

# Energy Islands Event

February, 2025

# Wave is needed to reach lowest cost, zero emission energy system



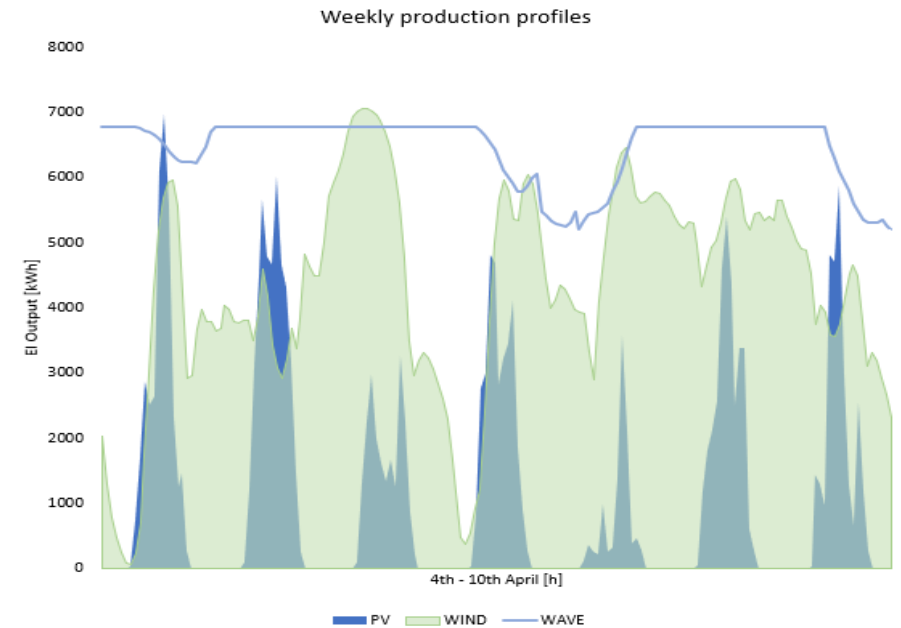
Dispatch cost reductions up to £1.5B/year with 10GW by 2040



40% reduction of over generation



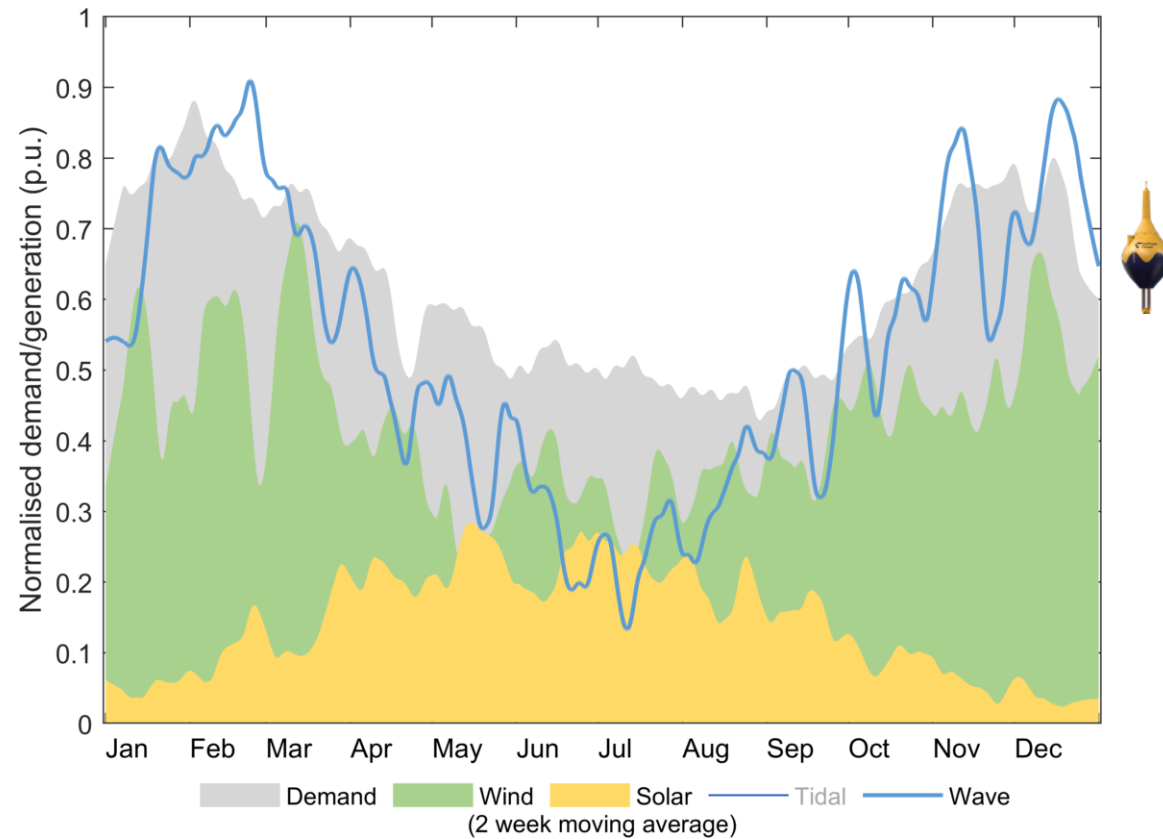
By 2050, 30GW+ would enable the lowest cost energy system



*“Wave energy complements wind and solar by producing at different times, making it easier to balance supply and demand of electricity.”*

# Seasonal availability profiles

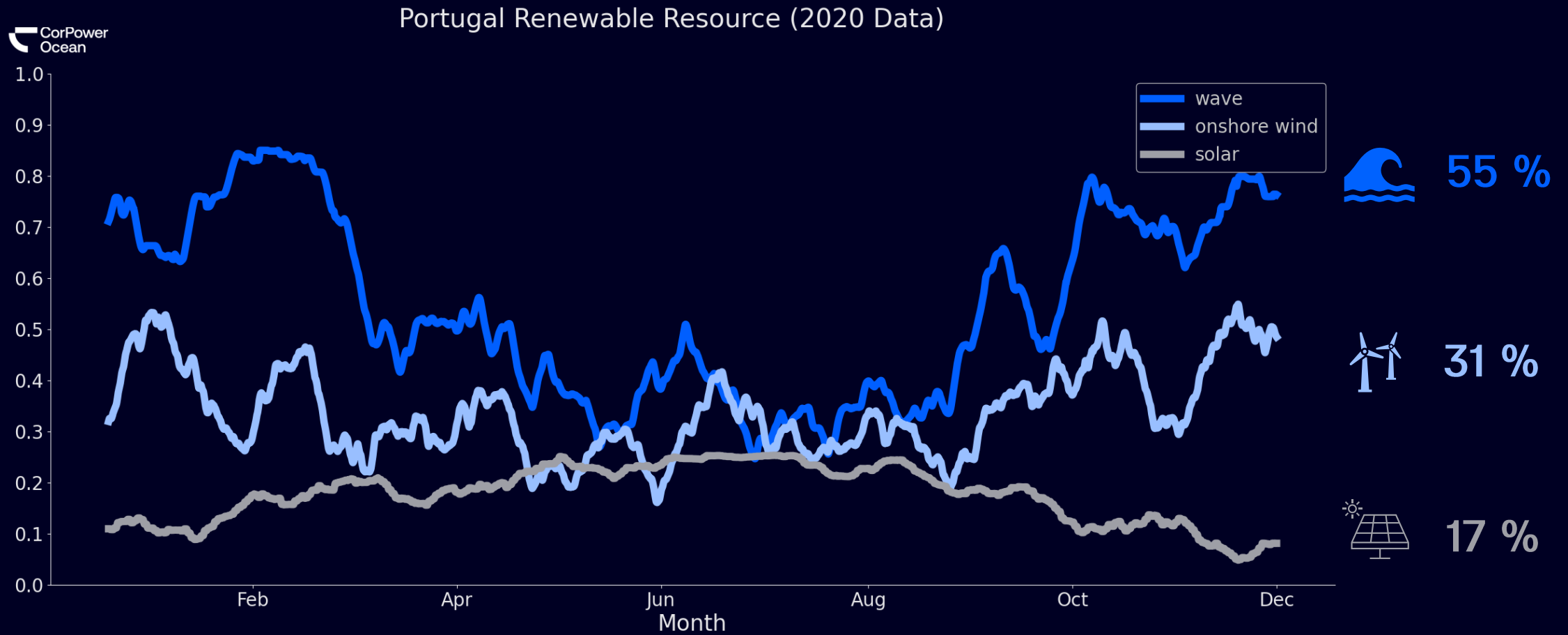
Wave resource strongly complementary with demand profiles in Europe



Source: <https://evolveenergy.eu/>

# Renewable resource comparison

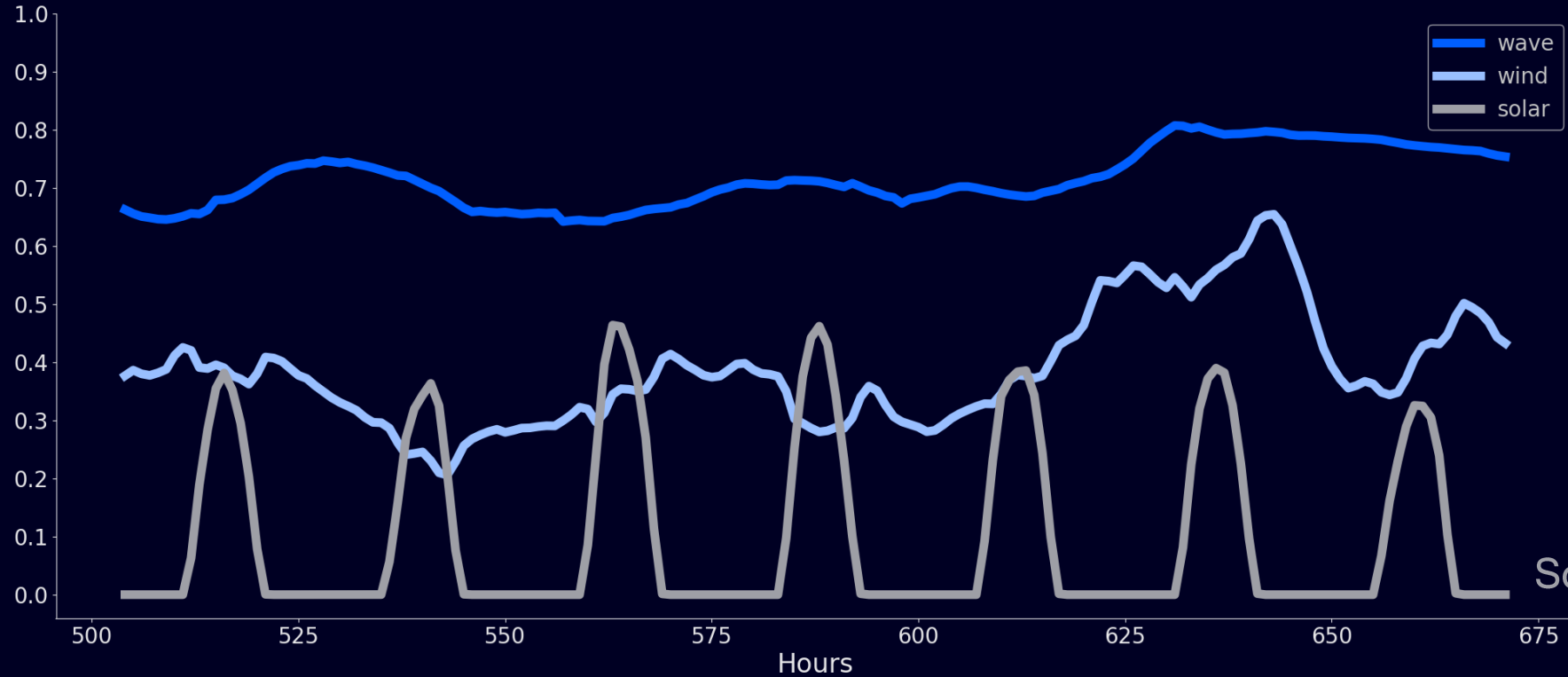
## 2020 historical data



# Average winter week

Viana do Castelo: (41.65°N, -9.05°E)

Winter week capacity factor comparison



Wave resource is highest in winter

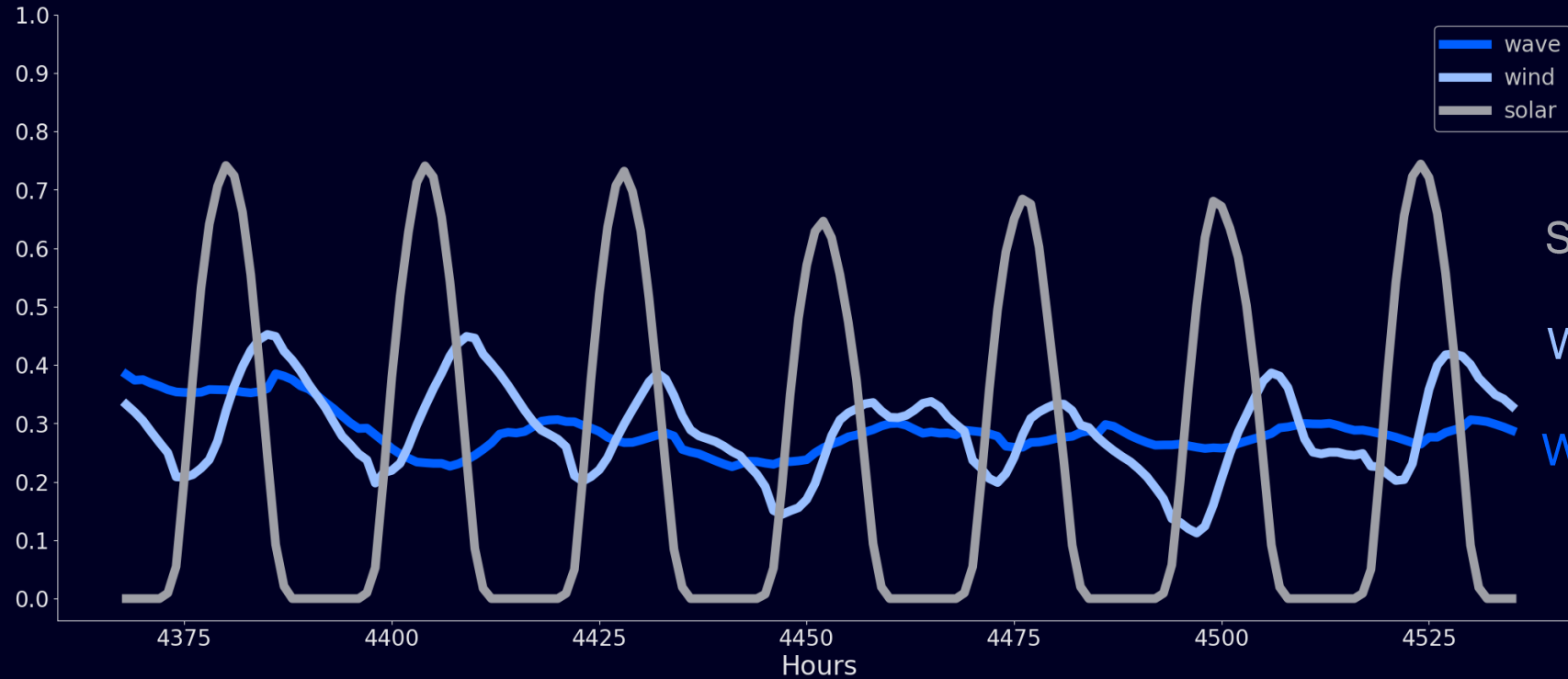
Wind resource has higher variability in winter

Solar resource is lowest in winter

# Average summer week

Viana do Castelo: (41.65°N, -9.05°E)

Summer week capacity factor comparison



Solar resource is highest in summer

Wind resource has higher variability

Wave resource is lower, but still less variable, in summer

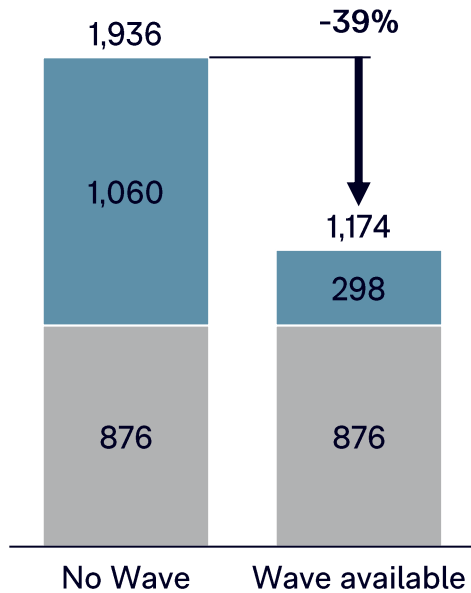
# Lowering cost for 24/7 green power

SAMPLE GEOGRAPHY,  
2031<sup>1</sup> 

## Wave reduces need for overgeneration of energy

24/7 green firm yearly generation, GWh

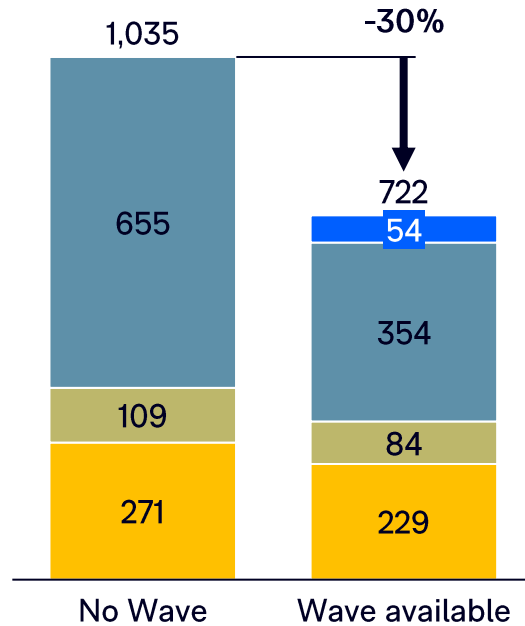
■ Total demand ■ Over generation



## Reduces capacity required

24/7 green firm optimal capacity, MW

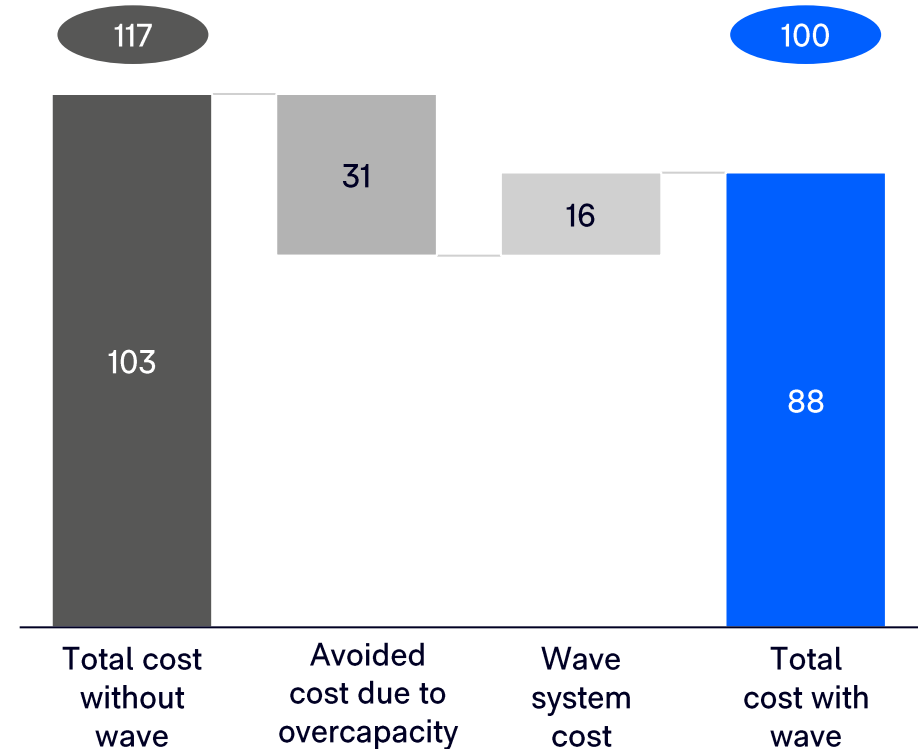
■ Wave ■ Wind ■ Battery ■ Solar PV



## Lowens total cost with wave energy

24/7 green firm annualized cost, € mn

XX LCOE, €/MWh



1. Green firm power with 100% hourly matching of demand profile; demand profile assumed flat at 100MWh similar to a data center  
Source: NREL; CorPower; THEMA Consulting; Green Power Procurement Optimizer



# Competitive by additional value

	LCOE vs. solar PV, €/MWh	LCOE vs. onshore wind, €/MWh	LCOE vs. offshore wind, €/MWh
Wave LCOE	65	65	65
Higher capture price	28	8	5
Lower cost for 24/7 green power	5	5	5
Higher peak support <sup>1</sup>	6	4	2
Others (harder to quantify)			
<b>Adjusted LCOE</b>	<b>26</b>	<b>48</b>	<b>52</b>
Offshore wind colocation synergies	8	8	8
<b>Adjusted LCOE co-located with offshore wind</b>	<b>18</b>	<b>40</b>	<b>45</b>
LCOE alternative RE	29	48	55

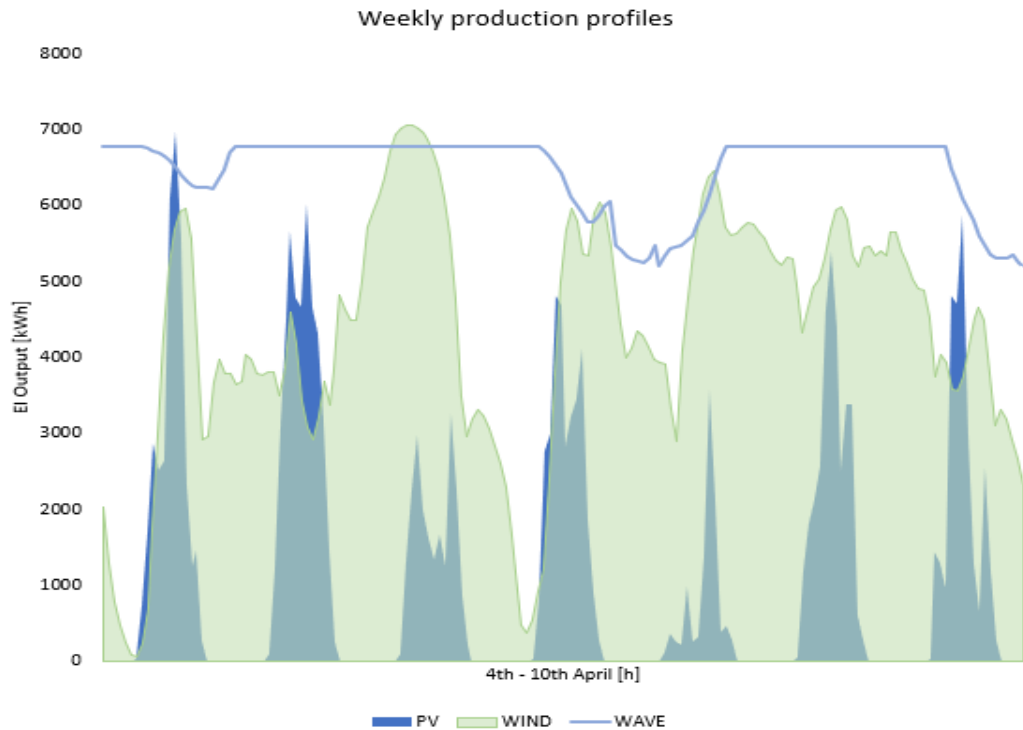
## Key takeaways

- **Wave energy becomes cost competitive after 600MW installed, when additional sources of value are factored in**
- **Improved capture price can be the largest source of additional value to wave energy in systems dominated by solar**
- **Colocation synergies with floating offshore wind are helpful in bridging the cost gap in the medium-term but are not the enablers**

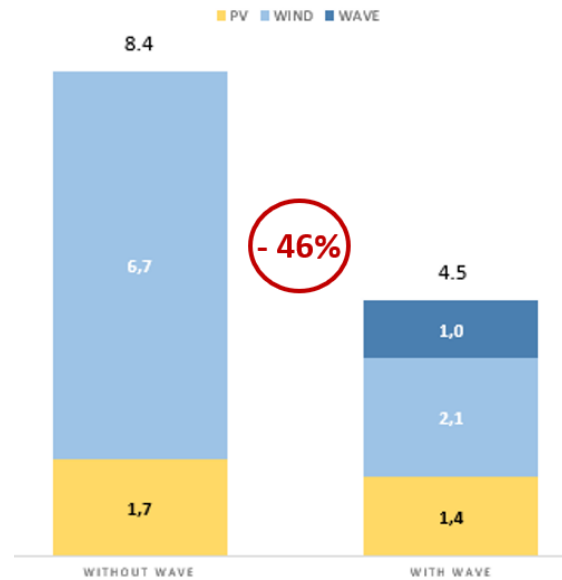


# Green Hydrogen – higher utilization gives significant cost reduction

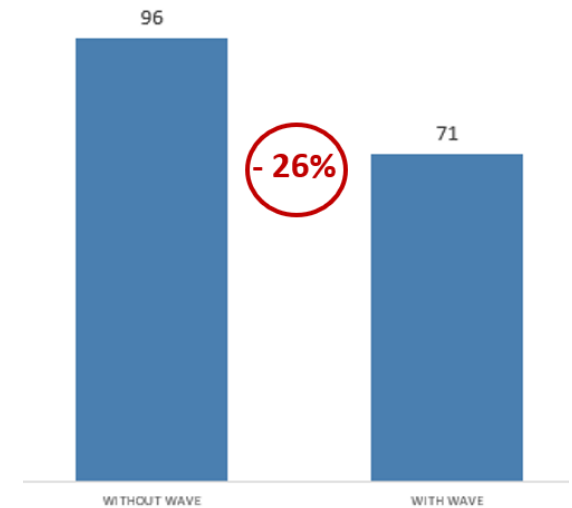
- Wave profile enables significantly higher electrolyser utilization for 100% green hydrogen
- 1GW electrolyser, 8000h/year of CO2 free electricity demand
- Significant reduction in required installed RES capacity (-46%), lowering LCOE



CAPACITY MIX TO DELIVER 1GW - 91% UTILIZATION (8000H) [GW]



LEVELIZED COST OF ELECTRICITY OF THE SYSTEM [€/MWH]





Wave power.  
To power the planet.

