

IHS Energy

## Solar PV Capacity Additions Forecast for PJM States: 2018–33

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# Solar PV Forecasting Methodology

## IHS Energy solar PV power forecasting methodology

### Analytical framework

*The IHS Energy outlook for solar power takes into account multiple drivers and inhibitors that reflect the maturity of the market and its growth potential for solar.*

*Key components of our framework for assessing market attractiveness for solar are*

- State renewable policy
- Regulatory incentives
- Solar resources
- Site approval
- Grid access and offtake

### Short-term data points

*In the short term (one to four years), our forecast is based primarily on existing policies, the late-stage project pipeline, and status of procurement and equipment orders.*

*Key data inputs collected and assessed by IHS Energy analysts include*

- Project announcements
- Utility requests for proposal, auctions, and tenders
- Existing mandates and incentives
- Project development track record
- Reported costs and pricing
- Supply-chain announcements and equipment orders

### Longer-term assumptions

*In the longer term (5–25 years), our forecast draws upon rigorous bottom-up research and on economic fundamentals, energy prices, and macroeconomic factors.*

*Key data inputs and assumptions include*

- Policy and regulatory trends
- Power demand growth and capacity retirements
- Annual solar power pricing forecasts
- Power and gas prices
- Transmission and grid infrastructure

Source: IHS Markit

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# Key assumptions

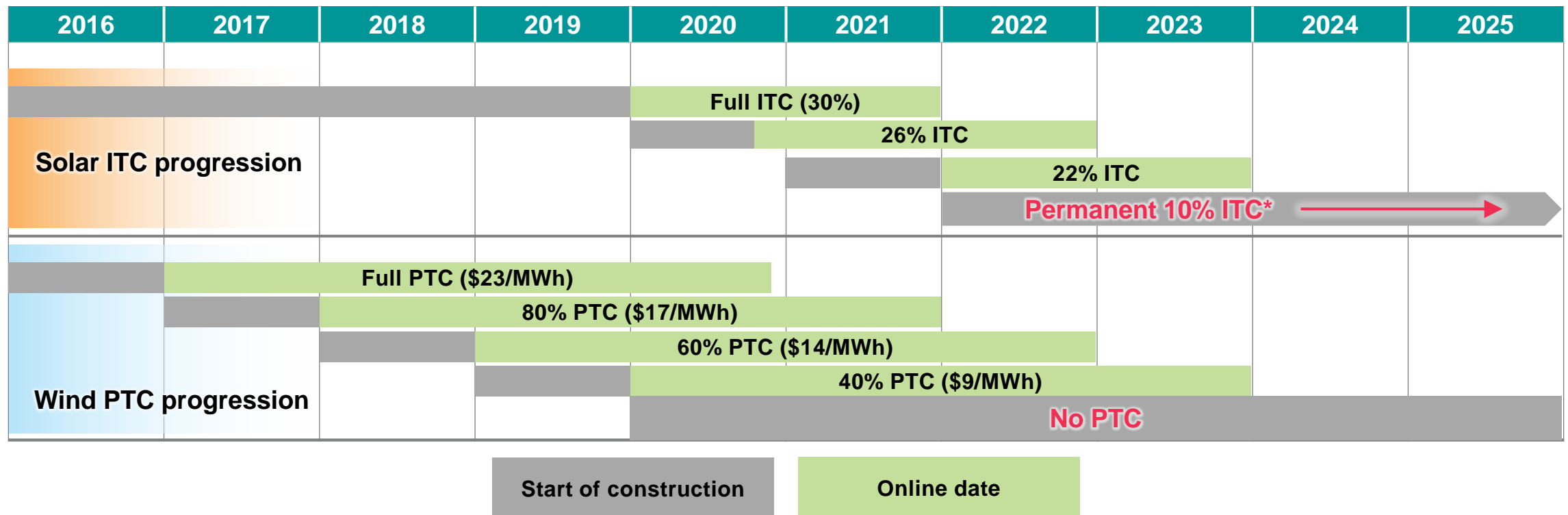
Solar forecast scenario overview			
Assumptions	Scenario 1: “NEM continuity”	Scenario 2: “NEM reform”	Scenario 3: “Lower cost solar”
Federal policy support	Current ITC schedule (see slide 5)	Current ITC schedule	Current ITC schedule
Net energy metering (NEM) policies and retail rate structures	Current retail rate structures are maintained, and NEM continues to be offered at full retail rates; existing NEM caps are consistently increased (as they have been in a number of states to date).	From 2020-2025, utilities adopt (and regulators approve) changes to NEM and retail rate structures which result in a more cost-based approach to customer-sited solar compensation. (see slide 6) Current detailed state NEM policy. (see slide 7)	Current retail rate structures and NEM are maintained for 3 years beyond the reform timeline in Scenario 2. They are then reformed in a similar manner.
Solar costs (\$/kW)	Solar costs decline by 18-23% in nominal terms from 2017-2033 (see slide 8)	Solar costs decline by 18-23% in nominal terms from 2017-2033	Solar costs decline by 35-45% in nominal terms from 2017-2033; driven by a combination of technology advancements and policy incentives
State policy support	Current RPS policies and state-level incentives maintained (see slide 7)	Current RPS policies and state-level incentives maintained	Current RPS policies and state-level incentives maintained

Note: NEM = Net energy metering  
Source: IHS Markit

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# Current Investment Tax Credit (ITC) schedule

## Evolution of tax credits by under-construction deadline and online date



Notes: Assumes that solar projects may be completed within two years of qualifying for the tax credit via start of physical construction or “safe harbor” provisions. \*ITC applied to residential taxes terminates for projects that start construction after 2021.

Source: IHS Markit

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## Options for NEM and retail rate reform

IHS Markit will not predict specific changes to state or utility NEM policies or rate structures; however, we assume states will choose from a variety of options that reduce the compensation for customer-sited solar, but still provide sufficient compensation for a moderate pace of additions.

- Holistic rate reform options: lower volumetric (\$/kWh) price in favor of higher:
  - a) Minimum (fixed) bill charge
  - b) Peak demand (\$/kW) charge
- Narrowly-tailored NEM reform options:
  - a) Add “standby” charge for NEM customers only
  - b) Reduce bill credits for all solar generation exported to the grid in real time (may require new meters)
- NEM replacement options:
  - a) Value-based tariff (adjusted periodically to account for changes in wholesale power markets and T&D costs)
  - b) Competitive process (for example, rolling tenders)

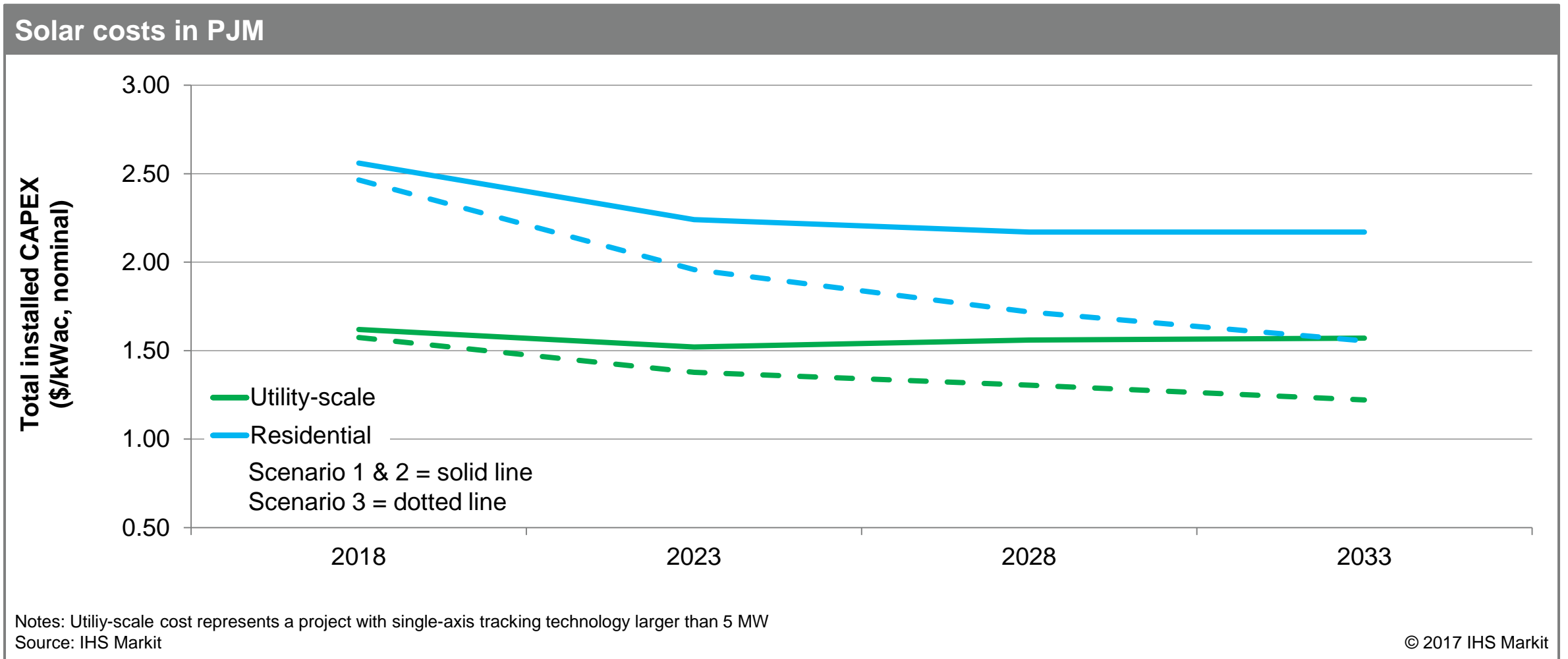
# RPS and NEM policy assumptions by state

## Current RPS and NEM policy by state

State	RPS target (% of retail sales)*	Solar carve-out (% of retail sales)	NEM Cap (% or capacity)	NEM System Size Limits by Segment (MW)	NEM Remuneration**	NEG Remuneration**
DE	24% by 2026	3.5% by 2026	5% of aggregated customer peak demand	Residential: 0.025 MW Non-residential (Delmarva): 2 MW, Non-residential: (DEC): 0.5 MW	Full retail rate	Full retail rate
DC	50% by 2032	5% by 2032	N/A	1.00	Full retail rate	Full retail rate
MD	25% by 2020	2.5% by 2020	1500 MW	2.00	Full retail rate	Full retail rate
NJ	21.98% by 2028***	4.1% by 2028	2.9% of retail sales	100% of customer load	Full retail rate	Full retail rate
OH	12.5% by 2026	0.5% by 2026	N/A	Not specified, must be sized to fit customer load	Full retail rate	Less than retail
PA	8% by 2021	0.5% by 2021	N/A	Residential: .050 MW Non-Residential: 3 MW	Full retail rate	Full retail rate
WV	-	-	3% of peak demand during previous year	Residential: 0.025 MW, Industrial (for large IOUs): 2 MW Commercial (for large IOUs): 0.5 MW, C&I (for small IOUs): 0.5 MW	Full retail rate	Full retail rate
IN	-	-	1% of utility's summer peak load	1.00	Less than retail after 2022	Full retail rate
IL	25% by 2026	1.5% by 2026	5% of utility's peak load in prior year	2.00	Full retail rate	Full retail rate
KY	-	-	1% of utility peak load in prior year	0.03	Full retail rate	Full retail rate
MI	35% by 2025	1% by 2025	0.75% of prior year peak load	0.15	Full retail rate	Full retail rate
NC	12% by 2021****	0.2% by 2020	N/A	1.00	Full retail rate	Full retail rate
VA	15% by 2025 (voluntary target)	-	1% of state's peak load for prior year	Residential: .020 MW Non-residential: 1 MW	Full retail rate	Full retail rate
TN	-	-	N/A	N/A	N/A	N/A

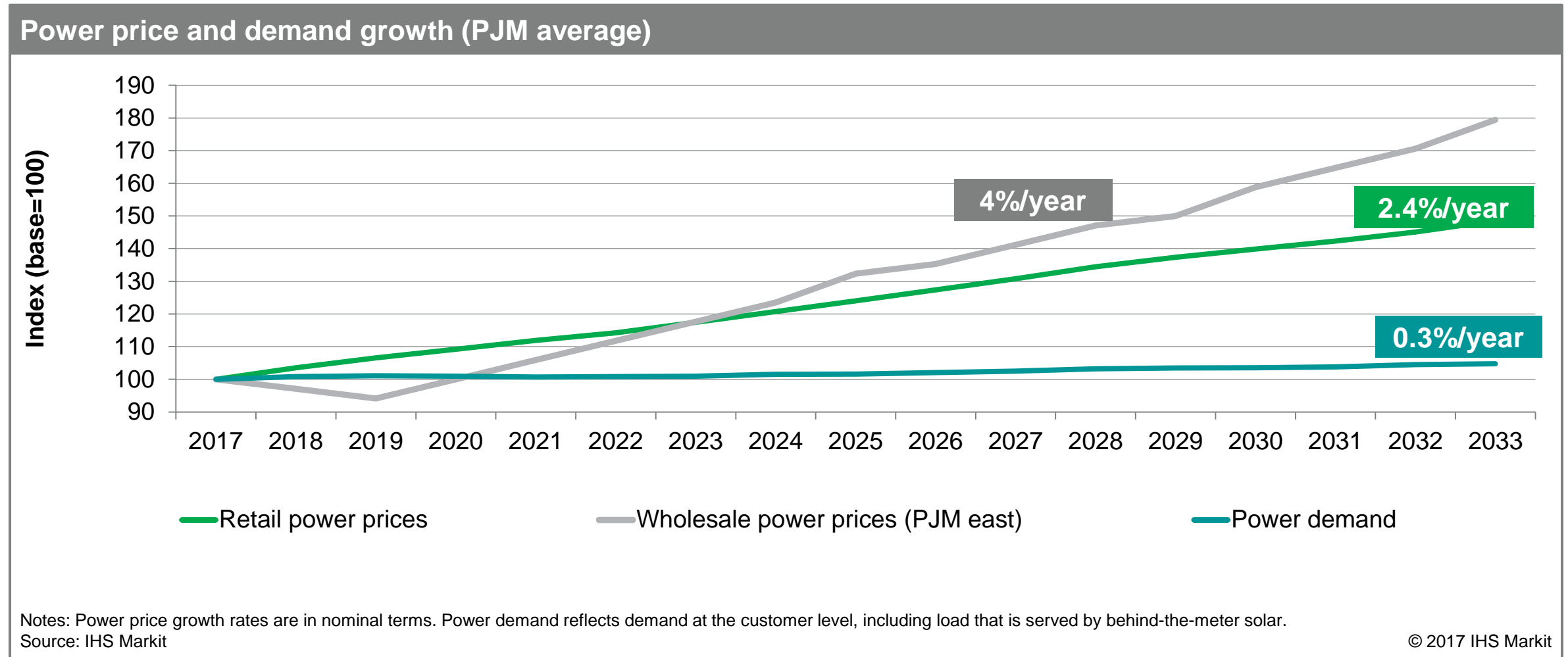
Note: \*RPS includes solar carve-outs \*\* NEM remuneration is a tariff structure under which the utility pays customers for excess generation, up to a given amount. NEG is the total amount of excess generation minus the total amount of energy consumed from the grid over a given period \*\*\* New Jersey RPS target only includes Class I renewable technologies and the solar carve-out.\*\*\*\*RPS compliance in NC can be achieved through energy efficiency and Renewable Energy Credits (RECs) from any state. The primary drivers for solar development include the current state PURPA policy, planned RFPs, solar resources, solar costs and the previous state tax credit .

# Solar cost

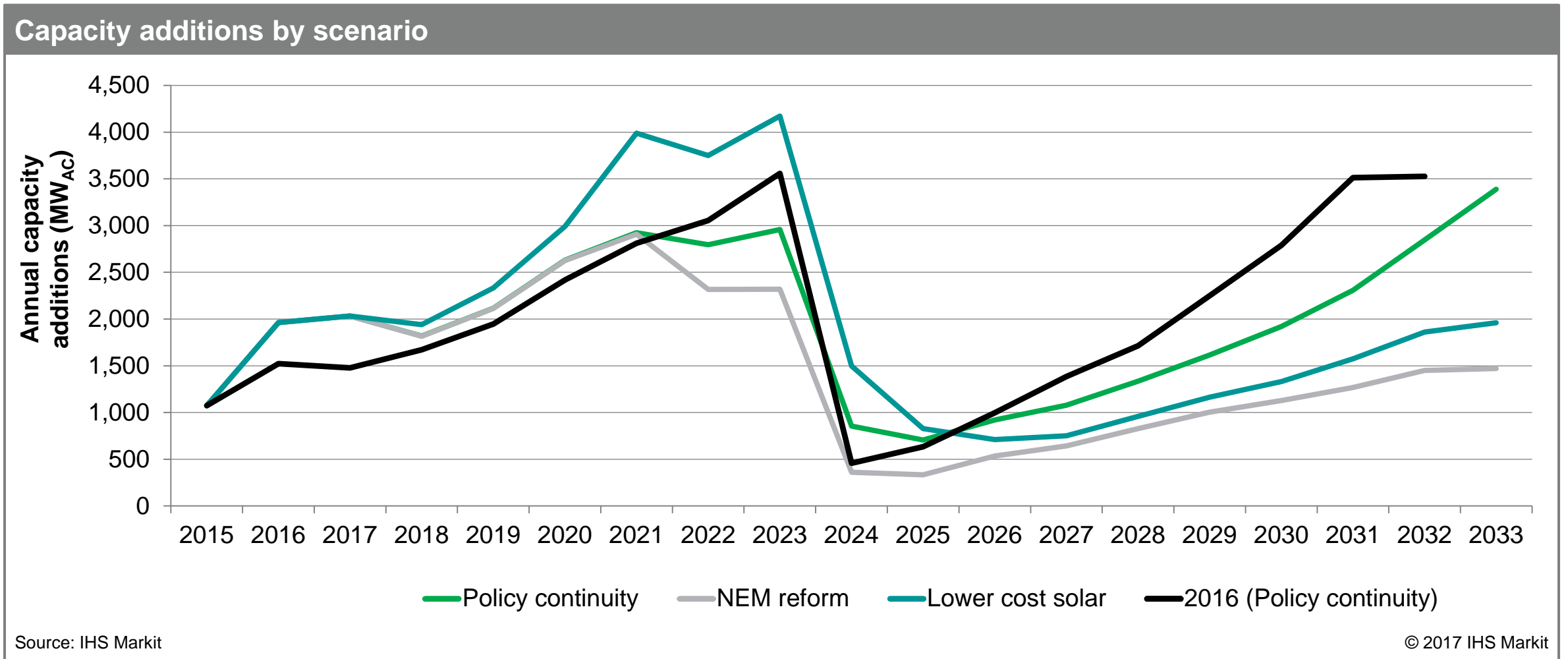




## Key power market assumptions (all scenarios)

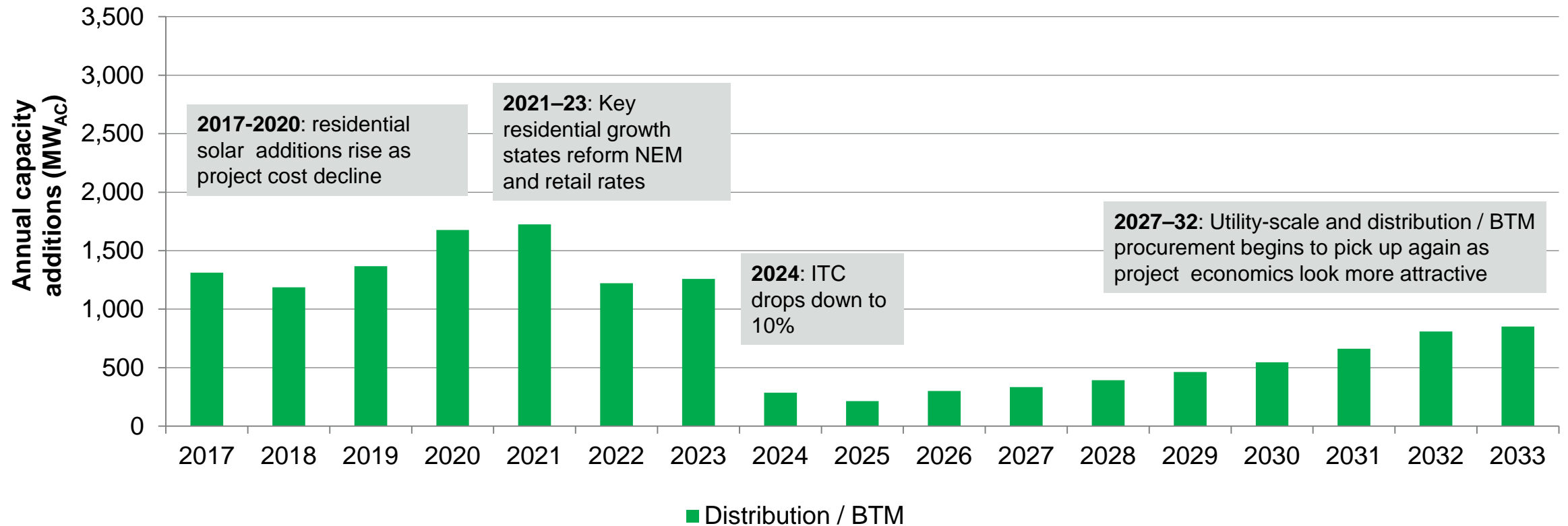


# Capacity additions by scenario



# Solar PV capacity additions by segment: Scenario 2: “NEM reform”

PJM annual solar PV capacity additions by segment: Scenario 2

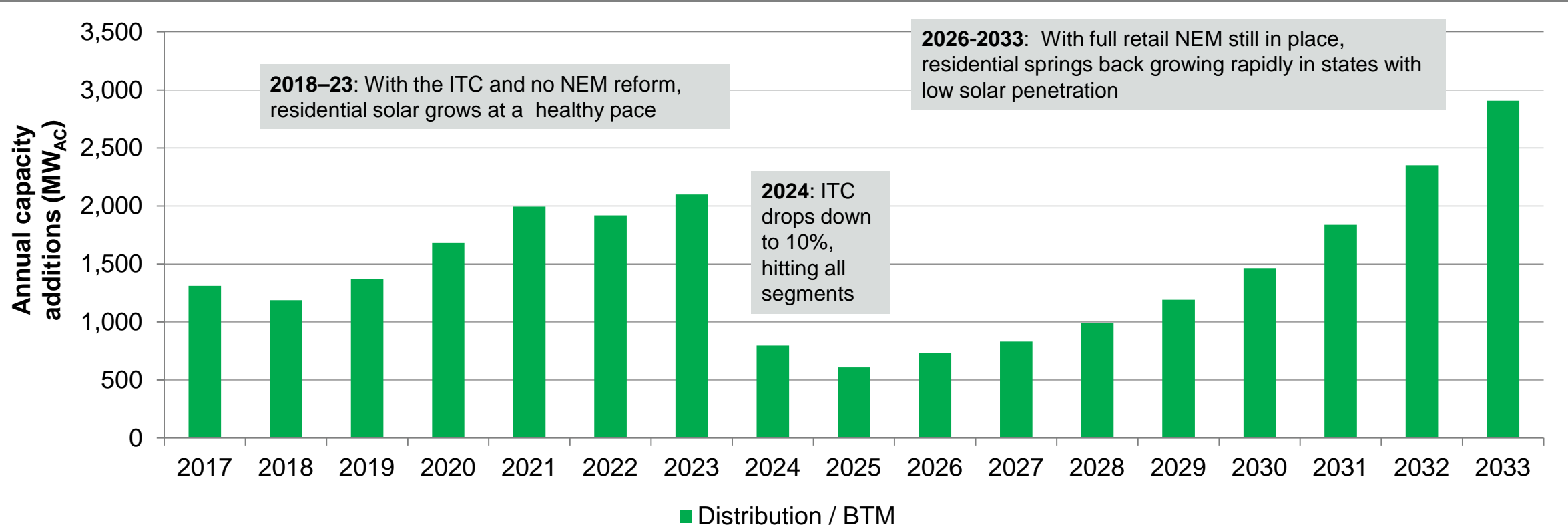


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# Solar PV capacity additions by segment: Scenario 1: “Policy continuity”

PJM annual solar PV capacity additions by segment: Scenario 1

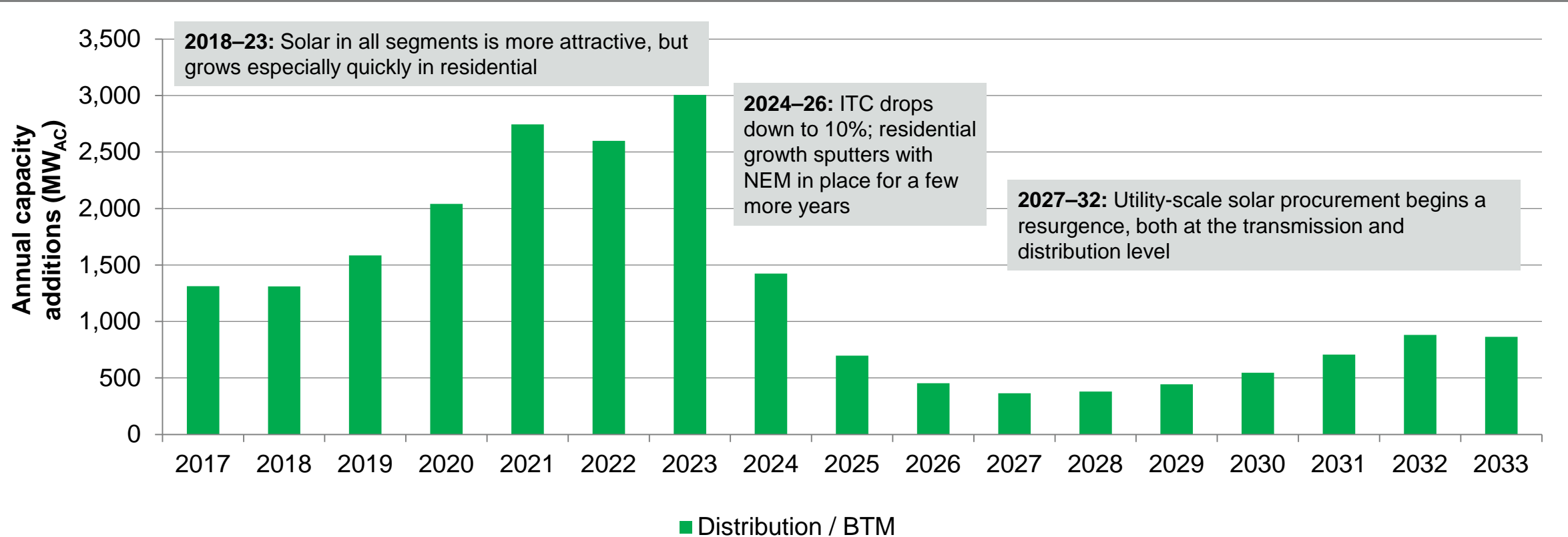


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# Solar PV capacity additions by segment: Scenario 3: “Lower cost solar”

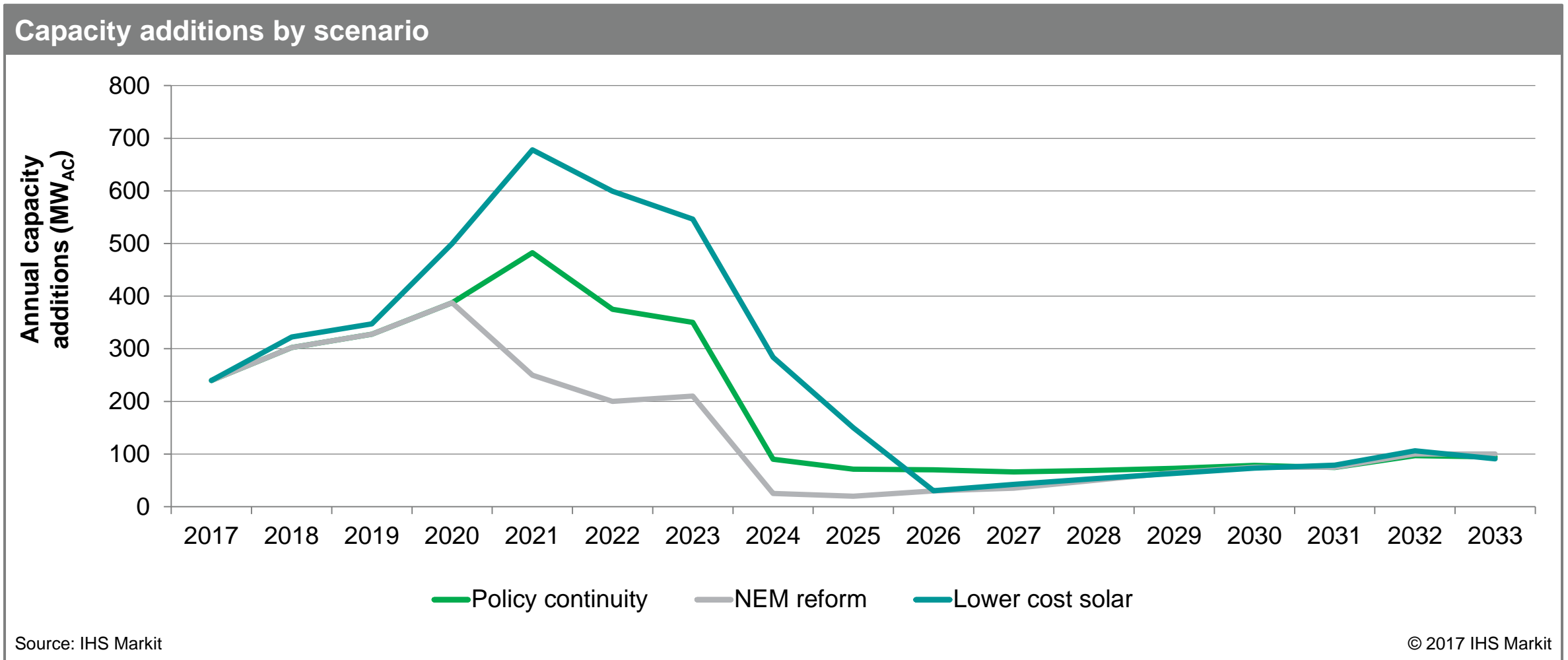
PJM annual solar PV capacity additions by segment: Scenario 3



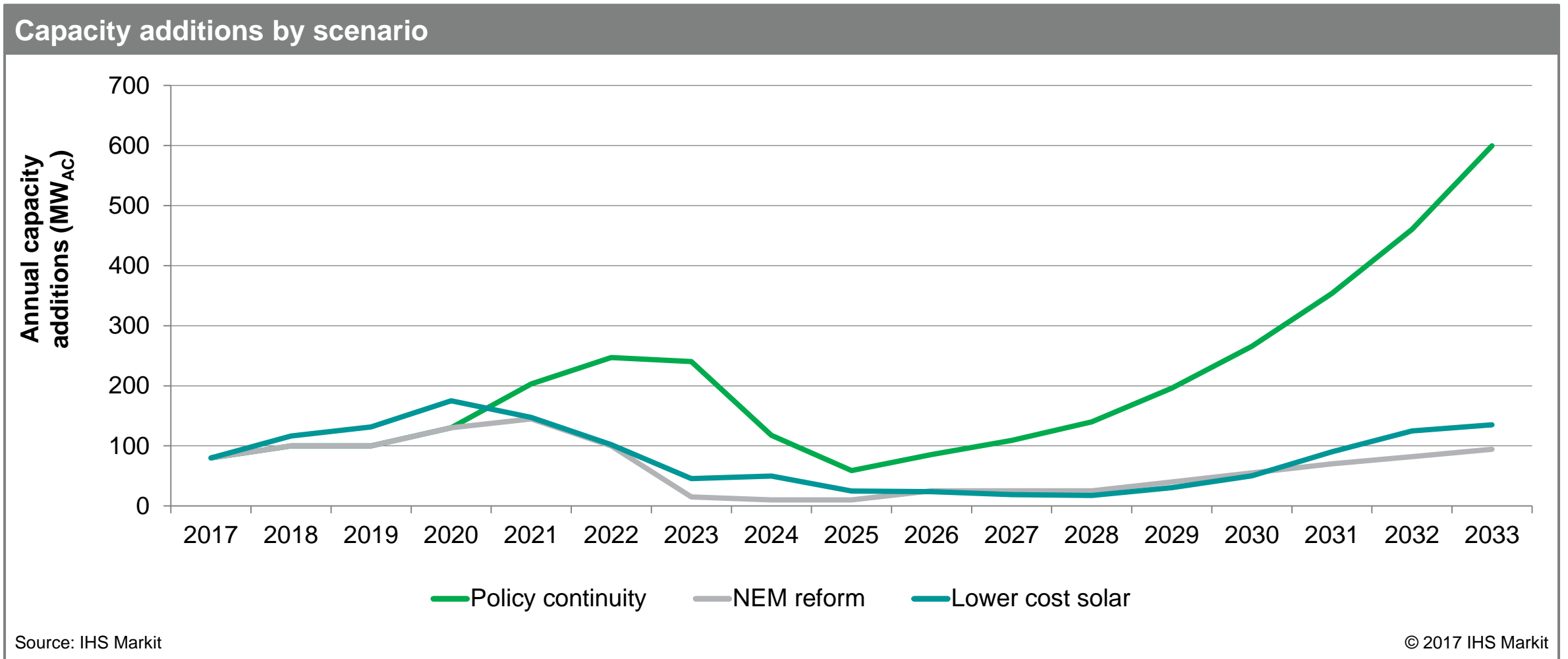
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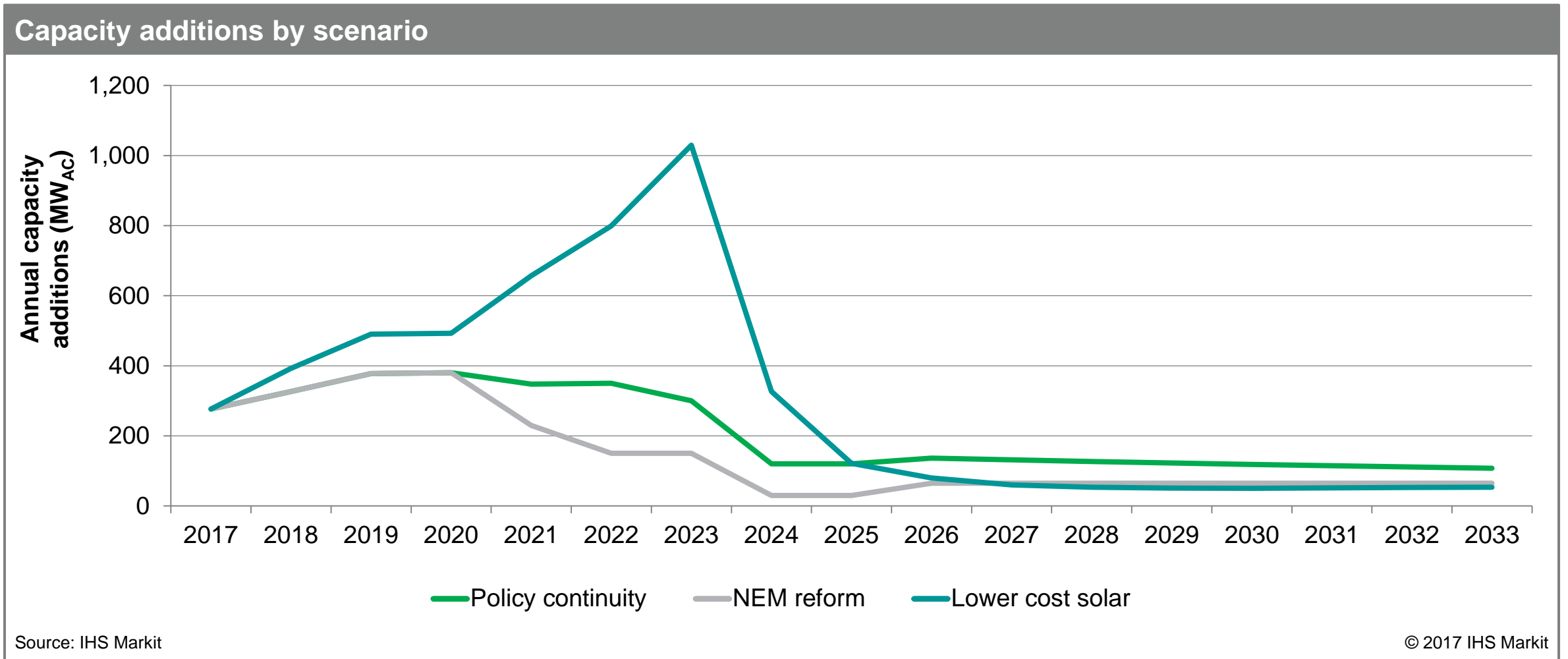
# Maryland solar PV capacity additions by scenario and segment



# Pennsylvania solar PV capacity additions by scenario and segment



# New Jersey solar PV capacity additions by scenario and segment





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