

INSIGHTS

THE RIGHT KIND OF DEMAND:

How flexible demand can support renewable energy

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PRESSURE ON RENEWABLE ENERGY INVESTMENTS

Europe needs a massive build-out of renewable energy to power the green transition, and policymakers aim to achieve this transition with minimum support to avoid budget risk and distorting markets. Yet recent market developments have weakened the business case for both wind and solar. For solar, the business case has particularly been challenged by falling capture prices due to cannibalisation.¹ As a result, new installation of solar capacity in the EU is projected to decline for the first time in a decade.²

FOCUS ON THE RIGHT KIND OF DEMAND

Energy needs have progressed more slowly than planned, with total electricity consumption in Denmark 8.3 per cent lower in 2024 than projected in 2023.³ This has contributed to the drop in power prices, and experts and the renewable energy industry have called for stronger demand to absorb production and improve the business case for further investments. This is not a straightforward challenge, since stimulating demand often requires support schemes for new technologies and significant investment in the power grid.

Therefore, policymakers seeking to support renewable energy should aim to support the right kind of demand, which has the biggest positive effect on renewable energy producers, while keeping public costs low.

What is the impact on solar producers of stimulating flexible demand instead of traditional demand?

To explore the potential, we conduct a stylised thought experiment examining the short-term impact of an 8.3 per cent increase in electricity demand equivalent to closing the gap between actual and projected 2024 electricity generation. Using our power market model, we analyse how the Danish power market would respond if this additional demand came from flexible rather than traditional consumers.⁴ Unlike traditional consumers, flexible consumers respond to price signals, shifting their demand to low-price hours, which typically coincide with high renewable production.⁵

All results are derived from our power market model and should be viewed as orders of magnitude showcasing the relative difference between traditional and flexible demand.

FLEXIBLE DEMAND CREATES MORE VALUE FOR SOLAR PRODUCERS

Stimulating flexible demand by 8.3 per cent benefits solar producers **31 per cent** more than if new demand follows traditional patterns, see Figure 1. Our power market model simulations show that increasing demand raises the average capture price for solar producers by 9.9 per cent when new demand is flexible, compared with 7.6 per cent if demand follows traditional consumption patterns. For investors, higher capture prices translate directly into stronger project returns.

Building on the above results, we find that the return for new solar parks in Denmark increases by an additional **0.3 percentage points** if new demand is flexible (an increase of 1.2 percentage points) than if new demand follows traditional patterns (an increase of 0.9 percentage points).⁶

0.3 percentage points may seem modest at first, but they are significant. With capital costs making up as much as 50 per cent of the levelised cost of electricity for solar projects and an average cost of capital of around 5-9 per cent in Europe,⁷ even small improvements in returns can be crucial for lowering risk and the overall costs of solar projects.

These results suggest that flexible demand can play a supporting role in making renewable investments more attractive. Solar producers in particular benefit more when demand growth is flexible rather than following traditional consumption patterns. For policy-makers, this underscores the importance of enabling flexible demand, not simply increasing overall demand, as a cost-effective way to accelerate the energy transition. We discuss the topic of flexible demand in our study "[Demand-side flexibility as a driver of greener electricity and more efficient grid use](#)".

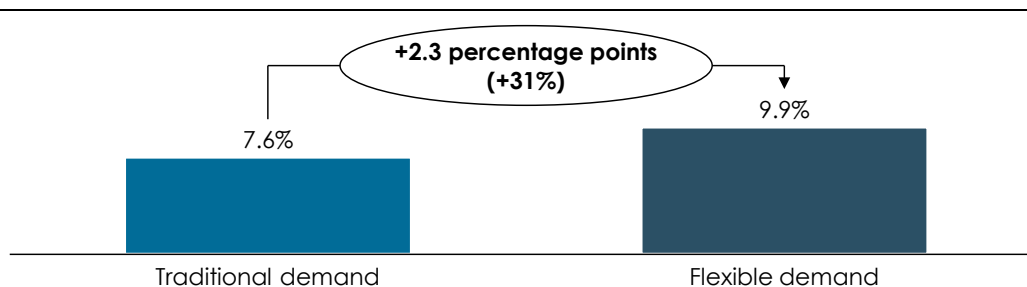
NOTES AND REFERENCES

1. See e.g. EIFO (2023), [link](#). Other drivers include higher financing and input costs.
2. Solar Power Europe (2025), [link](#).
3. Using "Analyseforudsætninger 2023" from Energistyrelsen (2023), [link](#) as the expected level.
4. We evaluate short-term effects where we hold all other things equal. In reality, production capacities would naturally be affected by increasing demand (and prices) in the long run, but we do not take that into account here.
5. Here, we evaluate the extreme case of flexibility across the year associated with e.g. power-to-X production, but with certain constraints on e.g. ramping possibilities.
6. We use the internal rate of return (IRR) as a measure for investor returns and we estimate the effect for investors using a simple discounted cashflow model.
7. IEA reports that nominal WACC after tax is between 6.5-9.6 per cent and 5.9-8.8 per cent pre-tax, and that the WACC can account for 20-50 percent of the levelized cost of electricity of a utility-scale solar project, see IEA (2021), [link](#).

Figure 1

Flexible demand boosts solar capture prices 2.3 percentage points (31 per cent) more than traditional demand

Closing the projected 2024 gap: Per cent increase in solar capture prices from an 8.3 per cent demand increase, Denmark 2024



Note: The figure shows the increase in the average solar capture rates in Denmark in 2024 from increasing total demand by 8.3 per cent. Traditional demand is the effect when new demand follows traditional consumption patterns, and flexible demand is the effect if new demand is flexible. Results are model-based, and the magnitude of the effect depends on a range of assumptions on market structure, marginal cost, flexibility technology, and actual consumer behaviour. As such, the results carry a degree of uncertainty, but the overall approach is sound. Other production technologies also gain from this upward shock in demand.

Source: Copenhagen Economics.

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