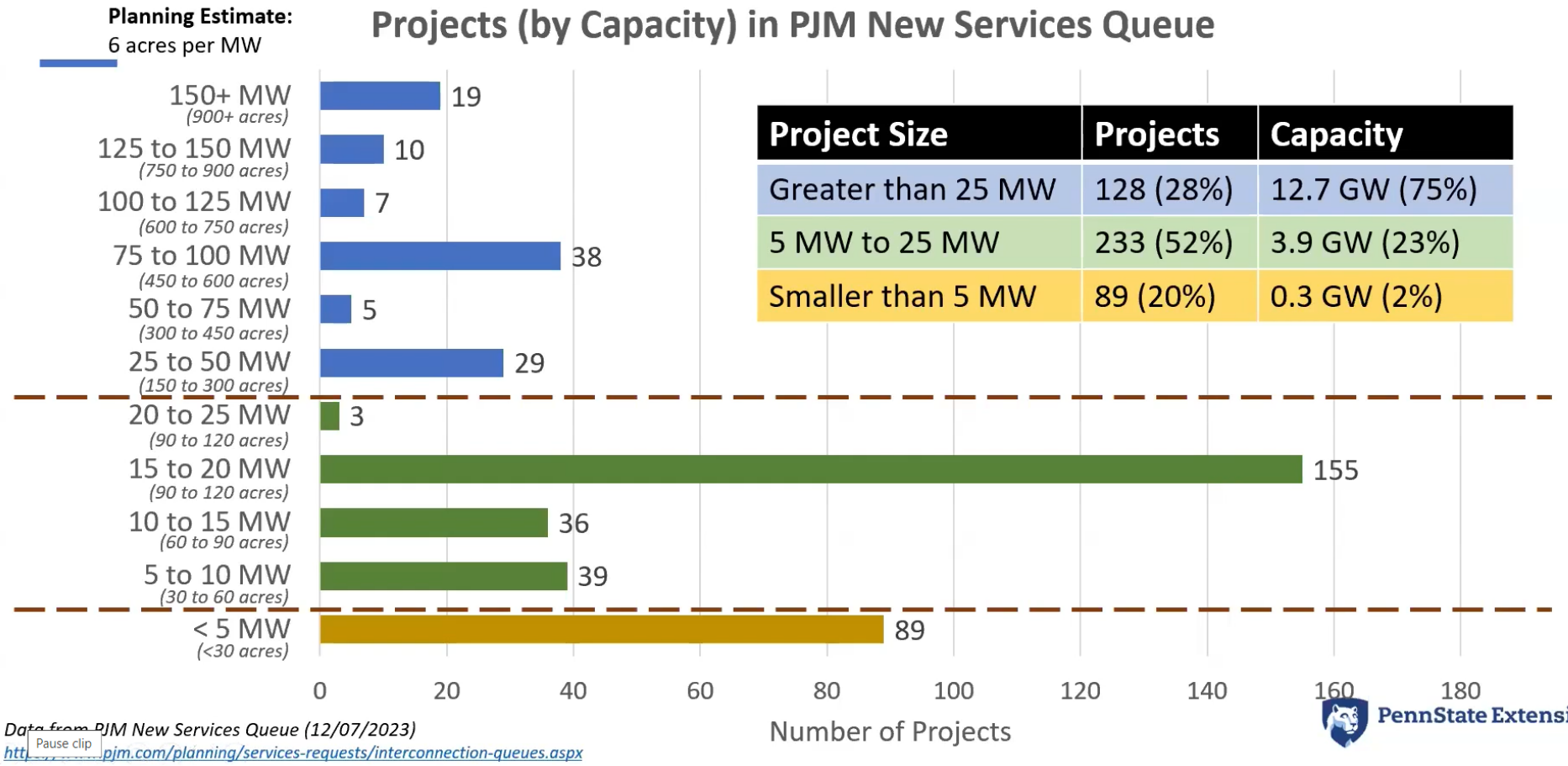
577 MW_{AC}



PA Grid Scale Solar Facilities – In Service in 2023

In Service in 2023					Transmission Owner	MFO Capacity MW	Actual In Service Date
Queue #	Name	Commercial Name	State	County			
AE2-129	Philipsburg-Clarence 34.5 kV	Philipsburg-Clarence 34.5 kV	PA	Clearfield	PENELEC	20	1/28/2023
AE2-126	Dubois-Curwensville 34.5 kV	CL-Viaduct	PA	Clearfield	PENELEC	20	3/23/2023
AF2-184	McConnelsburg-Mercersburg 34 kV II		PA	Franklin	APS	20	5/1/2023
AC2-168	Clinton 23kV	Gaucho Solar	PA	Washington	DL	11.7	6/29/2023
AD1-135	Clinton 23 kV II	Gaucho Solar	PA	Washington	DL	20	6/29/2023
AE2-115	Midland 23 kV II	BE-PINE 2 Dam Road	PA	Beaver	DL	17.1	11/5/2023
AE2-114	Midland 23 kV I	BE-PINE 1 Cain Road	PA	Beaver	DL	17.1	11/20/2023
AE2-224	Bearrock-Johnstown 230 kV	CPV Maple Hill Solar	PA	Cambria	PENELEC	100	11/28/2023
AD2-115	Lyons-Moselem 69kV	Lyons Solar	PA	Berks	ME	20	12/1/2023
	Total					**245.9**	

Project Size Distribution



Project Size	Projects	Capacity
Greater than 25 MW	128 (28%)	12.7 GW (75%)
5 MW to 25 MW	233 (52%)	3.9 GW (23%)
Smaller than 5 MW	89 (20%)	0.3 GW (2%)

Data from PJM New Services Queue (12/07/2023)
https://www.pjm.com/planning/services-requests/interconnection-queues.aspx

Pause clip

PennState Extension

Screenshot from PennState Extension Webinar:
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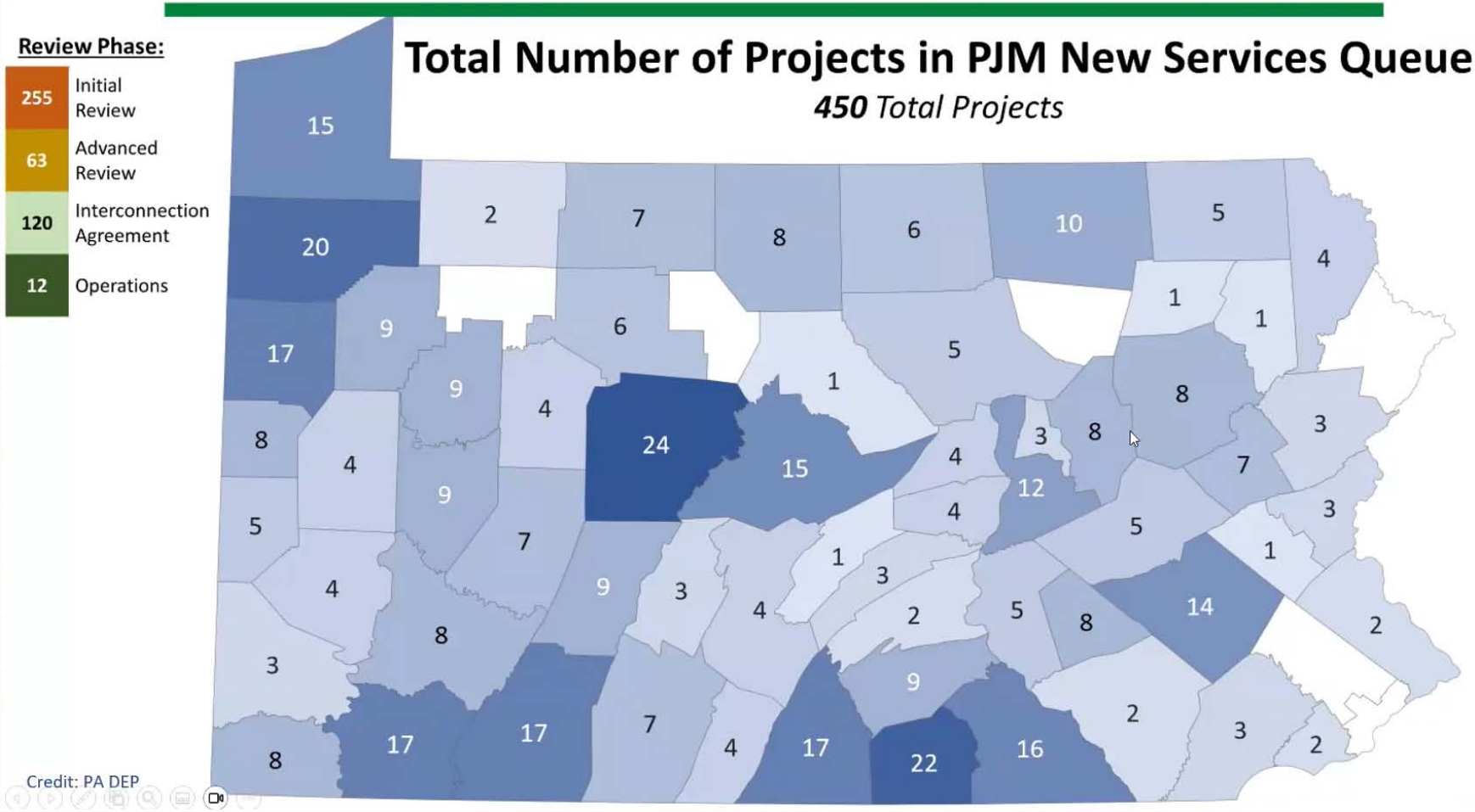
Development Potential (# of Projects)



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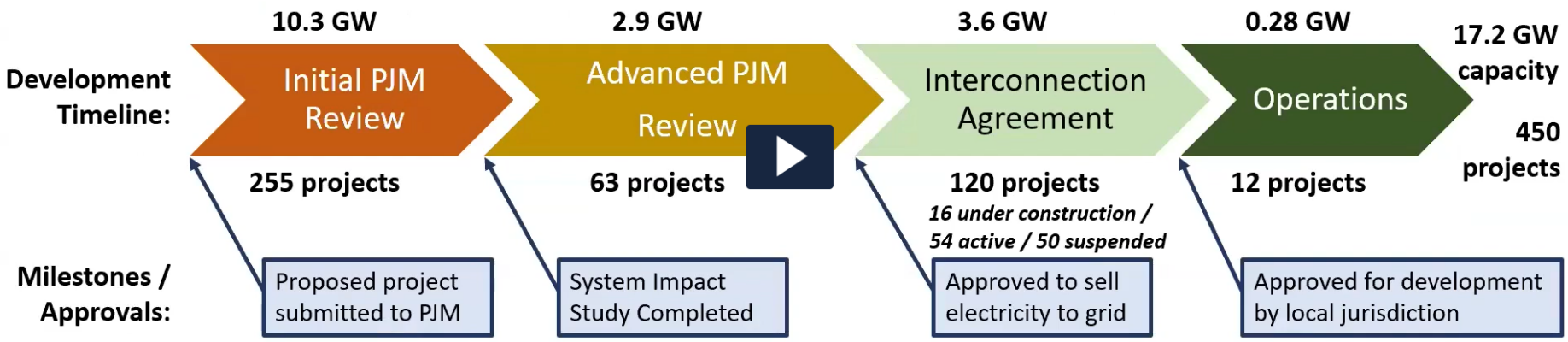
Grid-Scale Solar Project Development Proces

- Currently **17.2 GW** in new development queue – Finding PA's Solar Future Plan had 9.9 GW grid-scale solar goal by 2030 to reach 10% target for in-state solar



- Not all planned projects will be built, but to reach stage of development where project is reported in PJM queue, developers have made significant investments in project feasibility and design

Credit: PA DEP

Data from PJM New Services Queue (12/07/2023)

Playback Speed

Screenshot from PennState Extension Webinar:
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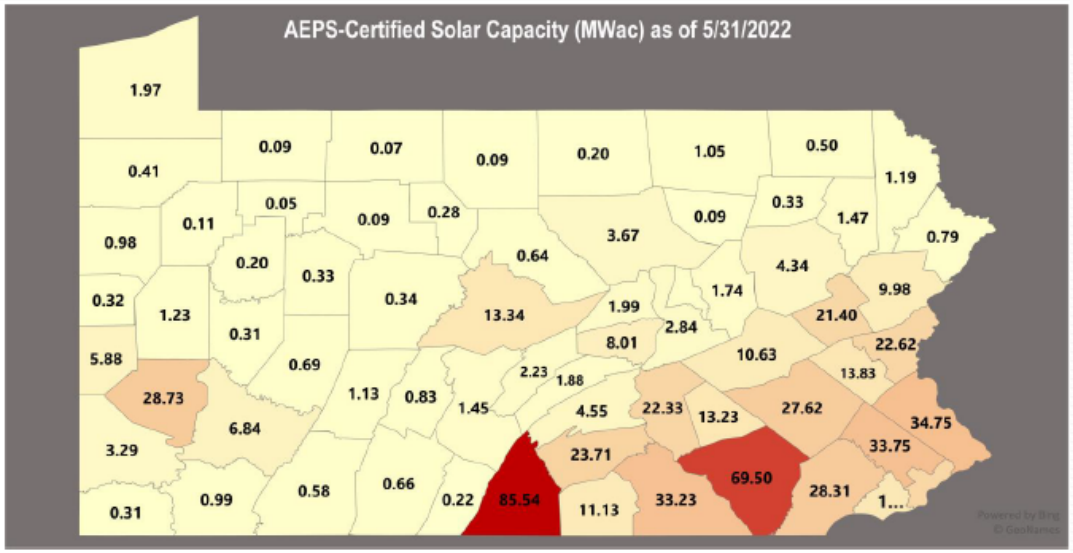
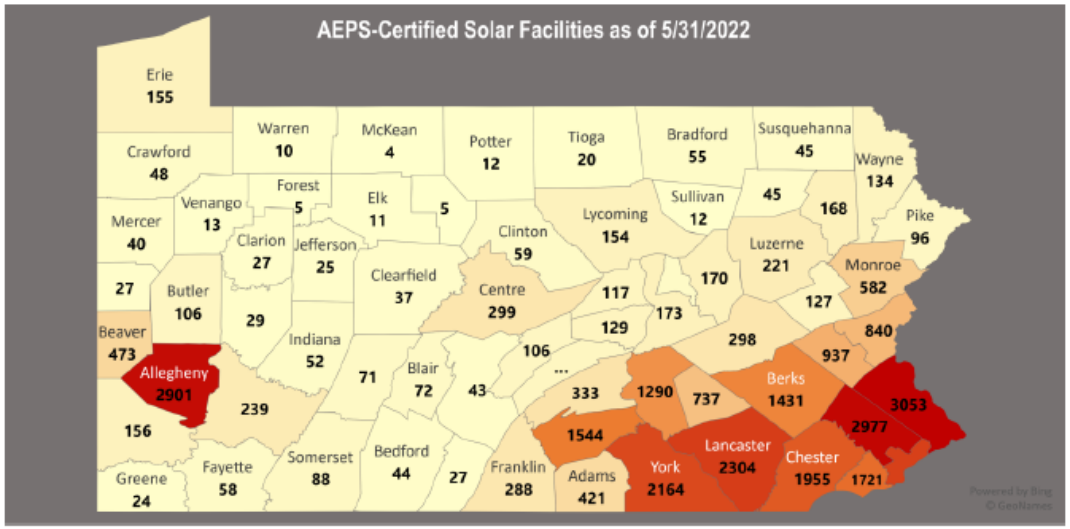
AEPS Report 2022 – Observations on Solar Resources



Note: As of 5/31/2022, the AEPS certified solar generation capacity was 12.55 MWac in Delaware County and 21.94 MWac in Philadelphia County.



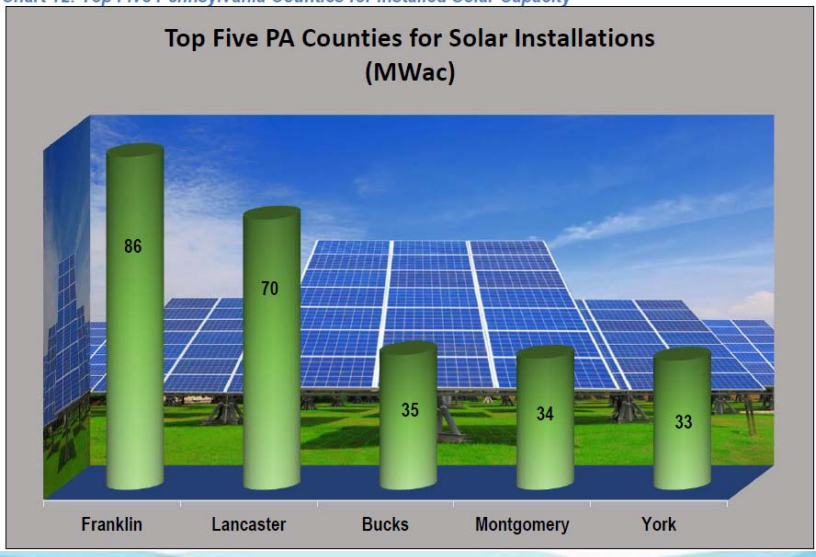
Note: As of 5/31/2022, Philadelphia County has 2,277 AEPS certified solar generation facilities.

0.5% Solar PV Requirement = 525.0 MW_{AC} Solar PV Capacity

534.4 MW_{AC} had been installed in PA by 5/31/2021

Currently, 1,098 MW_{AC} is installed (as of 2/21/2024), or the solar share = 1.05%

Chart 12: Top Five Pennsylvania Counties for Installed Solar Capacity



MAREC Study

Mid-Atlantic Renewable Energy Coalition (MAREC), Advanced Energy United (AEU) and American Clean Power Assoc (ACP) commissioned Gabel Associates to prepare the following study:

Economic and Environmental Impact of Gov. Shapiro's "30x30" Alternative Energy Pledge

This was primarily based on PA House Bill 1467 (HB1467), which expands the Alternative Energy Standard Portfolio (AEPS, consisting of:

Increasing Tier 1 renewable energy sources from 8% to 30% by 2030; which includes: 14% in-state solar, broken down into the following carve-outs:

- 4% - Distributed Generation (DG) Solar
- 2% - Community Solar
- 8% - Grid-scale Solar

MAREC Study - Findings

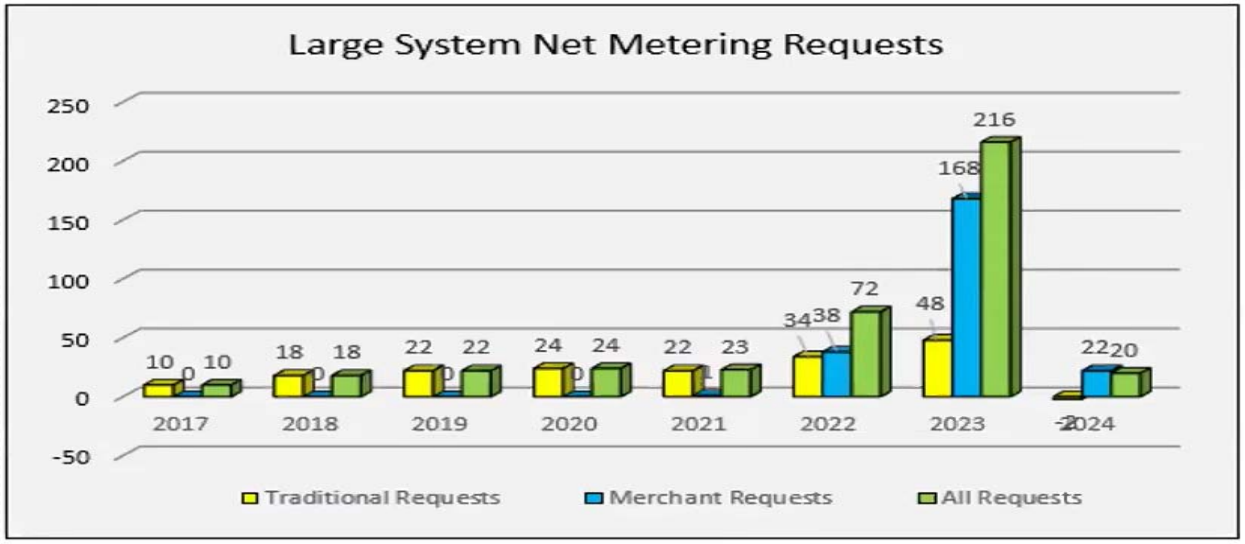
- Average ratepayer impact will be $3.43 per month ($41.18 per year, a 2.2% increase) for a typical residential customer during the 2024-2035 forecast period;
- Spur an estimated investment in Pennsylvania of $13.1 billion ($9.9 billion NPV) to develop energy projects;
- Increase the state GSP by $15.0 billion ($11.4 billion NPV);
- Create 129,134 direct, indirect, and induced job-years between 2024 through 2031;
- Create an average of 3,154 annual direct, indirect, and induced job years supported by the ongoing operations and maintenance of the installed systems;
- Lower the cost to ratepayers through reductions in the price cap (known as the Alternative Compliance Payment) on alternative energy credits starting in 2032, further increasing the value of the enhanced AEPS in HB1467; and,
- Yield estimated environmental benefits through reduced emissions of $6.5 billion ($4.2 billion NPV).

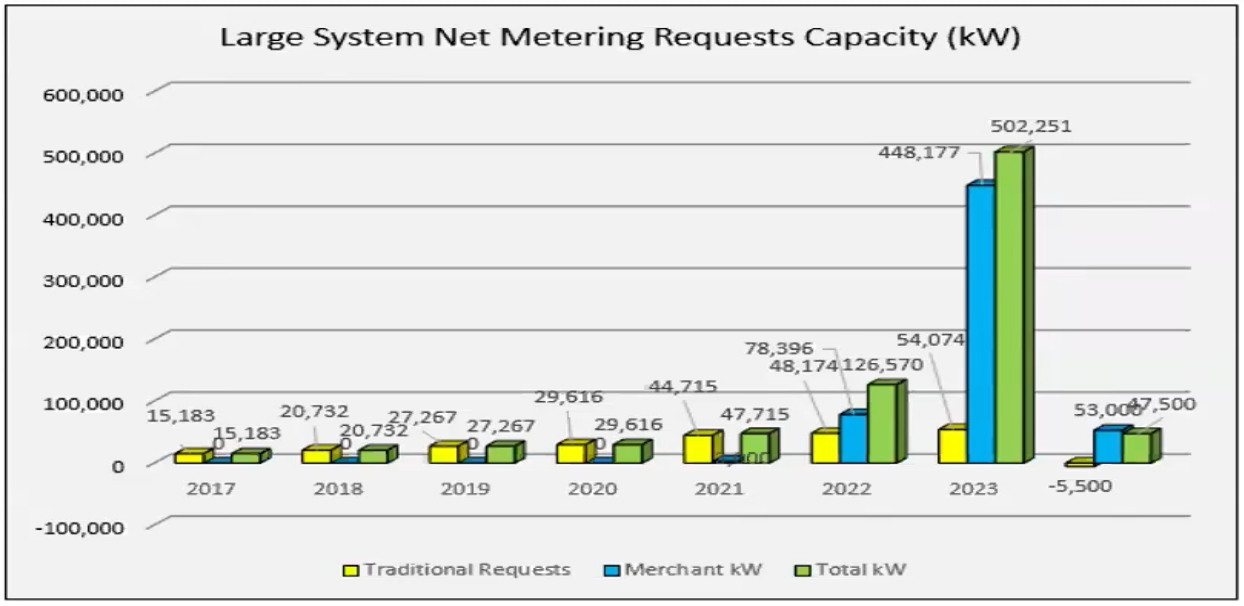
Further, the Study finds the following net benefits for Pennsylvania from 2024-2035:

- **Net economic benefits** can be calculated by subtracting ratepayer costs from the economic benefits to Pennsylvania. Based on the analysis in the Report, **Pennsylvania will realize net economic benefits of $8.3 billion NPV**.
- **Net economic and societal benefits** can be calculated by subtracting ratepayer costs from the economic and environmental benefits to Pennsylvania. Based on the analysis in the Report, **Pennsylvania will realize net total benefits of $11.2 billion NPV**.

Large Net Metering 500 kW to 3+ MW

Interconnection Applications – Merchant Generator Issue





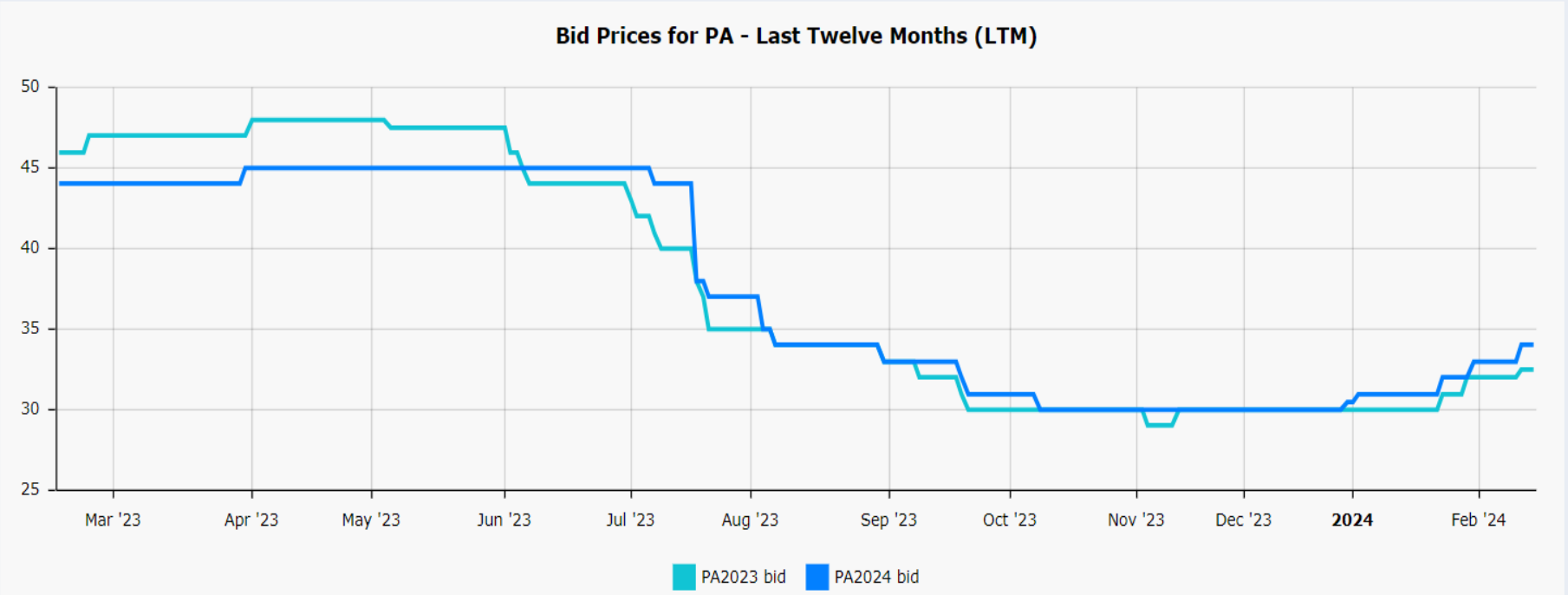
PA PUC

Current PA SACP = $82.90/SREC

Current PA SREC Prices

PA

Latest Bid Price: $34.00



PA Utility Solar Incentive Programs for C&I Customers

Four utilities currently provide an incentive for solar projects for commercial customers, including schools, under their Act 129 energy efficiency plans. PECO, Duquesne Light Company (DLC), First Energy (including Met-Ed, Penn Power, Penelec and West Penn Power) and PPL have announced solar incentives in their current Act 129 plans. Most of them require the project meets a minimum Total Resource Cost Test ("TRC") value. The utilities will reimburse commercial/industrial customers for every solar kWh generated and used on site for the first 12-month period.

Utility	Payment per kWh	Min TRC Requirement	For solar systems put in service	Cap
PECO	$0.10	May not apply	1/1/23 - 5/31/26	Must not exceed system cost
DLC - Duquesne	$0.05	0.90 is acceptable	Uncertain	Up to 90% of system costs, capped at $500,000
First Energy	$0.05	0.85	1/1/23 - 5/31/26	Up to 50% of system costs, capped at $500,000
PPL	$0.03	0.85	1/1/23 - TBD	Up to 50% of system costs, capped at $500,000

Note: Utility program availability & incentive levels are subject to change without prior notice.

UPDATE: Now up to $0.10/kWh for IX applications submitted until August, 2024

Solar Ordinances in Pennsylvania

Principal Use Solar Allowed	Accessory Use Solar Allowed	No Solar Guidance
8%	15%	85%
The zoning ordinance clearly allows for solar energy to be the principal use of the land for given districts, generally subject to approval (as a conditional use).	Accessory solar energy is permitted, often subject to various requirements. Principal use solar is either implicitly or explicitly prohibited.	These ordinances either fail to mention solar energy at all or only mention solar without specifying where or under what circumstances it is permitted.

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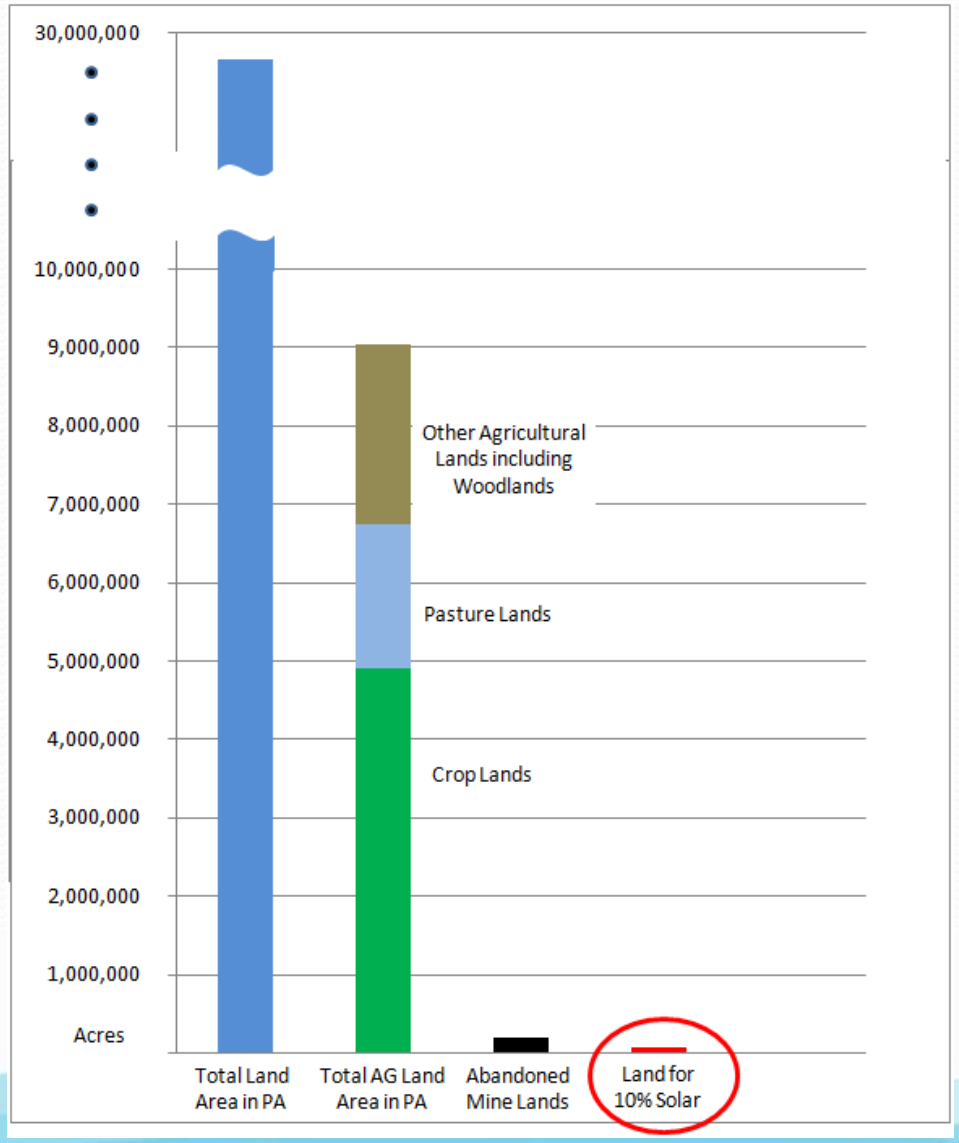
Land Area in Pennsylvania

Relative to Land Usage for Grid Scale Solar PV



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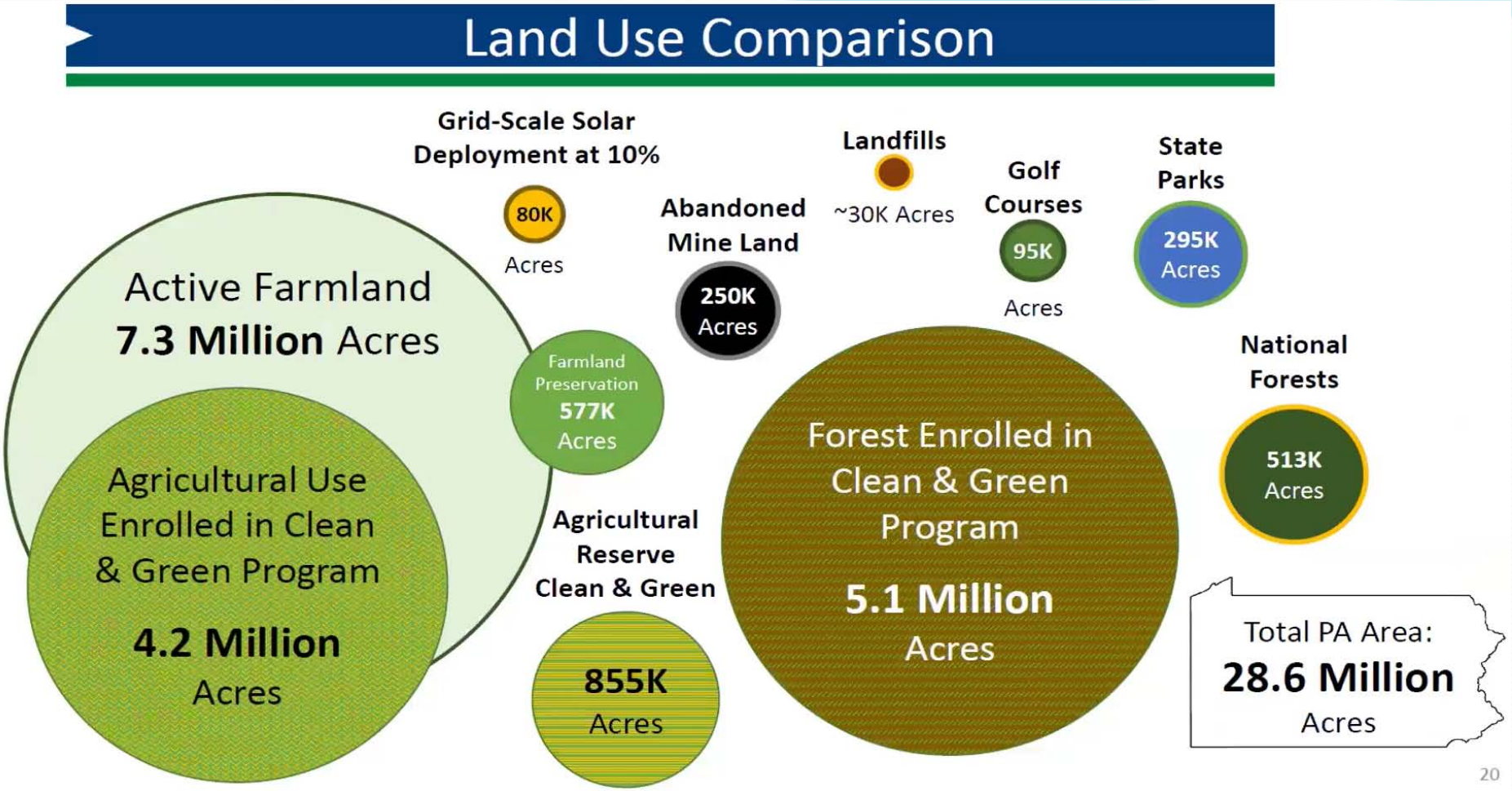

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Thank You!!