

# Charting the Future: Chile's PMGD Stabilized Price Outlook

Public Report

March 2025



- I. About Aurora
- II. Current situation overview
- III. Calculation of stabilized prices
- IV. Market discussion and potential scenarios
- V. Aurora's central scenario

# Introducing the Aurora team

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# Aurora provides market leading forecasts & data-driven intelligence for the global energy transition

A U R  R A

Power markets



Renewables & PPAs



Storage



Grid & Congestion



Electric vehicles



Hydrogen



Carbon



Natural gas



 Regular detailed coverage  Analytics on demand



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+ Mexico coming soon



**900+**  
market experts

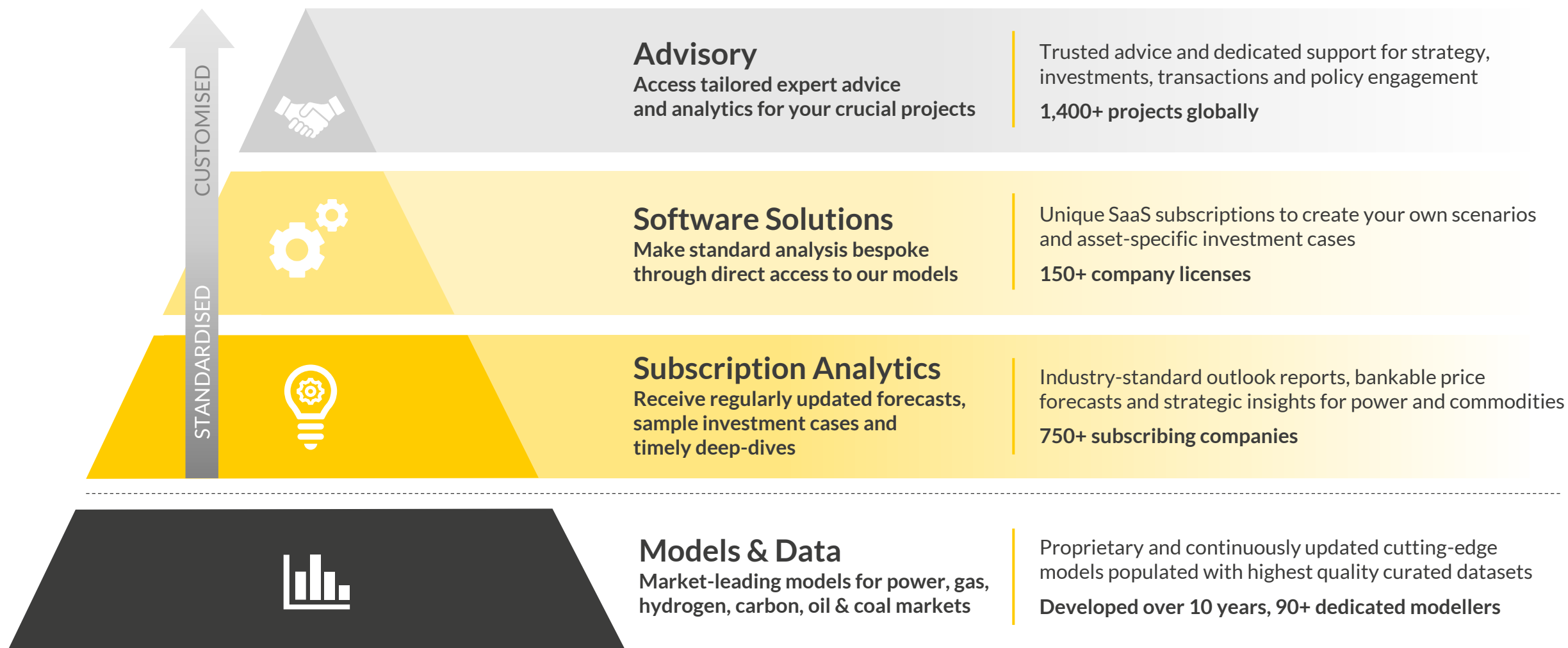


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- **Capacity Payments and curtailment** for the 16 Nodal Hubs
- **PMGD Price Forecast**
- Service provided based on Aurora's internally developed model

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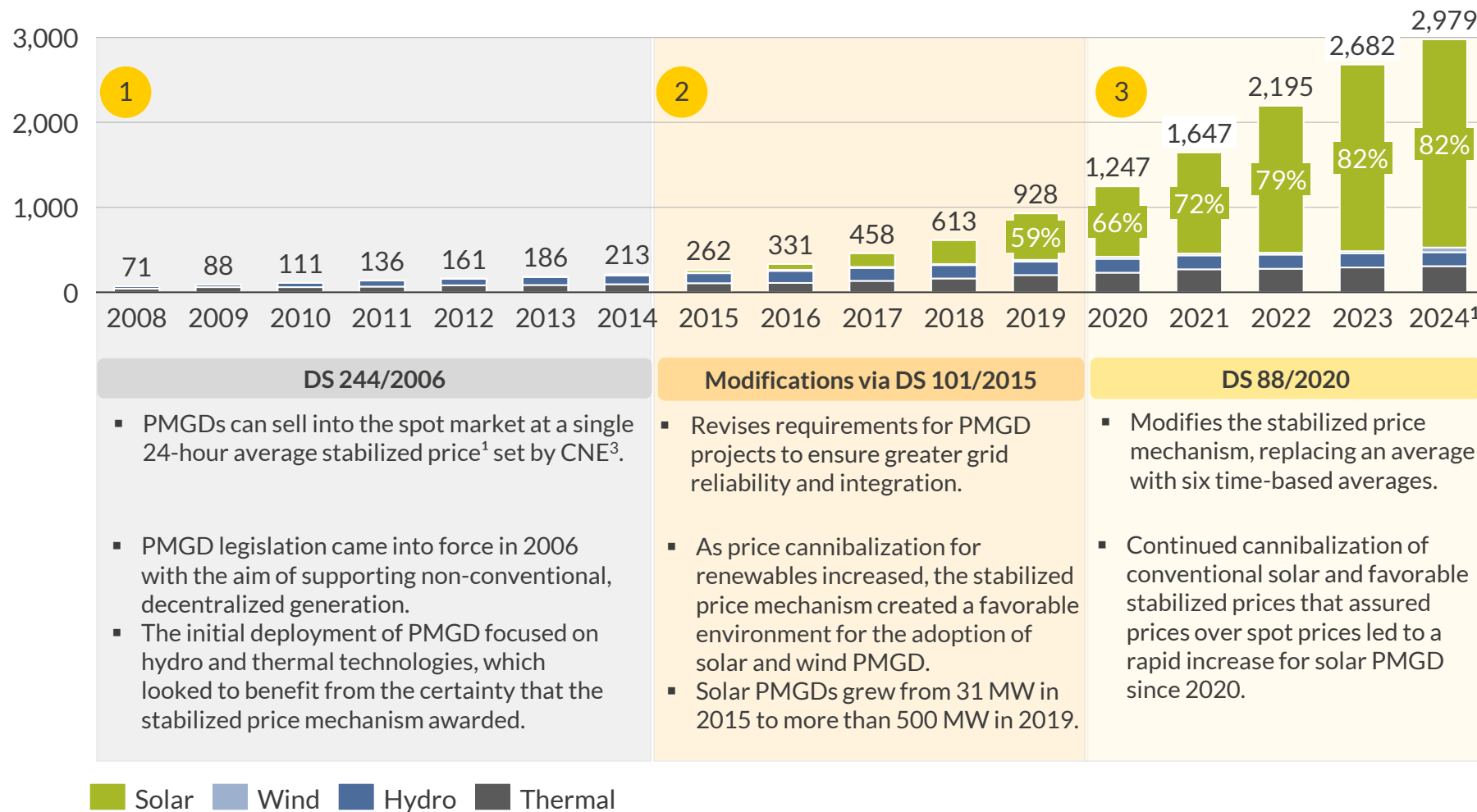
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# PMGD installed capacity has increased steadily since 2014, reaching ~3 GW in 2024; the solar share has grown by ~70% since 2015

Total PMGD capacity installed by technology

MW



1) Updated until December 2024. 2) Precio estabilizado. 3) Comisión Nacional de Energía.

## What is PMGD

- Decentralized small-scale power generators with maximum capacity of 9MW and connected at a distribution point.
- PMGD plants operate in a self-dispatch model within the wholesale market.

## Pricing Scheme

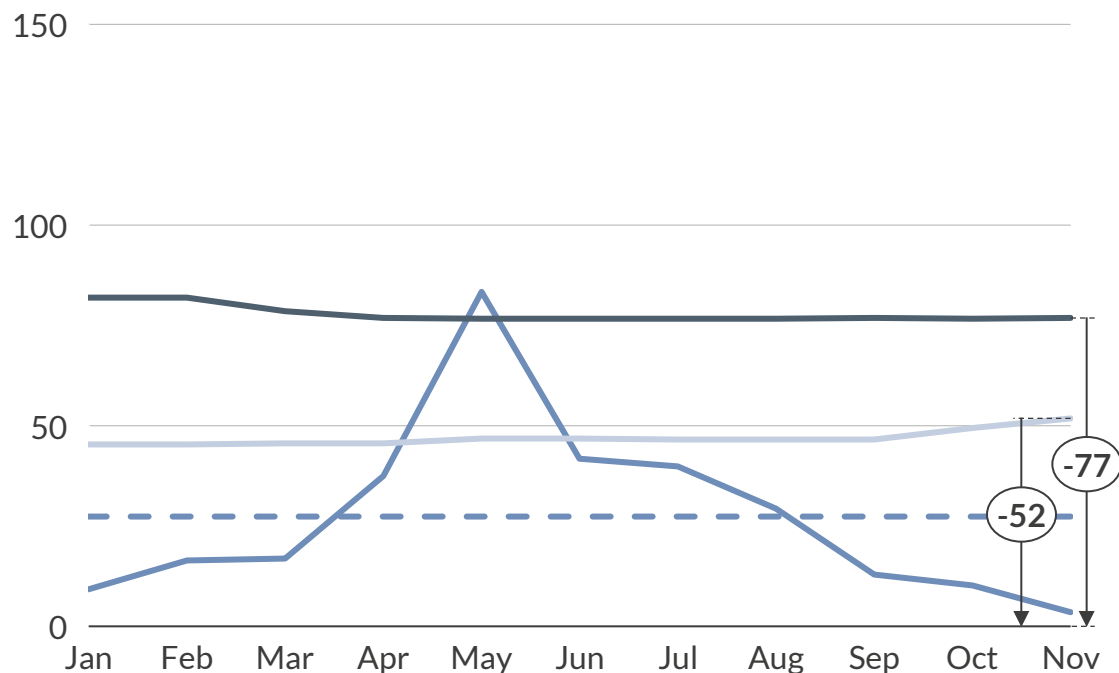
- PMGDs choose one of two pricing schemes for at least 4 years:
  - Spot price based on the nodal hourly marginal cost.
  - Stabilized price<sup>2</sup> as set out in DS 244 or DS 88, as applicable.
- From 2034, assets under DS 244 will have to transition into the current scheme, DS 88.
- Among assets under the DS 244, 97% are solar assets.



# Old and new PMGD price regimes curb hourly marginal cost volatility but raise prices above market energy prices, advantaging solar PMGD assets

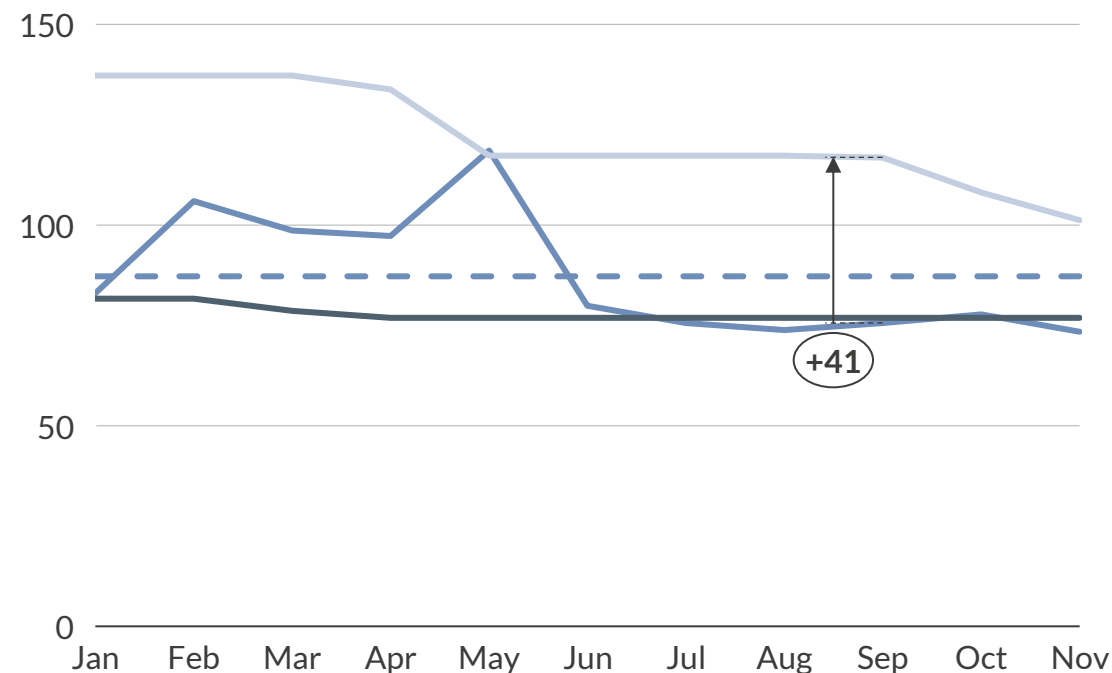
During solar hours, both stabilized prices remain above spot prices, though the new scheme reduces the price gap.

Price scheme comparison for Quillota node – Monthly average prices in 2024  
\$/MWh (nominal)



During night hours, the old stabilized price falls below spot prices, while the new price regime pushes prices above spot.

Price scheme comparison for Quillota node – Monthly average prices in 2024  
\$/MWh (nominal)

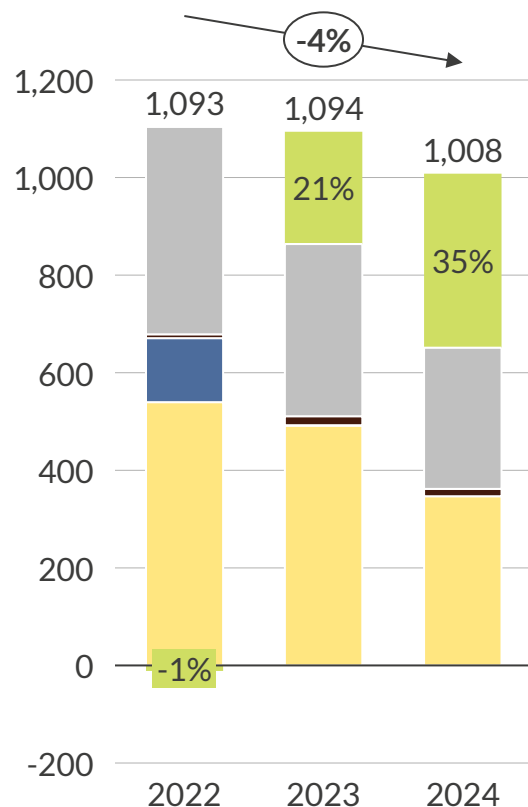


— CMG<sup>1</sup> — CMG Average — Old PE PNCP (DS 244) — Current PE (DS 88)

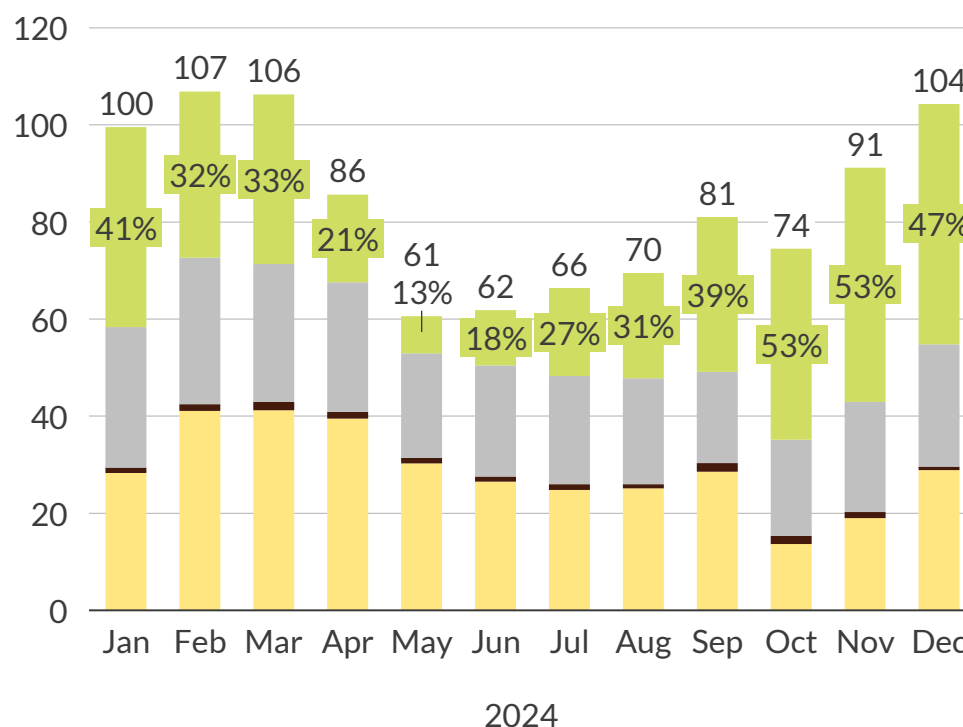
1) Costo marginal or marginal cost in English.

# Stabilized price compensations are increasing the systemic costs that are paid by generators and can be transferred to free clients

Total systemic costs by component  
M\$, nominal



Monthly systemic costs by component in 2024  
M\$, nominal



Stabilized price<sup>1</sup> Overrun costs of energy<sup>2</sup> Ramping costs<sup>3</sup> Hydro reserve<sup>4</sup> Ancillary services<sup>5</sup>

1) Compensaciones por Precio Estabilizado; 2) Sobrecosto de Energía; 3) Sobrecosto de Partida y Detención; 4) Costos de Reserva Hídrica; 5) Servicios Complementarios

- In 2022, systemic costs were driven by minimum constraint generation and ancillary services
  - Stabilized price compensations were negative as the price fell below CMG, requiring PMGD assets to cover the price differential.
- Systemic costs have decreased by 4%, but stabilized price compensations now make up 35% of total systemic costs in 2024.
- At monthly level, stabilized price compensations are higher during summer months, reaching 50 Mio \$ in December 2024.
- This results from solar cannibalization and market saturation, which push energy spot prices to zero, while PMGDs in the stabilized price scheme still receive positive prices during daylight hours.

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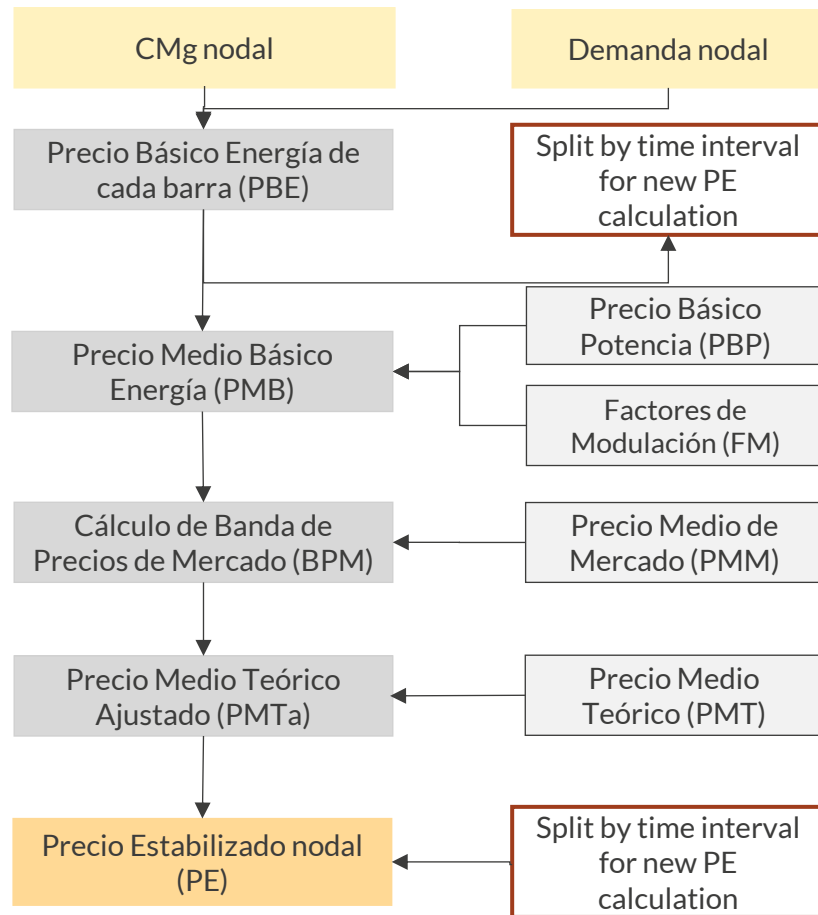


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# Beyond its impact on the system, the stabilized price methodology is a legacy calculation with ambiguities, prompting a rethink of its pricing approach

## Primary steps<sup>1</sup> for Stabilized Price Calculation



## Fundamentals for PMGD stabilized price calculation

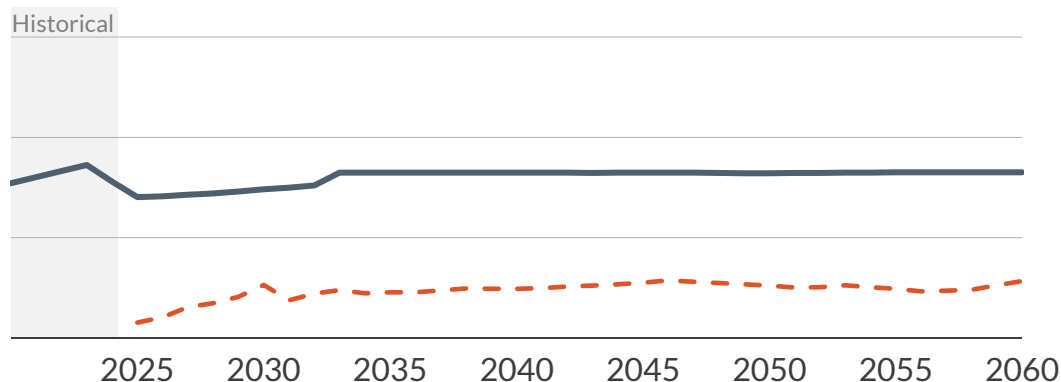
- *Precio básico de la energía* is calculated based on demand and marginal costs per node for the next 48 months.
- Price and volumes are split into 4-hour intervals across the day creating a total of 6 intervals each with a unique price.
- Monthly demand is modeled and distributed at hourly level to adapt demand to time intervals.
- The old PNCP price does not consider the split into time intervals.
- *Precio medio básico* is calculated to include both energy and capacity prices. It seeks to align and make the price comparable with *precio medio de mercado*<sup>2</sup>.
- *Precio medio básico* is benchmarked against market bands defined in relation to *precio medio de mercado* (PMM), which is the average price of all active PPAs known to the CNE.
- *Precio medio teórico* is calculated as the sum of the *precio medio básico* and transmission costs.
- If PMT falls within BPM limits, it stays the same; otherwise, it adjusts to the nearest limit resulting in *precio medio teórico ajustado*.
- The stabilized price is calculated by adding the PMTa – PMT difference to the *precio básico de la energía* by each time interval.

Primary data input   Intermediary outputs   Additional required data inputs   Final output

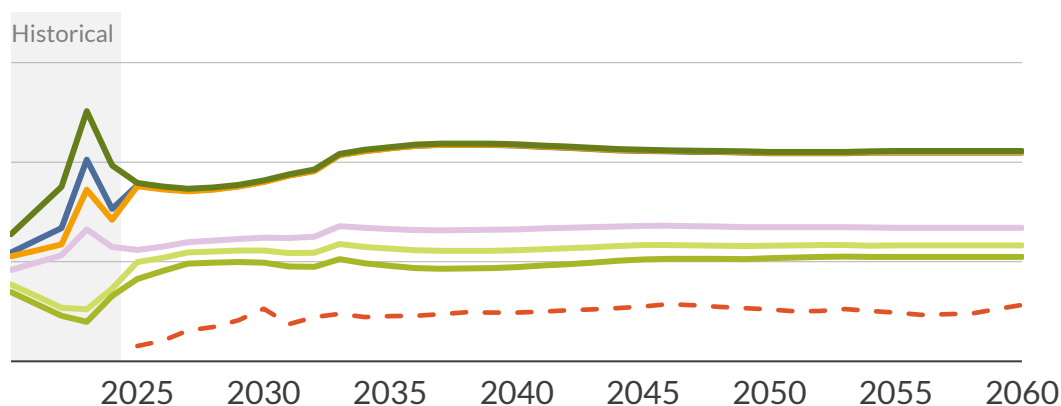
1) Translation in English of the intermediary price steps available in the Appendix of this deck. 2) No disclosure of calculation of *precio medio de mercado*. In the long-term, we assume the *precio medio de mercado* will be re-assessed and will converge with the marginal cost. For additional details, review next slides.

# The current PE price regime reduces the price gap compared to the old PE system; but still doubles the revenues of the spot market

Quillota – Old stabilized price, PNCP price (DS 244)  
\$/MWh (2023 real)



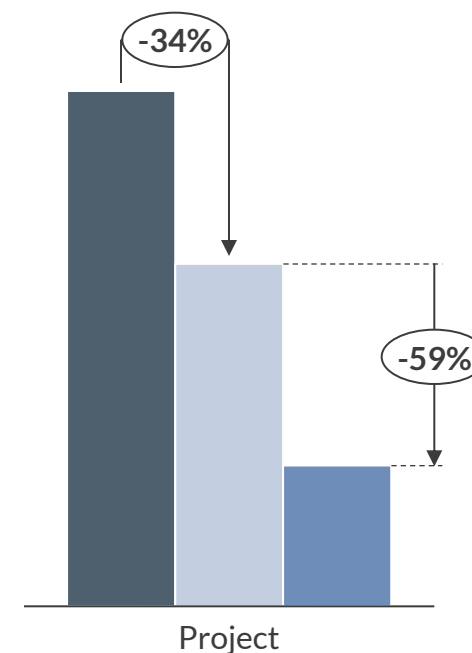
Quillota – Current stabilized price (DS 88)  
\$/MWh (2023 real)



1 2 3 4 5 6 Old PE (DS 244) Capture Price - AER

1) Net Present Value 2) Assuming a 1MW solar asset located in Quillota, with a 25% load factor over a 30-year lifetime, COD in 2026.

Present value<sup>1</sup> of energy revenues  
for exemplary solar project<sup>2</sup>  
k\$ (2023 real)



Old PE (DS 244)  
Current PE (DS 88)  
Spot

- The old scheme (DS 244) primarily benefits solar assets, which is why 97% of assets within this price regime are solar.
- The current stabilized price regime sets the average price higher than spot market during solar time intervals.
  - While daytime intervals are significantly lower than in the old scheme, nighttime intervals show higher prices.
  - The average price across all six intervals aligns with the old scheme.
- While the current price regime (DS 88) reduces solar asset revenues by 34%, these revenues remain significantly higher than in the spot market, with a 59% income differential.
  - This revenue considers only merchant market and excludes capacity recognition revenues.

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# The current PMGD scheme seems economically unsustainable, driving the need for change; Aurora has modeled a considered number of alternatives

The market momentum shows differing views on stabilized prices (PE) calculations, but there is consensus on the need for an alternative approach. Aurora aligns with this view and reviewed the stabilized price methodology, developing various scenarios for potential future changes:

Disruption grade

Abolition of stabilized prices	<ul style="list-style-type: none"> <li>▪ <b>Discussion:</b> Market participants propose restricting new PMGDs from accessing the stabilized pricing scheme.</li> <li>▪ <b>Aurora:</b> We consider the removal of stabilized prices an aggressive movement, especially considering financing projects in Chile. Aurora does not model this scenario.</li> </ul>	-
Stabilized prices adjusted to energy	<ul style="list-style-type: none"> <li>▪ <b>Discussion:</b> Calculation of stabilized prices incorporates capacity prices to align them with the market average price.</li> <li>▪ <b>Aurora:</b> We created a scenario removing capacity prices, to model the impact of establish a pricing scheme fully based on energy prices and not capacity<sup>4</sup>.</li> </ul>	A
Average PPA price (PMM) <sup>1</sup> adjusted to RES LCOE	<ul style="list-style-type: none"> <li>▪ <b>Discussion:</b> Average PPA<sup>2</sup> price (PMM) reflects average of PPA prices from CNE's<sup>3</sup> pool, including older, higher-priced contracts. Market players argue that benchmarking against PMM inflates the stabilized price.</li> <li>▪ <b>Aurora:</b> Aurora reflects the increasing volume of Chile's green PPAs by creating a scenario using RES LCOE<sup>5</sup> as the base.</li> </ul>	B
Average PPA price (PMM) adjusted to spot price	<ul style="list-style-type: none"> <li>▪ <b>Discussion:</b> Market agents suggest that the stabilized price should reflect energy market conditions and gradually converge with baseload nodal prices.</li> <li>▪ <b>Aurora:</b> Aurora models a scenario using baseload prices as the main market reference for the stabilized price.</li> </ul>	C

1) "Precio Medio de Mercado". Includes the average price of all active PPAs known to Comisión Nacional de Energía. 2) Power Purchase Agreement 3) Comisión Nacional de Energía 4) Aurora still considers PMGDs would receive capacity payments but would not factor into the calculation of the stabilized price itself. 5) Levelized Cost of Energy for Renewable Energy Systems.

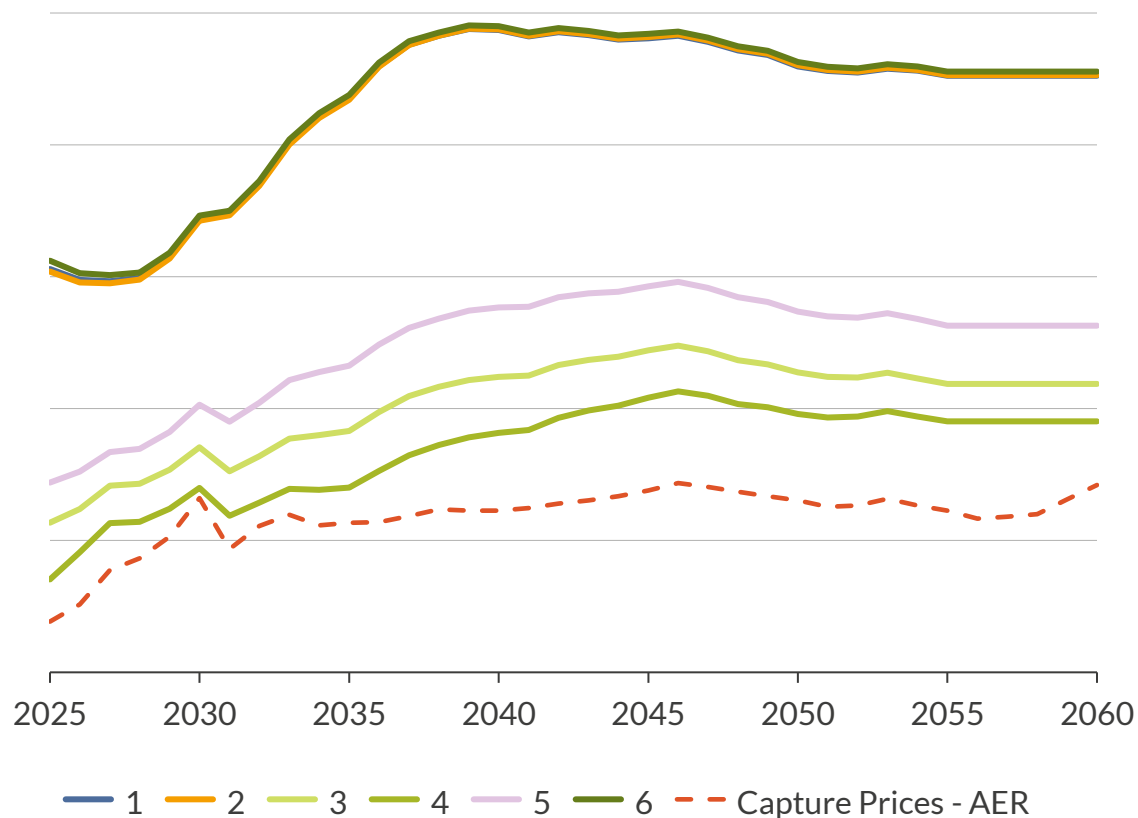


# Scenario A excludes capacity prices, and yet still results in high stabilized prices with solar revenues 39% higher than spot

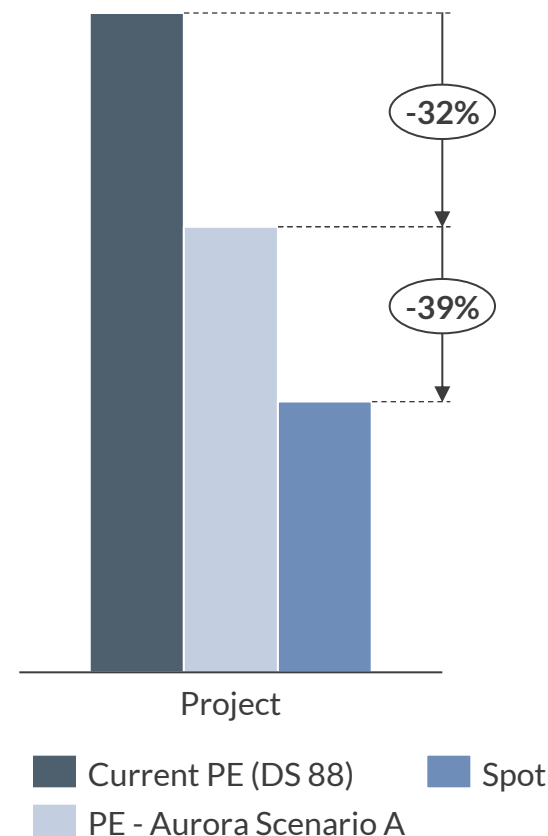
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Scenario A

Quillota – Stabilized price adjusted to energy indexing to Aurora Baseload, without considering capacity prices  
\$/MWh (2023 real)



Present value<sup>1</sup> of energy revenues for exemplary solar project<sup>2</sup>  
k\$ (2023 real)



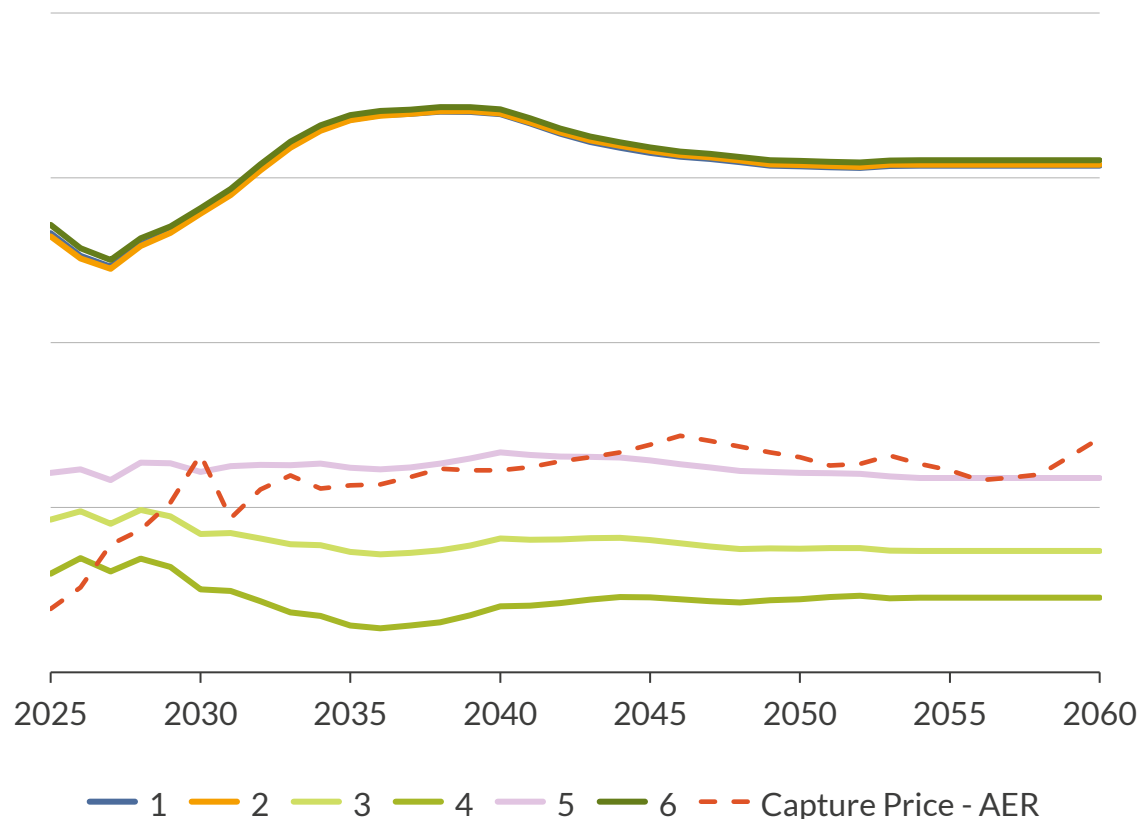
- Aurora considers this sensitivity to assess the impact of capacity prices in the stabilized price methodology.
- This scenario uses Aurora forecast of baseload prices as the PMM reference and excludes capacity prices from the equation.
- As a result, the PE decreases compared to the current stabilized price regime (DS 88) during solar hours.
- Capture prices are significantly lower than stabilized price intervals, leading to total revenues for a PMGD asset under this regime being 39% higher than those of a solar asset in the spot market.
- This scenario remains yet economically unsustainable.

1) Net Present Value 2) Assuming a 1MW solar asset located in Quillota, with a 25% load factor and over a 30-year lifetime, COD in 2026.

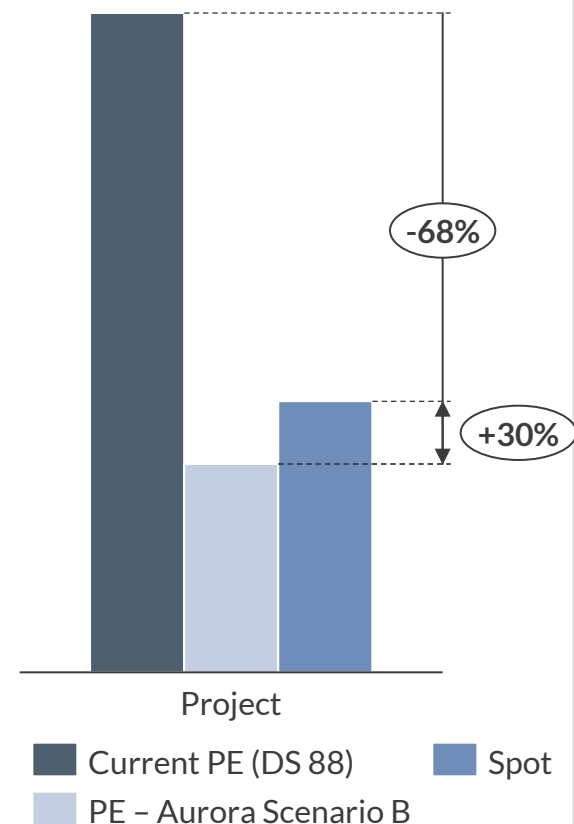
# Scenario B uses average RES LCOE and pushes stabilized prices down, reaching 30% lower revenues than in the spot market

## Scenario B

Quillota – Stabilized price after indexing to average RES LCOE  
\$/MWh (2023 real)



Present value of energy revenues  
for exemplary solar project<sup>1</sup>  
k\$ (2023 real)



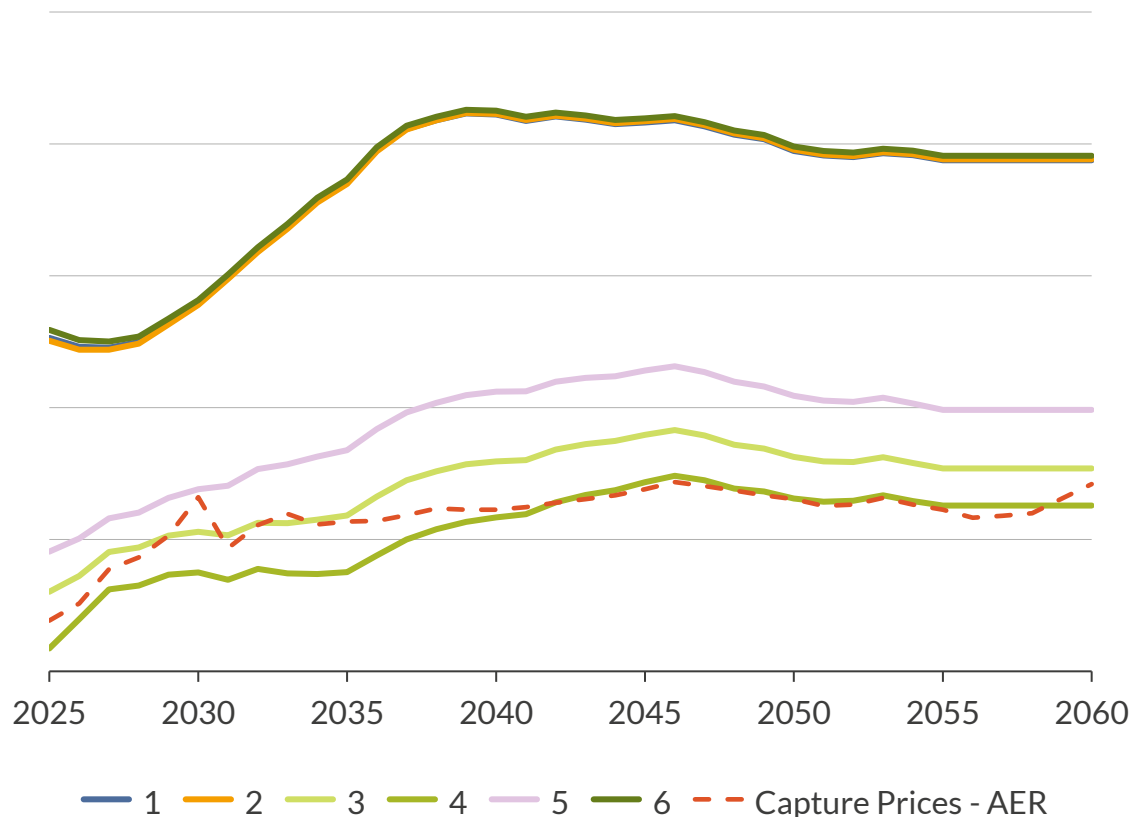
- This scenario uses solar LCOE<sup>2</sup> as the *precio medio de mercado* to reflect the growing influence of green PPAs and better align with market dynamics.
- Given the low cost of solar deployment and high energy generation, LCOE drives stabilized prices down –68% lower than the current stabilized price (DS 88).
- Daytime intervals, in particular, show low prices.
- Meanwhile, solar capture prices in the spot market are slightly higher, leading to greater revenue opportunities for assets operating under the spot price regime.

1) Assuming a 1MW solar asset located in Quillota, with a 25% load factor and over a 30-year lifetime, COD in 2026. 2) Aurora used average LCOE across all nodal hubs given the current methodology also benchmarks the *precio medio de mercado* as an average of PPAs independently of location.

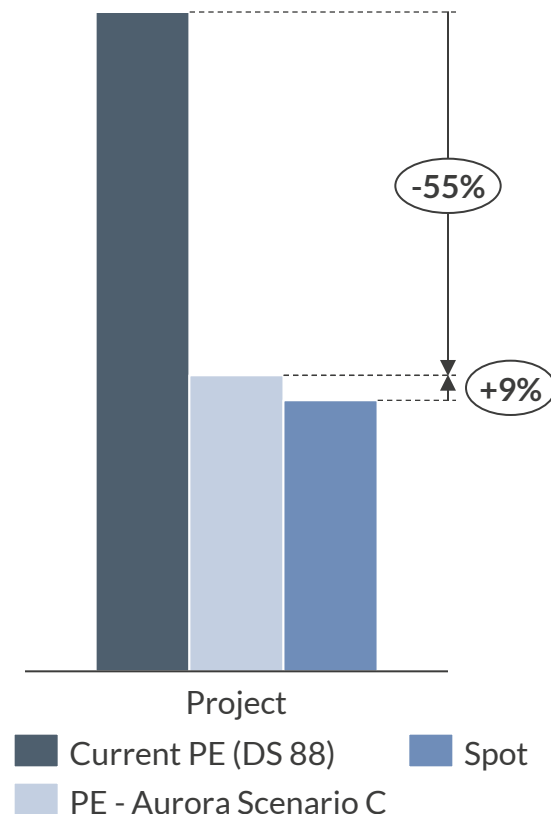
# Scenario C sets baseload prices as reference, balancing market competition with marginal benefits for assets under this regime

## Scenario C

Quillota – Stabilized price after indexing to Aurora Baseload Price  
\$/MWh (2023 real)



Present value of energy revenues  
for exemplary solar project<sup>1</sup>  
k\$ (2023 real)



- Aurora proposes a scenario where energy baseload prices are used as the reference to adjust the *precio medio de mercado* and market price bands.
- Solar capture prices align with the stabilized price set during daylight time intervals.
- Under this scenario, PMGDs within the stabilized price regime would still receive 9% higher revenues than in the spot market.
- This alternative strikes a good balance between market competition and stabilized price legacy.

1) Assuming a 1MW solar asset located in Quillota, with a 25% load factor and over a 30-year lifetime, COD in 2026.

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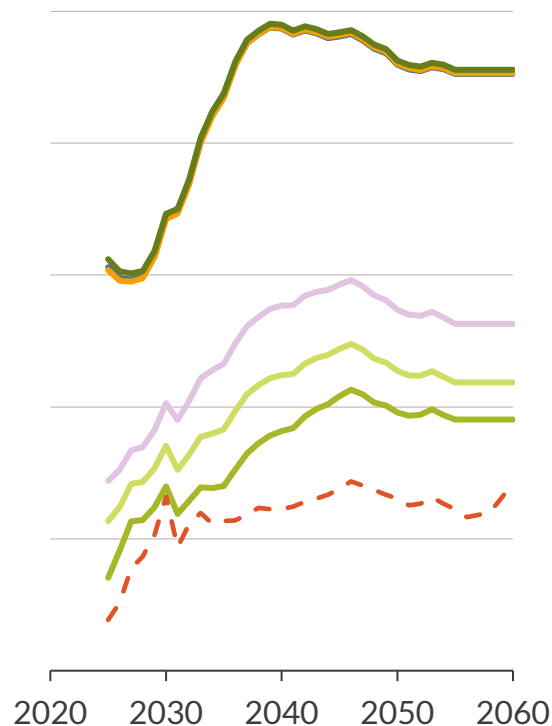


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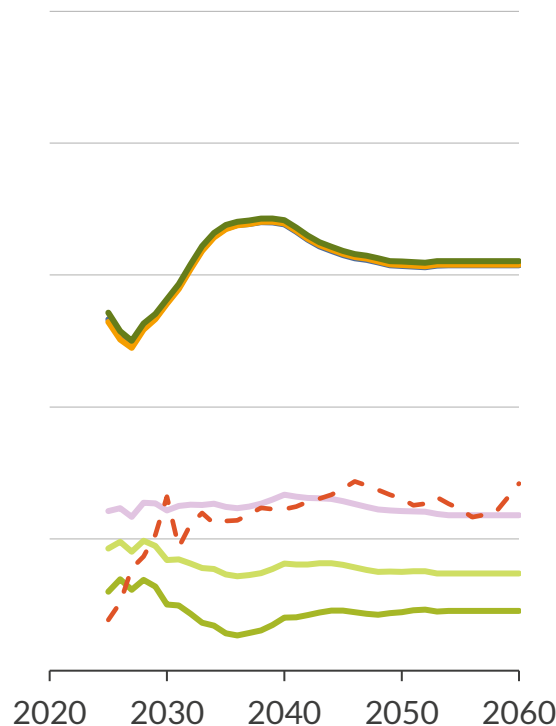
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# Aurora's go-to scenario strikes a balance between preserving the stabilized price legacy but enhancing market competitiveness

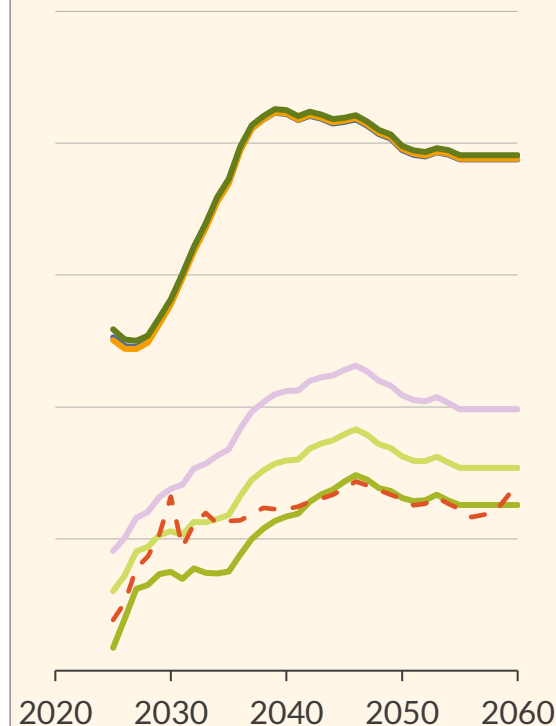
Quillota – Scenario A – PE adjusted to Energy  
\$/MWh (2023 real)



Quillota – Scenario B - PMM  
adjusted to LCOE  
\$/MWh (2023 real)



Quillota – Scenario C – PMM  
adjusted to Baseload  
\$/MWh (2023 real)

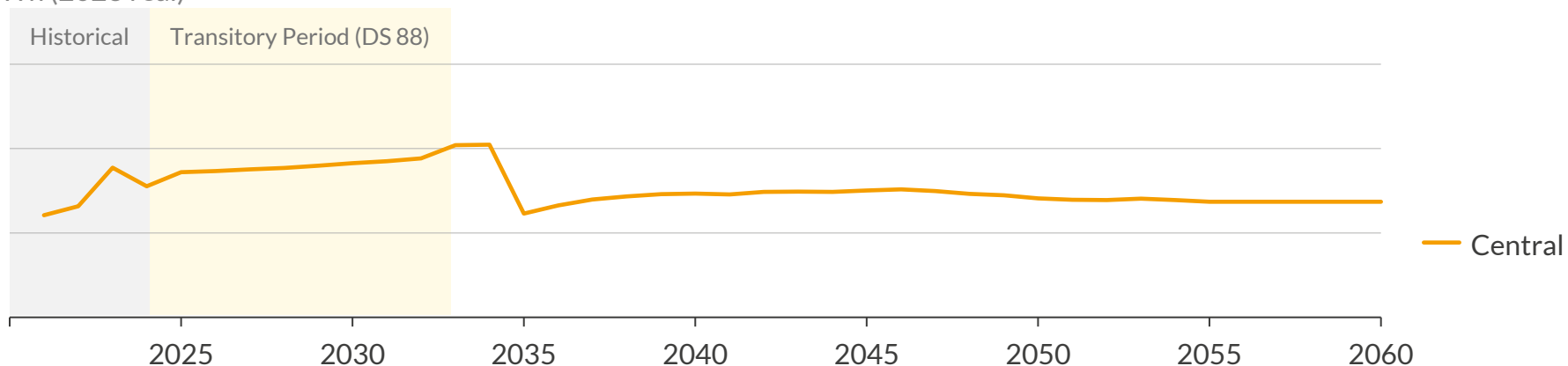


1 2 3 4 5 6 - Capture Prices - AER

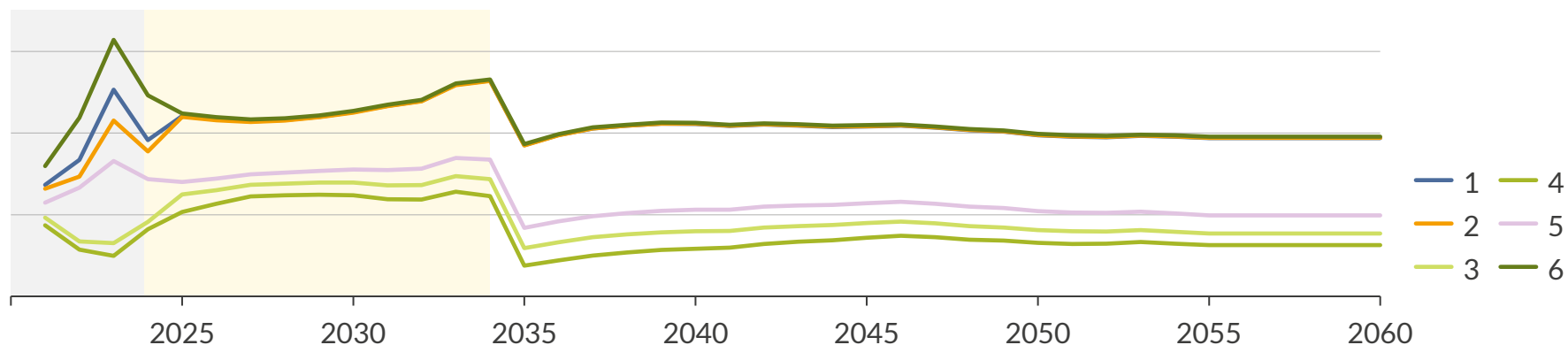
- Scenario A still benefits solar assets in the stabilized pricing scheme, showing higher prices than solar capture price.
- Scenario B results in low stabilized price, potentially jeopardizing financing for PMGD projects in Chile and causing an investment outflow.
- Scenario C balances market competition while slightly benefiting solar assets under the stabilized price regime, making it the most realistic future scenario.
- It offers a balanced solution, modifying the stabilized pricing scheme without disrupting market dynamics.

# Aurora has developed a future PE scenario where PMGDs transition before a full shift, presented for both central and low cases

**Aurora's Central forecast – Averaged PE price for Quillota**  
\$/MWh (2023 real)



**Aurora's Central forecast by time interval for Quillota**  
\$/MWh (2023 real)



- Aurora has incorporated a 10-year transitory regime<sup>1</sup>, anticipating that regulatory changes will align with this approach.
  - This phased transition allows a smooth adaptation period before full implementation, similar to what happened in previous regulatory changes.
- The transitory regime applies to operational PMGD assets, while new PMGDs would account either for the spot market or the new scenario for the stabilized price regime.
- Aurora has calculated Central and Low scenarios which can be found in Aurora's PRMF reports.

1) Aurora applies a transitory period of 10 years based on previous events. We are monitoring the market debate on the transitory period which is subject to be adjusted accordingly. 2) Databook with Central and Low stabilized prices is available in EOS platform.

# Outlook on PMGD price regime remains uncertain; Aurora will continue monitoring market trends and exploring scenarios and business models



## Key takeaways

Aurora believes that a regulatory change to PMGD remuneration is likely.

The current stabilized price calculation is based on a legacy methodology that no longer reflects market dynamics.

A convergence of the current DS 88 methodology with baseload prices offers a balanced solution, modifying the stabilized pricing scheme without disrupting market dynamics.



## What is next

Upcoming webinar on BESS and PMGD co-location.



Aurora is closely monitoring market and regulatory discussions, including the review of the FET Cargo and its impact on PMGD remuneration, as well as the potential to restrict its generation (curtailment).

PMGDs can find economic opportunities in co-locating with BESS. Aurora has explored their potential revenue impact under current and future regulation.



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## Details and disclaimer

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### Publication

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Stabilized Price Outlook – Public Version

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