



# The Value of Solar PV in the Republic of Ireland

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# Our presenters today



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**Market analysis**

We assist companies in assessing market developments and government institutions in market design.



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We support clients to improve performance through reorganisation, optimisation and transformation.



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We help asset owners, investors and financiers to evaluate infrastructure and energy companies (due diligence).

## Expertise & value chain coverage



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<b>Power &amp; Heat Generation</b>	<b>Gas &amp; Oil</b>	<b>Networks</b>	<b>Customer Solutions</b>
– Thermal generation	– E&P	– Transmission	– Retail sales/ customer service
– Renewable generation	– Oil midstream	– Distribution	– Decentralised business models
– Hydro power & storage	– Gas storage	– Smart grids & metering	– Decentralised generation & storage
– Waste to energy	– Gas transportation	– EV infrastructure	– Energy efficiency
– District heating	– (Small scale) LNG	– System operation	– E-mobility services
– PPAs	– Long term contracts	– Market operation	
	– Hydrogen		
	– Carbon capture & storage/ utilisation		



# Are there 'hidden' benefits of solar not captured within the strike price?

## Background

- It is widely accepted that the levelized cost of solar in the Single Electricity Market (SEM) is higher than that of onshore wind.
- In turn, cost-reflective RESS auction bid prices will generally favour onshore wind.
- This results in the view that onshore wind naturally provides the most attractive way to decarbonize the Irish power system.

## Issue

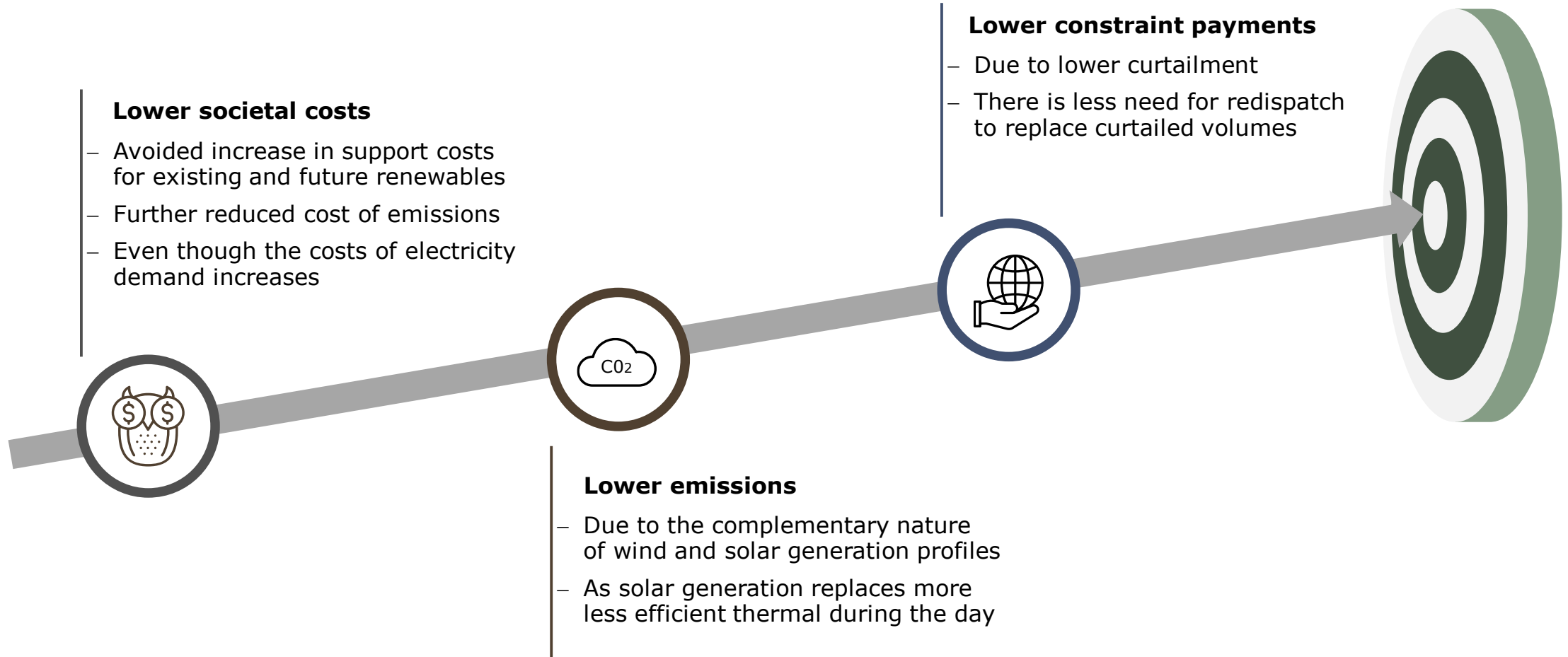
- The benefits to society of either solar PV or onshore wind cannot be captured simply by looking at auction strike prices.

## Key Question

- Are there 'hidden' benefits of solar not captured within the strike price?



# Full benefits of solar may not be captured by comparisons on strike price alone



METHODOLOGY

# Using counterfactual analysis the hidden benefits of solar have been addressed

## ANALYTIC APPROACH

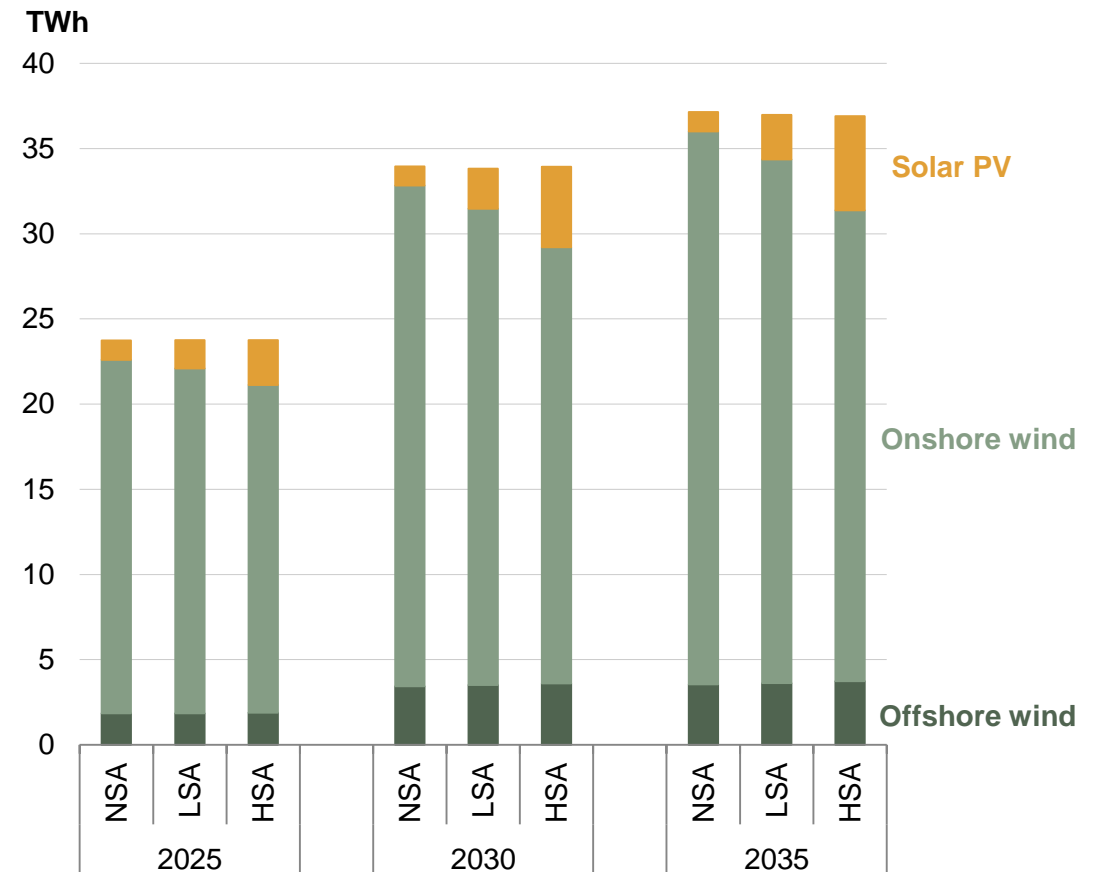
- By keeping all other variables constant, the impact of building a mix of wind and solar rather than solely wind is isolated.
- A renewables penetration of 70% is reached by 2030 in both Northern Ireland and the Republic of Ireland.
- We use AFRY's proprietary market model to assess dispatch/re-dispatch in SEM using inputs on key parameters (e.g. demand) from third party publications (e.g. Eirgrid)

## SCENARIOS

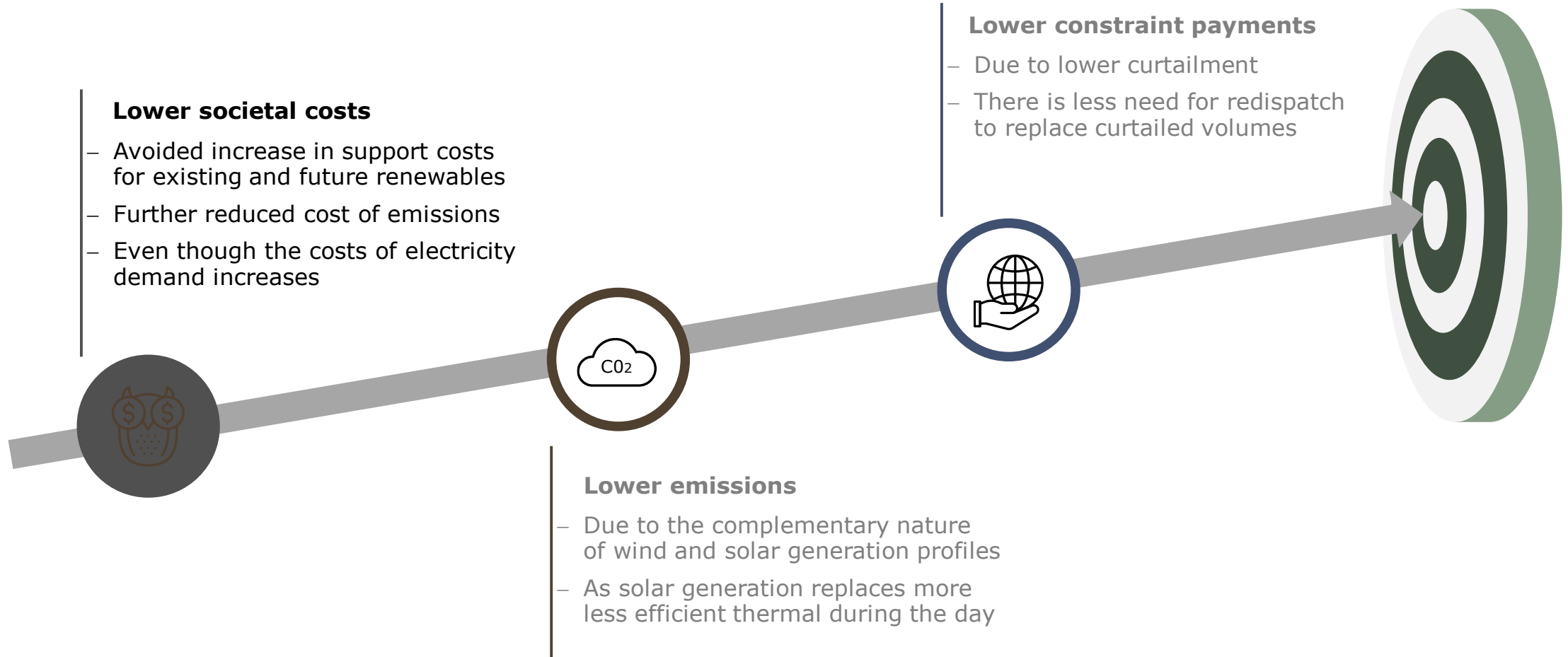
<b>No Solar Ambition (NSA)</b>	<ul style="list-style-type: none"> <li>- all future renewable capacity is from wind (with 1GW of offshore wind)</li> <li>- no new solar</li> </ul>
<b>Low Solar Ambition (LSA)</b>	<ul style="list-style-type: none"> <li>- a total of 2.5GW solar in the SEM by 2030</li> <li>- all remaining future renewable capacity will be from wind (with 1GW of offshore wind)</li> </ul>
<b>Higher Solar Ambition (HSA)</b>	<ul style="list-style-type: none"> <li>- a total of 5GW solar in the SEM by 2030</li> <li>- all remaining future renewable capacity will be from wind (with 1GW of offshore wind)</li> </ul>

RESS-1 capacity is assumed to develop as planned.

## RENEWABLE GENERATION IN THE SEM (TWh, post curtailment)



# Full benefits of solar may not be captured by comparisons on strike price alone

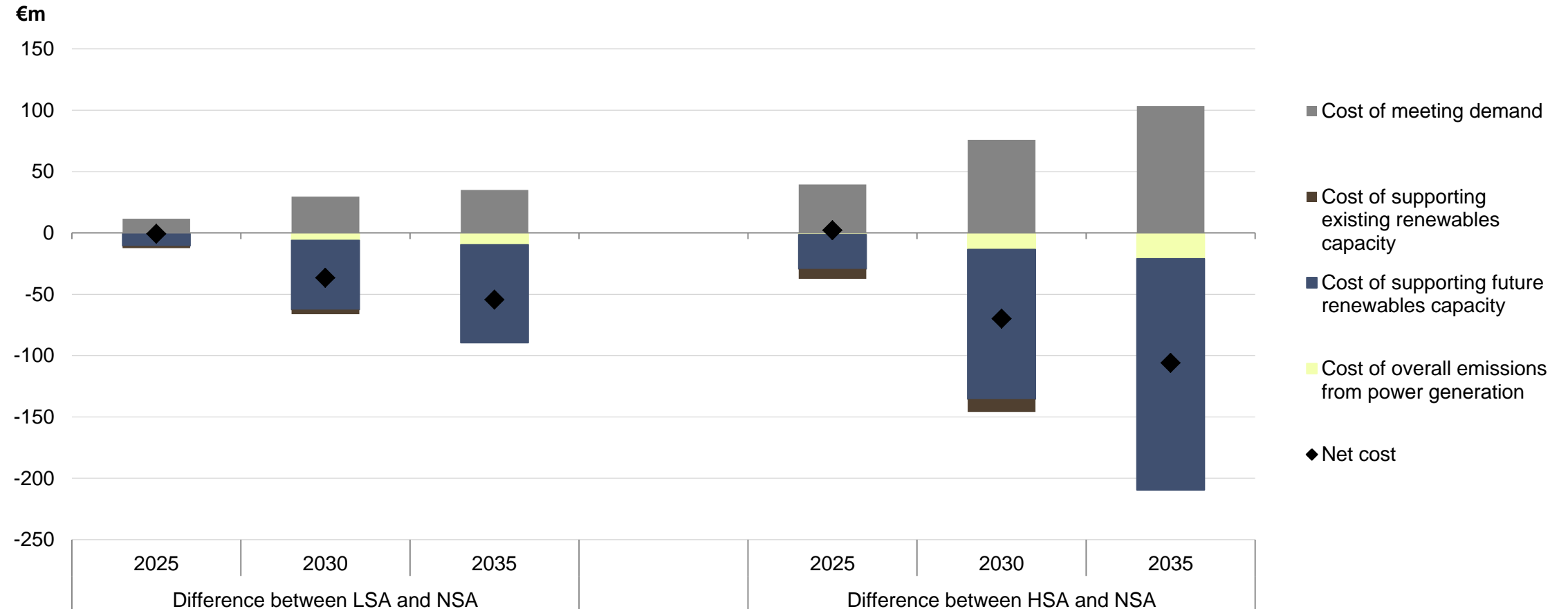




LOWER SOCIETAL COSTS

A more balanced mix of wind and solar substantially reduces annual societal cost, particularly due to lower costs of supporting future renewables

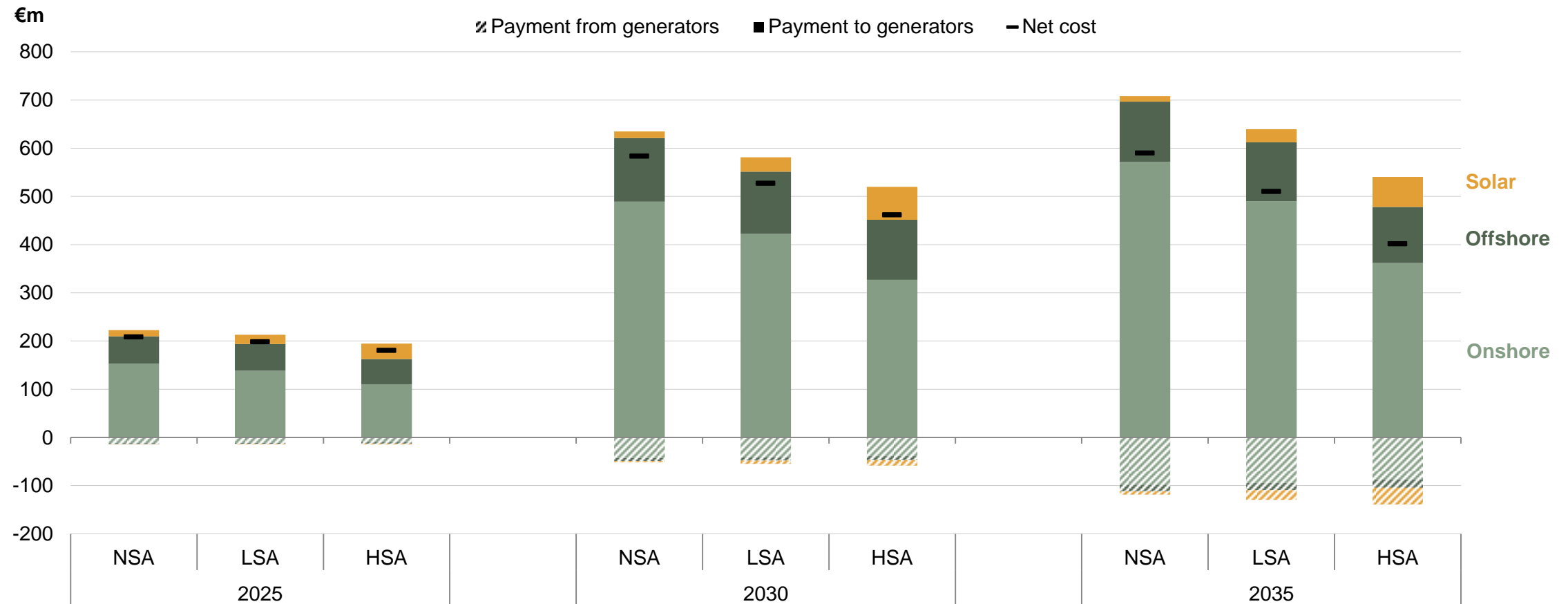
**DIFFERENCE IN ANNUAL SOCIETAL COSTS** (€m, real 2019 money)



LOWER SOCIETAL COSTS

With a more balanced mix of solar and wind, overall support costs are lower

**ANNUAL COST OF SUPPORTING FUTURE RENEWABLES** (€m, real 2019 money)



LOWER SOCIETAL COSTS

Average strike price of solar portfolio is higher than onshore wind, although this difference becomes smaller over time

**AVERAGE STRIKE PRICES ACROSS THE PORTFOLIO OF FUTURE RENEWABLES** (€/MWh, real 2019 money)



LOWER SOCIETAL COSTS

The difference in wind and solar capture prices increase over time, although much more limited when more solar is built

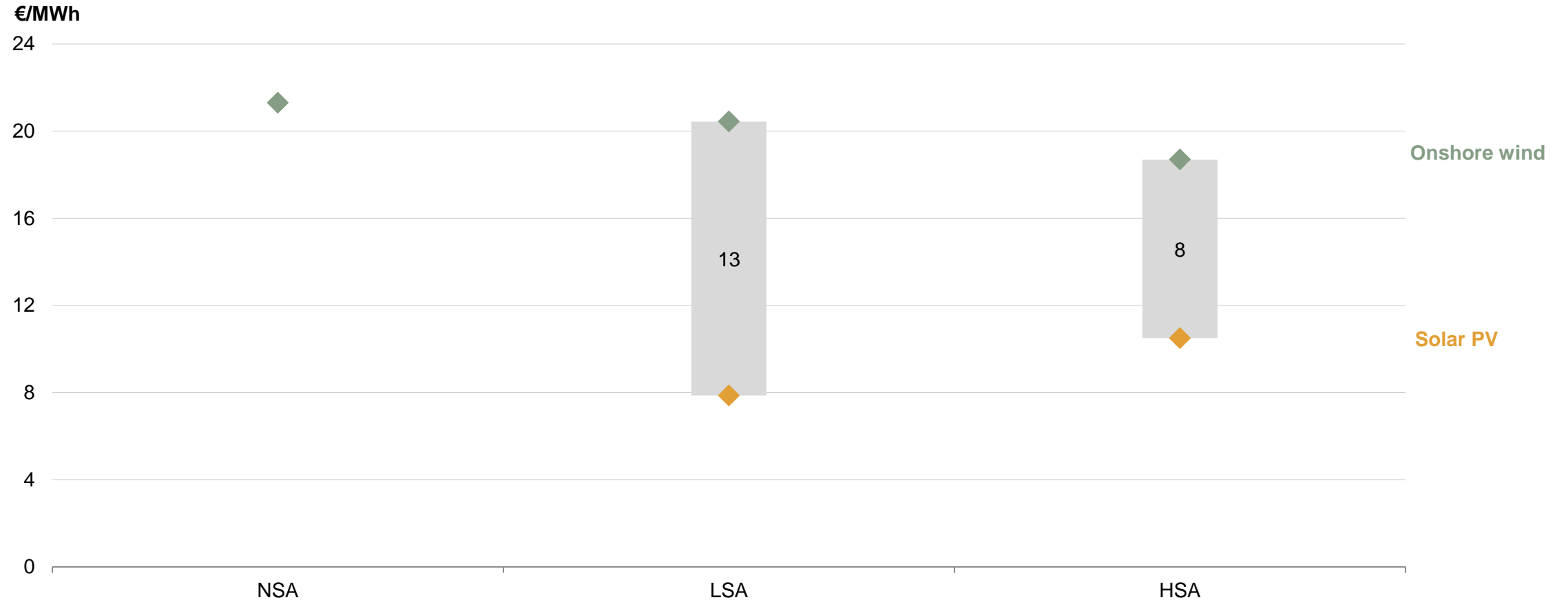
**ANNUAL CAPTURE PRICES** (€/MWh, real 2019 money)  
€/MWh



LOWER SOCIETAL COSTS

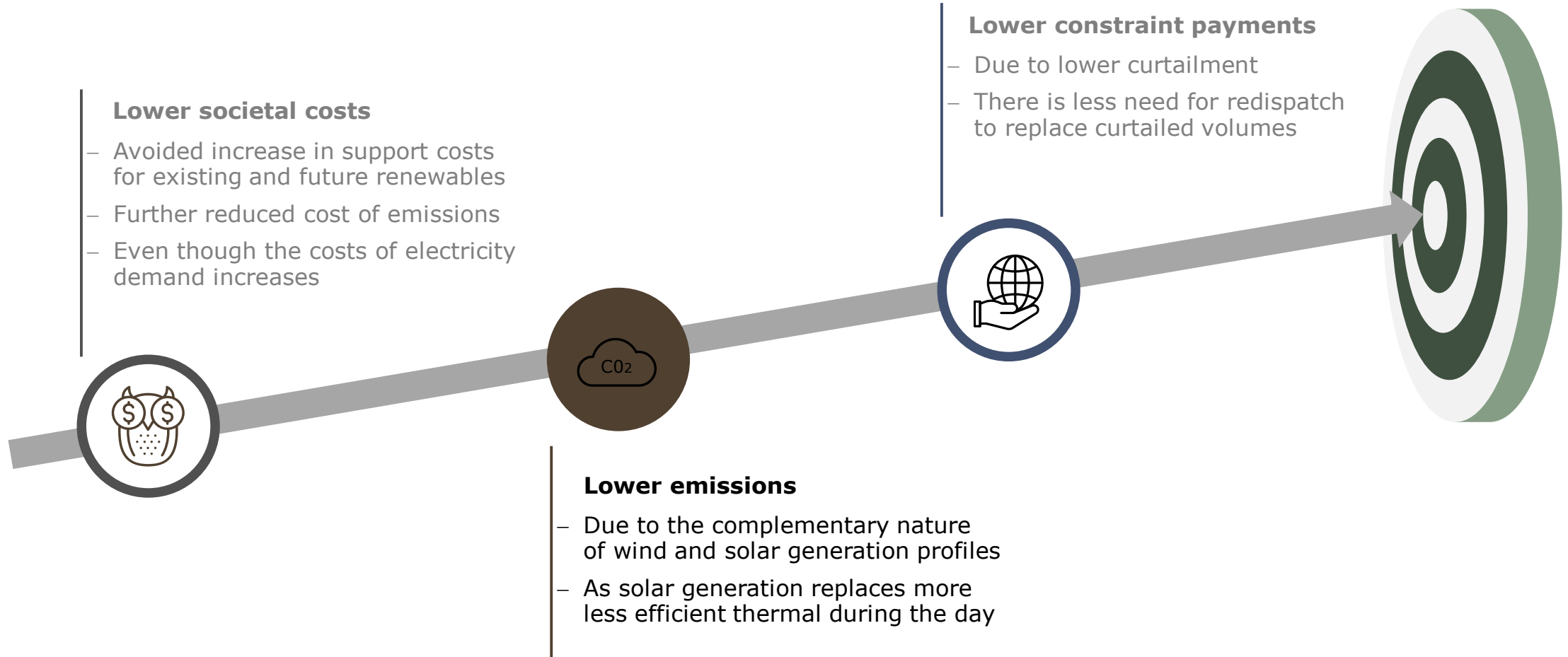
Solar can achieve a high strike price in the next auction and still provide lower cost to consumers than onshore wind, even under the HSA scenario

**DISCOUNTED SUPPORT COST PER UNIT OF GENERATION OVER THE SUPPORTED PERIOD (€/MWh, real 2019 money)**





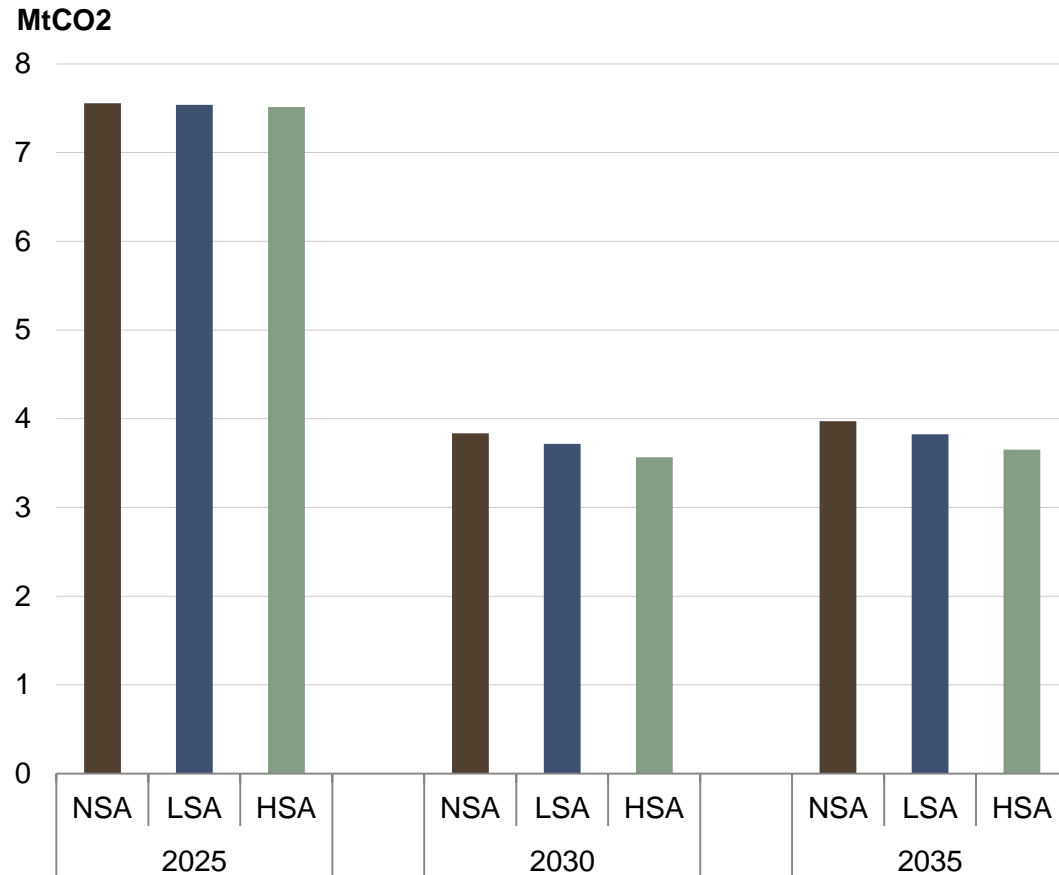
# Full benefits of solar may not be captured by comparisons on strike price alone



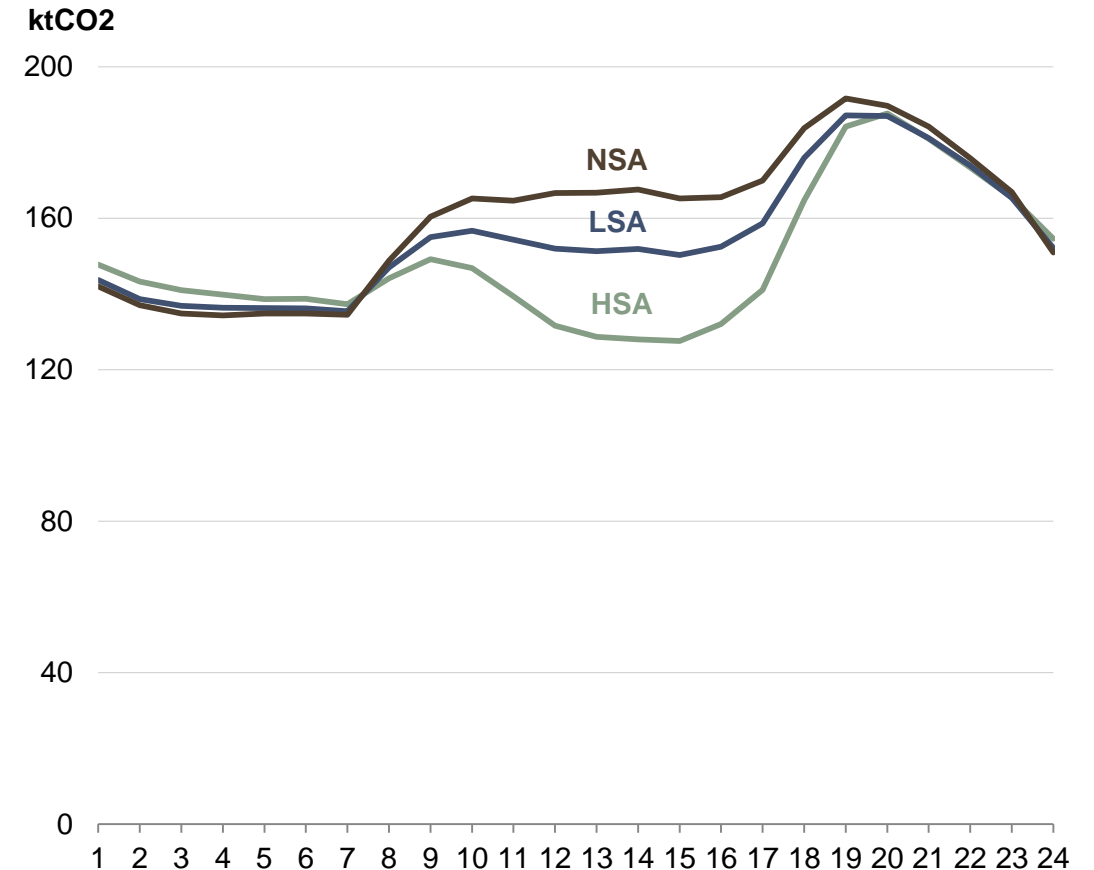
LOWER EMISSIONS

A more balanced mix of wind and solar reduces emissions by replacing less efficient thermal during the day

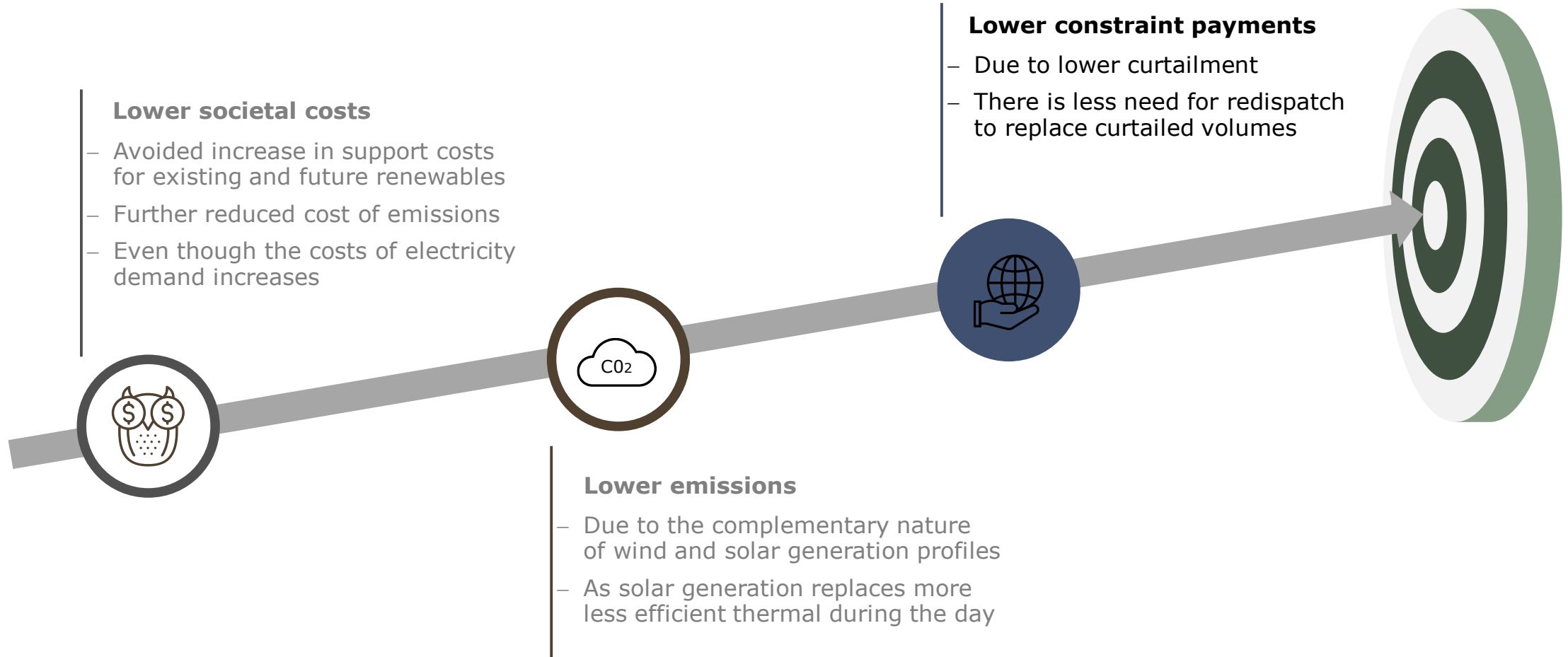
TOTAL ANNUAL POWER SECTOR EMISSIONS (MtCO<sub>2</sub>)



TOTAL EMISSIONS BY HOUR OF THE DAY IN 2030 (ktCO<sub>2</sub>)



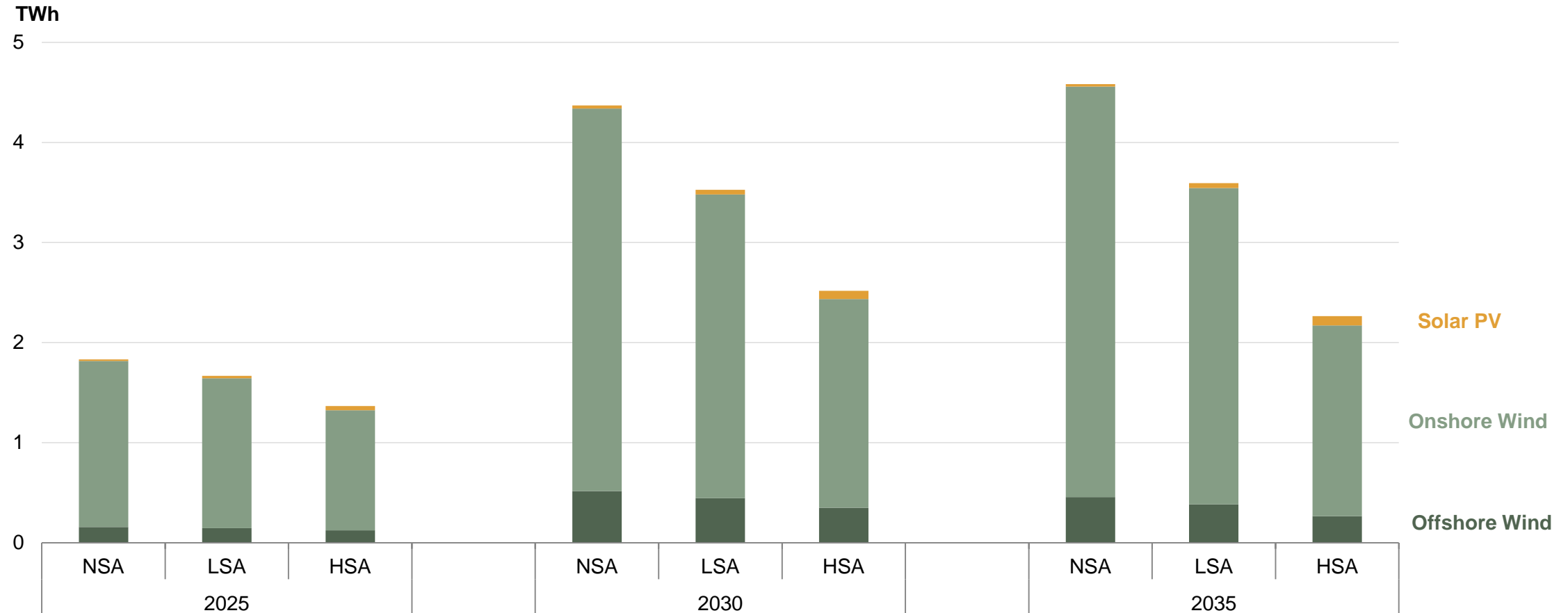
# Full benefits of solar may not be captured by comparisons on strike price alone



LOWER CONSTRAINT PAYMENTS

Wind curtailment reduces with a more balanced mix of wind and solar, which means less redispatch is required leading to lower constraint payments

**ANNUAL RENEWABLES CURTAILMENT (TWh)**



HOW APPROPRIATE IS IT FOR SOLAR TO COMPETE BASED ON AUCTION BIDS ALONE?

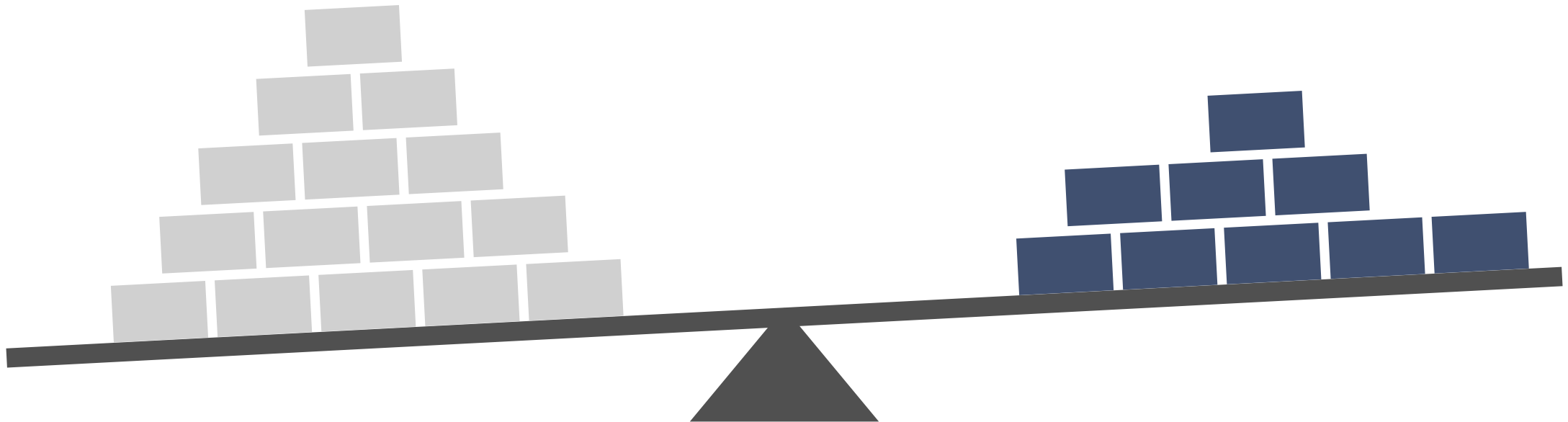
In conclusion, some form of mechanism could be employed to provide a more equitable comparison than relying on strike prices alone

#### **AUCTIONS WITH SOME FORM OF MECHANISM**

- RESS-1 had preference categories that allowed some solar to compete and capture some of the benefits
- The Evaluation Correction Factor (ECF) in RESS auctions could be another way, with an ECF smaller than 1 for solar.
  - Deemed Offer Price (= Offer Price x ECF) is used to determine the successful projects in the auction

#### **AUCTIONS BASED ON STRIKE PRICES ALONE**

- This neglects benefits that are not directly captured in the auction bids.







**Thank you**

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