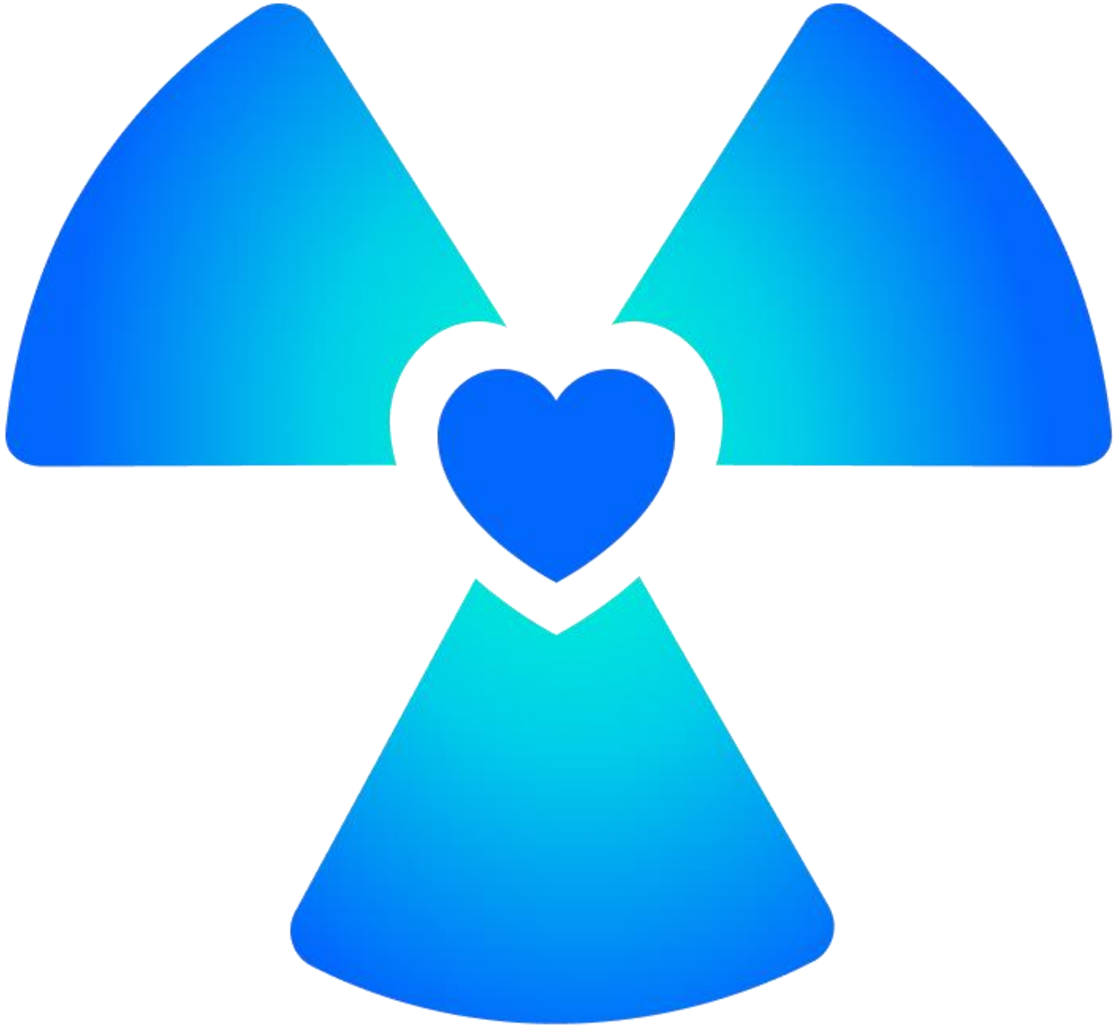
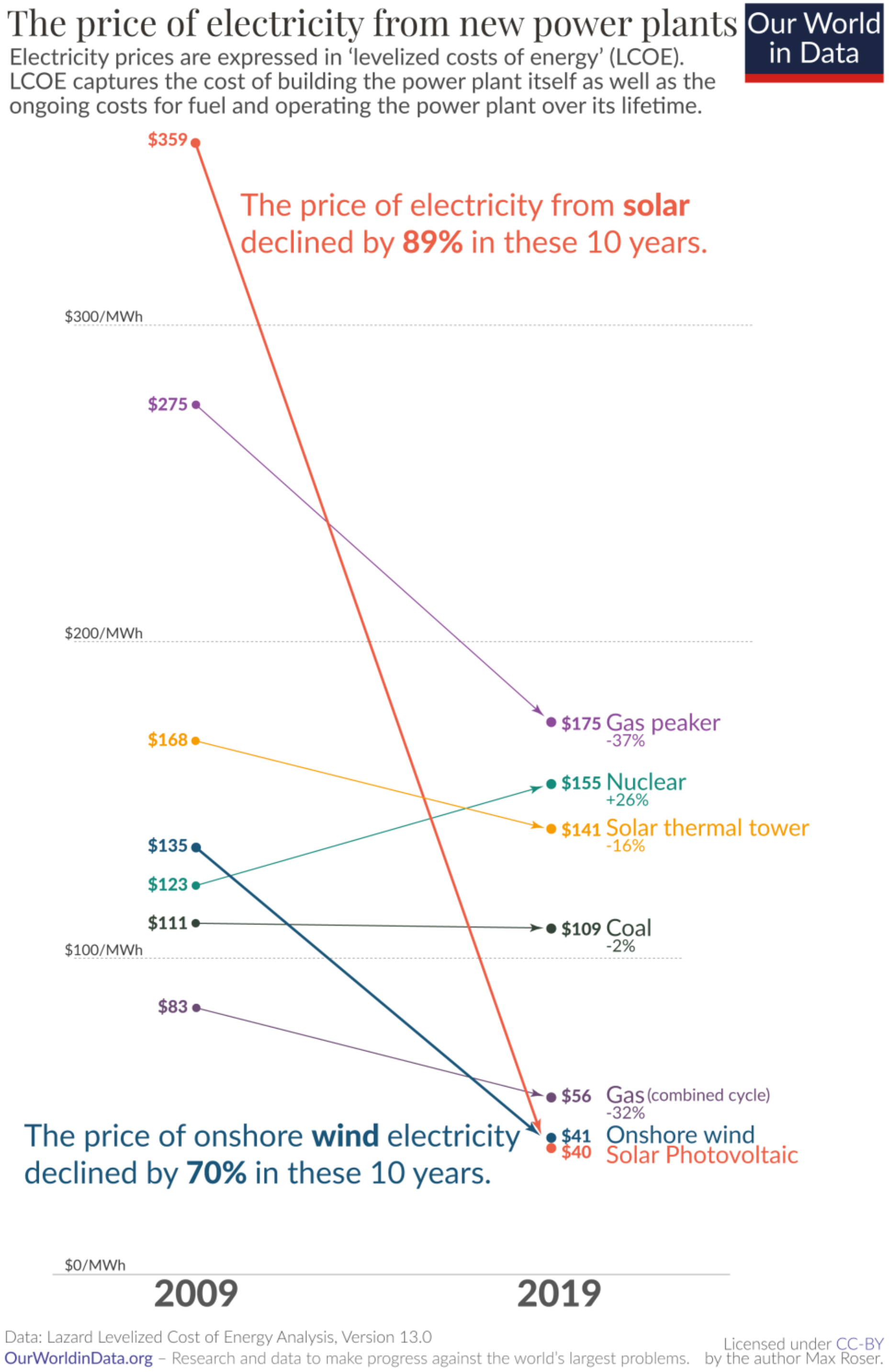


# Costo, valore e prezzo dell’energia

Come rendere l’elettricità del futuro economica e sostenibile

# Costi



The price of electricity from new power plants
Our World in Data
Electricity prices are expressed in 'levelized costs of energy' (LCOE).
LCOE captures the cost of building the power plant itself as well as the ongoing costs for fuel and operating the power plant over its lifetime.
$359
The price of electricity from **solar** declined by **89%** in these 10 years.
$300/MWh
$275
$200/MWh
$175 Gas peaker
-37%
$168
$155 Nuclear
+26%
$141 Solar thermal tower
-16%
$135
$123
$111
$109 Coal
-2%
$100/MWh
$83
$56 Gas (combined cycle)
-32%
The price of onshore **wind** electricity declined by **70%** in these 10 years.
$41 Onshore wind
$40 Solar Photovoltaic
$0/MWh
2009
2019
Data: Lazard Levelized Cost of Energy Analysis, Version 13.0
OurWorldinData.org – Research and data to make progress against the world's largest problems.
Licensed under CC-BY by the author Max Roser.

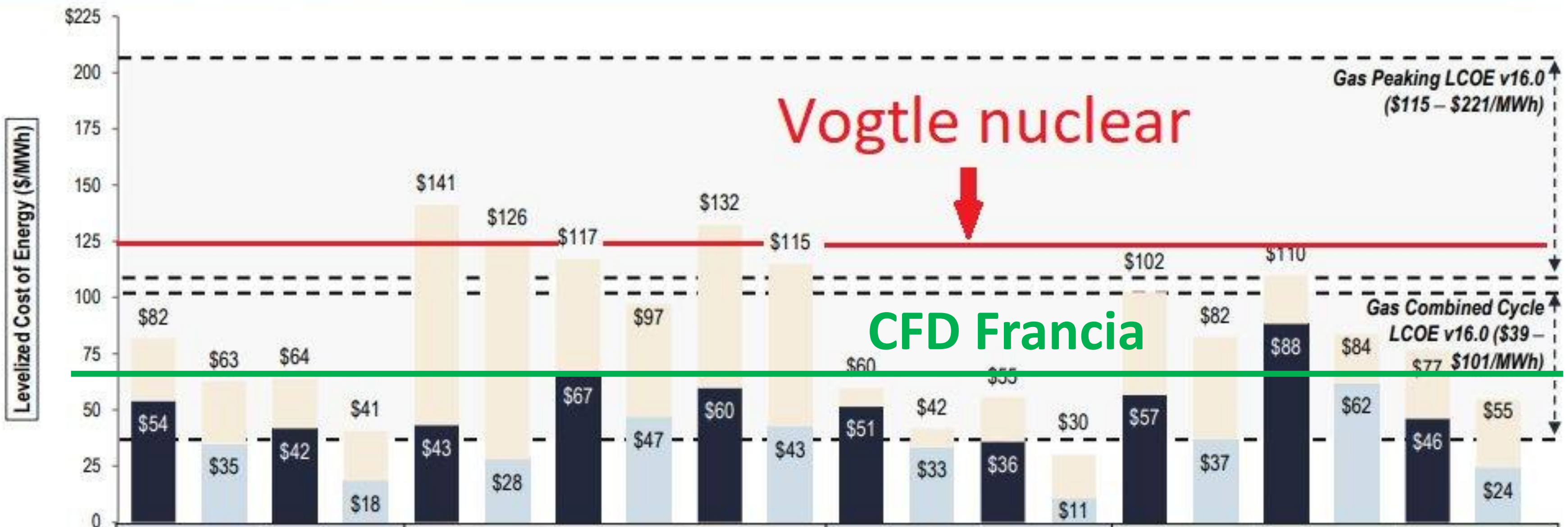
# Costi



## Levelized Cost of Energy Comparison—Cost of Firming Intermittency

The incremental cost to firm[1] intermittent resources varies regionally, depending on the current effective load carrying capability ("ELCC")[2] values and the current cost of adding new firming resources—carbon pricing, not considered below, would have an impact on this analysis

**LCOE v16.0 Levelized Firming Cost ($/MWh)[3]**




| | Solar | Wind | Solar | PV + Storage | Wind | Solar | Wind | Solar | PV + Storage | Wind |
|---|---|---|---|---|---|---|---|---|---|---|
| ELCC | 50% | 16% | 7% | 51%[4] | 15% | 85% | 17% | 38% | 70%[4] | 15% |
| Capacity Factor | 20% | 43% | 25% | 25% | 30% | 21% | 50% | 19% | 19% | 39% |
| Resource Penetration | 3% | 25% | 32% | 32% | 19% | 1% | 56% | 5% | 5% | 7% |
| | MISO | | CAISO | | | SPP | | PJM | | |

■ Lazard's Unsubsidized LCOE[3] ■ Lazard's Subsidized LCOE[3] ■ Firming Cost[1]

*Source: Lazard and Roland Berger estimates and publicly available information.*

(1) Firming costs reflect the additional capacity needed to supplement the net capacity of the renewable resource (nameplate capacity * (1 – ELCC)) and the net cost of new entry (net "CONE") of a new firm resource (capital and operating costs, less expected market revenues). Net CONE is assessed and published by grid operators for each regional market. Grid operators use a natural gas CT as the assumed new resource in MISO ($8.22/kW-mo), SPP ($8.56/kW-mo) and PJM ($10.20/kW-mo). In CAISO, the assumed new resource is a 4 hour lithium-ion battery storage system ($18.92/kW-mo). For the PV + Storage cases in CAISO and PJM, assumed Storage configuration is 50% of PV MW and 4 hour duration.

(2) ELCC is an indicator of the reliability contribution of different resources to the electricity grid. The ELCC of a generation resource is based on its contribution to meeting peak electricity demand. For example, a 1 MW wind resource with a 15% ELCC provides 0.15 MW of capacity contribution and would need to be supplemented with 0.85 MW of additional firm capacity in order to represent the addition of 1 MW of firm system capacity.

(3) LCOE values represent the midpoint of Lazard's LCOE v16.0 cost inputs for each technology adjusted for a regional capacity factor to demonstrate the regional differences in both project and firming costs.

(4) For PV + Storage cases, the effective ELCC value is represented. CAISO and PJM assess ELCC values separately for the PV and storage components of a system. Storage ELCC value is provided only for the capacity that can be charged directly by the accompanying resource up to the energy required for a 4 hour discharge during peak load. Any capacity available in excess of the 4 hour maximum discharge is attributed to the system at the solar ELCC. ELCC values for storage range from 90% – 95% for CAISO and PJM.

# Origine delle differenze

**Costi**

- **Costi capitali**
  - Costo dell’impianto
  - Costo del denaro
- **Costi operativi**
  - Costi operatività e manutenzione
  - Costi materia prima
- **Costi di sistema**
  - Costi rete
  - Costi di backup e storage
  - Altri costi di integrazione (spinning reserve, backstop…)

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Markets

## Germany Faces $1 Trillion Challenge to Plug Massive Power Gap

- About 250 gigawatts of new electricity capacity needed by 2030
- Germany needs 43 soccer fields of solar power every day

Siemens Energy CEO: Supply Chain Management a Key Focus

By Petra Sorge and Josefine Fokuhl
February 25, 2023 at 12:00 AM EST

Gift this article

# Qualche esempio

## UK Maps Out £54 Billion of Wiring to Connect Offshore Wind

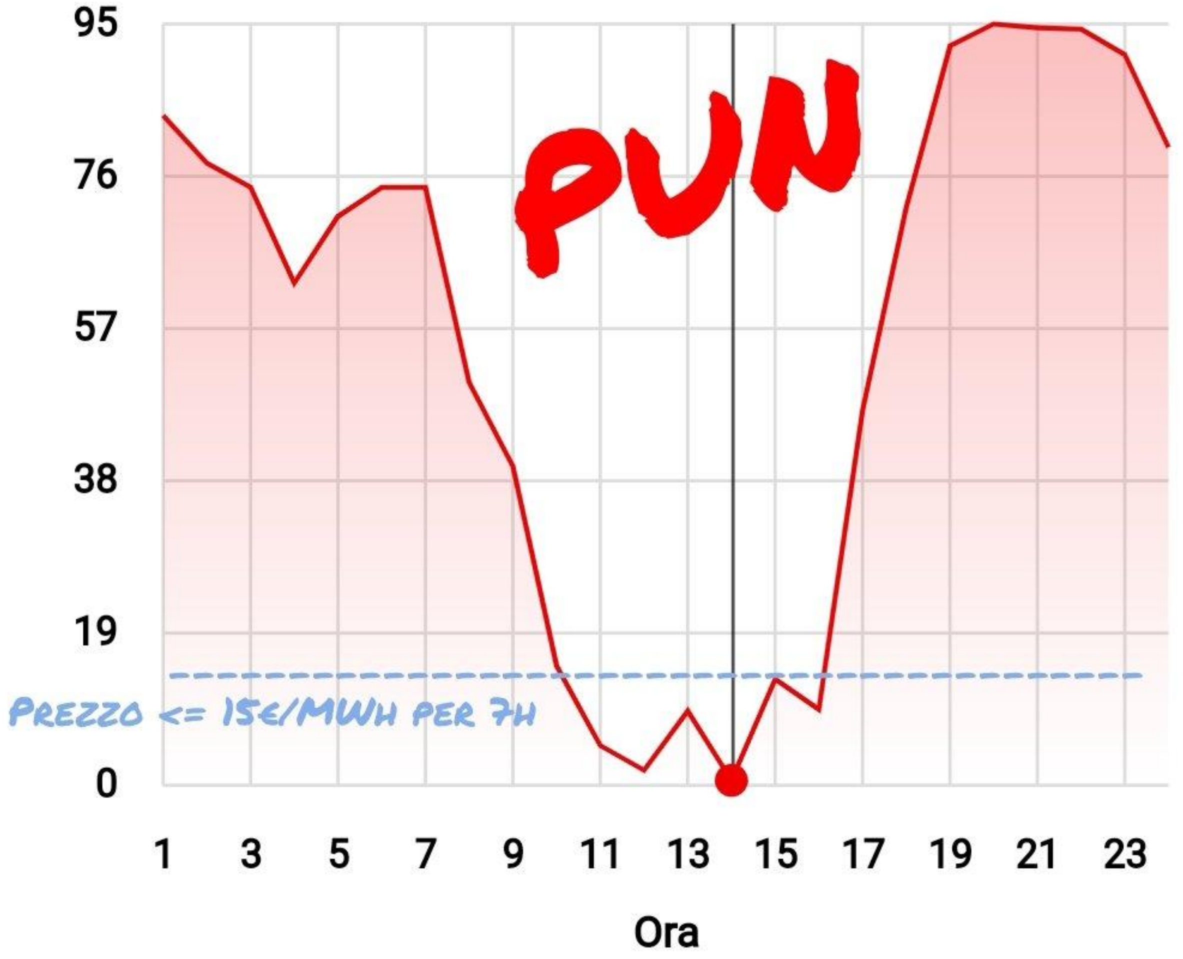
- New wires and pylons are needed to bring power from Scotland
- Transmission projects can expect local objections in planning

The lack of grid capacity has significant implications for international climate and energy goals too. And the task to correct it is daunting. Globally, over 80 million kilometres of grid infrastructure will need to be added or refurbished worldwide by 2040 if countries are to fulfil their national climate commitments on time and in full. That is the equivalent of doubling the length of the existing grids worldwide.

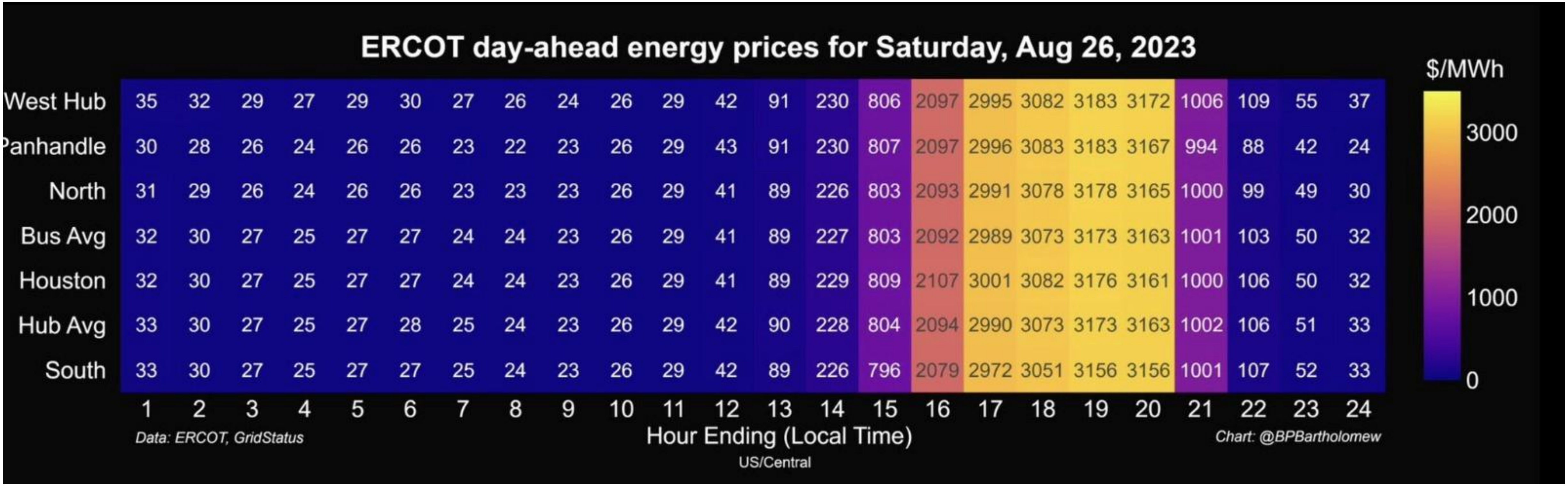
# Costi
# Vs Prezzi

**MGP - Prezzi orari (€/MWh) - ITA**
*24 mar 2024*

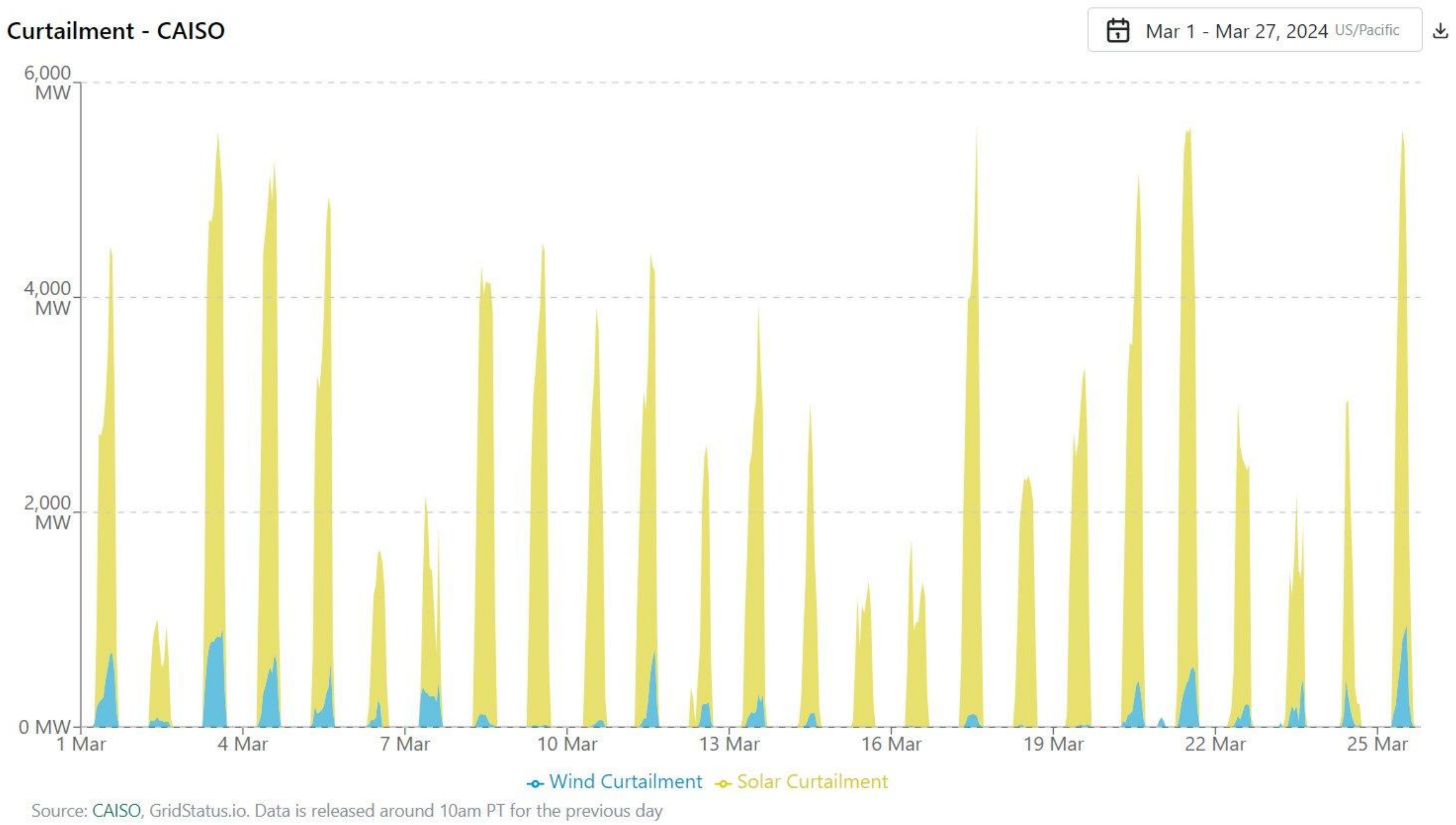
| | |
|---|---|
| Ora | 14 |
| Prezzo (€/MWh) | 0,62 |



# Costi
# Vs Prezzi

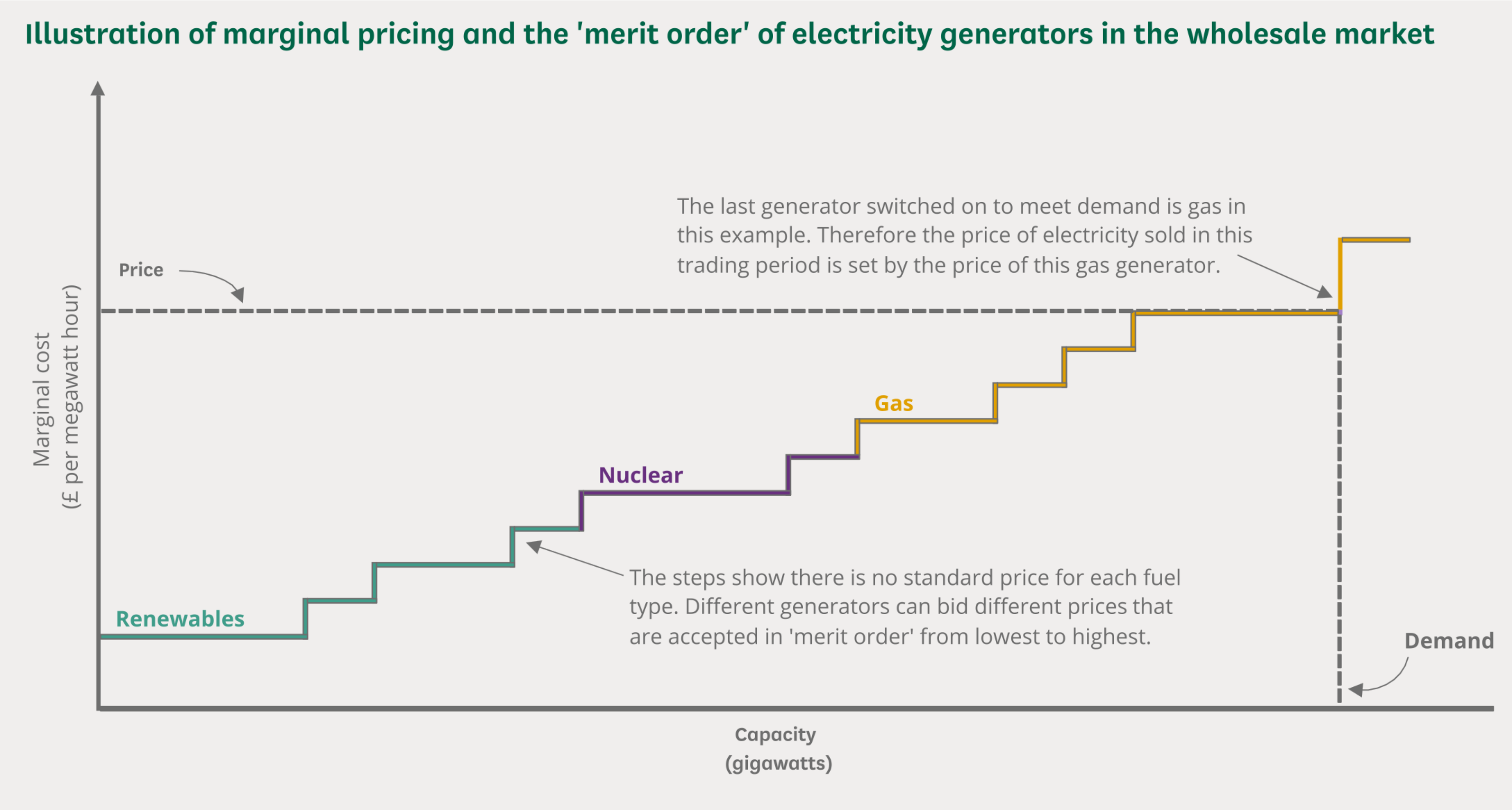


# Costi
# Vs Prezzi
# e sprechi



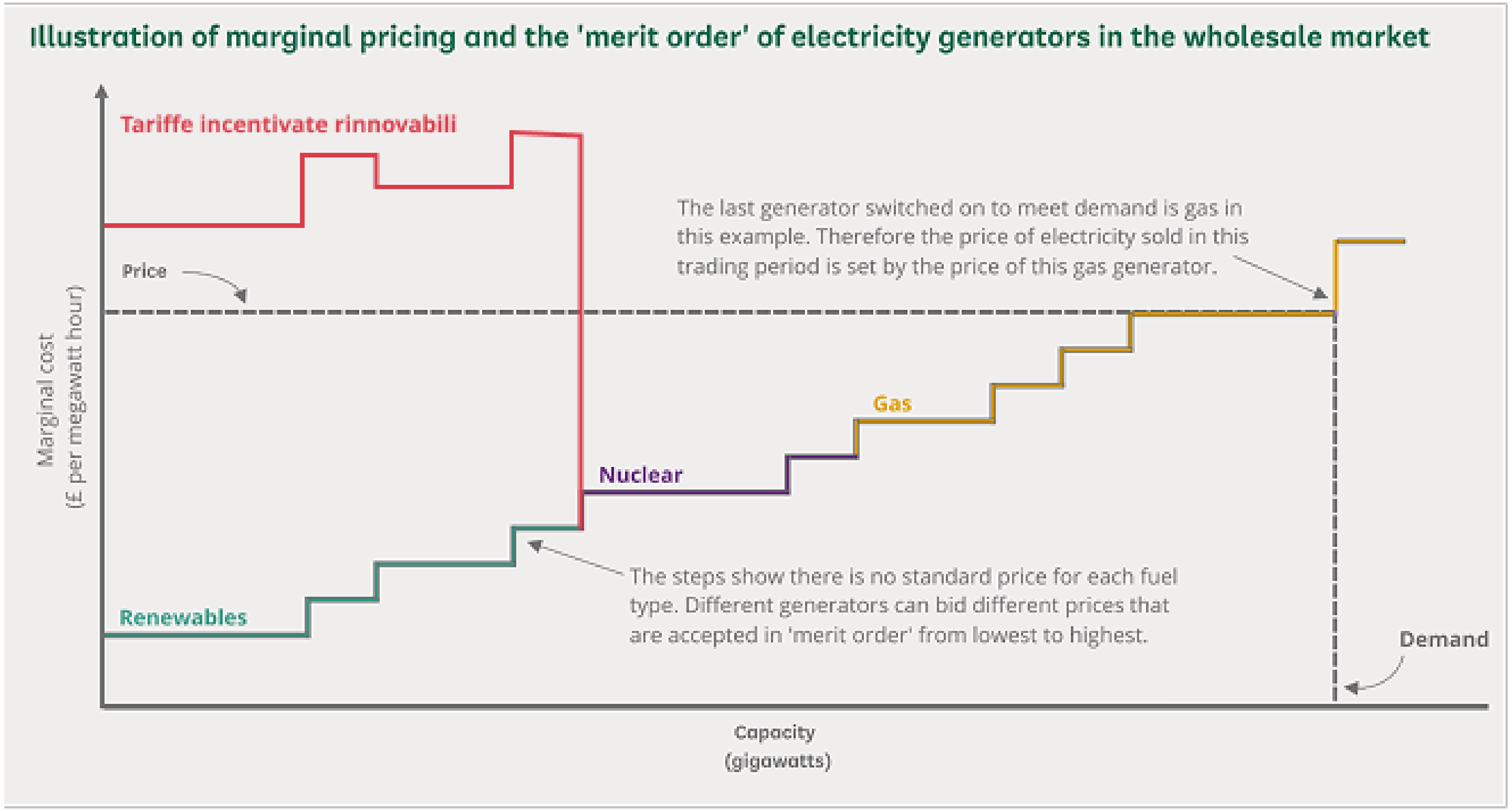
# Costi Vs Prezzi

Come pensi che funzioni?



# Costi Vs Prezzi

Come funziona realmente

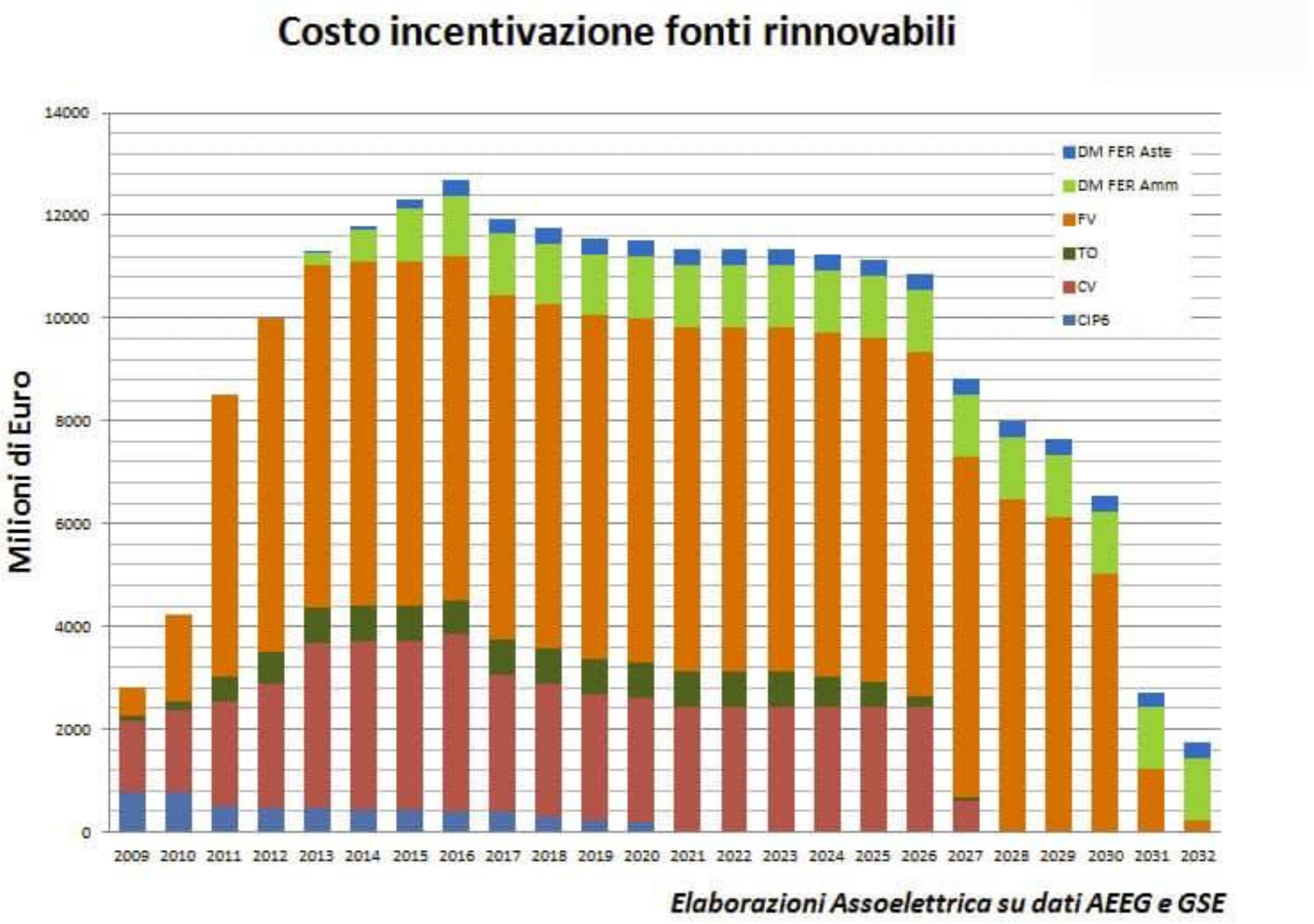


# A quanto ammontano gli incentivi?

| Ammontare incentivo primo conto energia €/kWh | | | | | | |
|---|---|---|---|---|---|---|
| **Anno domanda** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| 1 kW < P <= 20 kW | 0,445 | 0,445 | 0,423 | 0,402 | 0,378 | 0,356 |
| 20 kW < P <= 50 kW | 0,460 | 0,460 | 0,437 | 0,414 | 0,391 | 0,368 |
| 50 kW < P <= 1 MW | 0,490 | 0,490 | 0,466 | 0,441 | 0,417 | 0,392 |
| | Massima potenza annua installata incentivabile | | | | | |
| 1 kW < P <= 50 kW | 60 MW | 60 MW | 60 MW | 60 MW | 60 MW | 60 MW |
| 50 kW < P <= 1 MW | 25 MW | 25 MW | 25 MW | 25 MW | 25 MW | 15 MW |
| *Nota*: secondo DM 28/07/2005 modificato dal DM 06/02/2006 | | | | | | |

| Ammontare incentivo secondo conto energia €/kWh | | | |
|---|---|---|---|
| **Potenza impianto** | **Non integrato** | **Parzialmente integrato** | **Integrato** |
| 1 kW < P <= 3 kW | 0,40 | 0,44 | 0,49 |
| 3 kW < P <= 20 kW | 0,38 | 0,42 | 0,46 |
| 20 kW < P | 0,36 | 0,40 | 0,44 |

# A quanto ammontano gli incentivi?



# Lezioni dall’estero

eia.gov

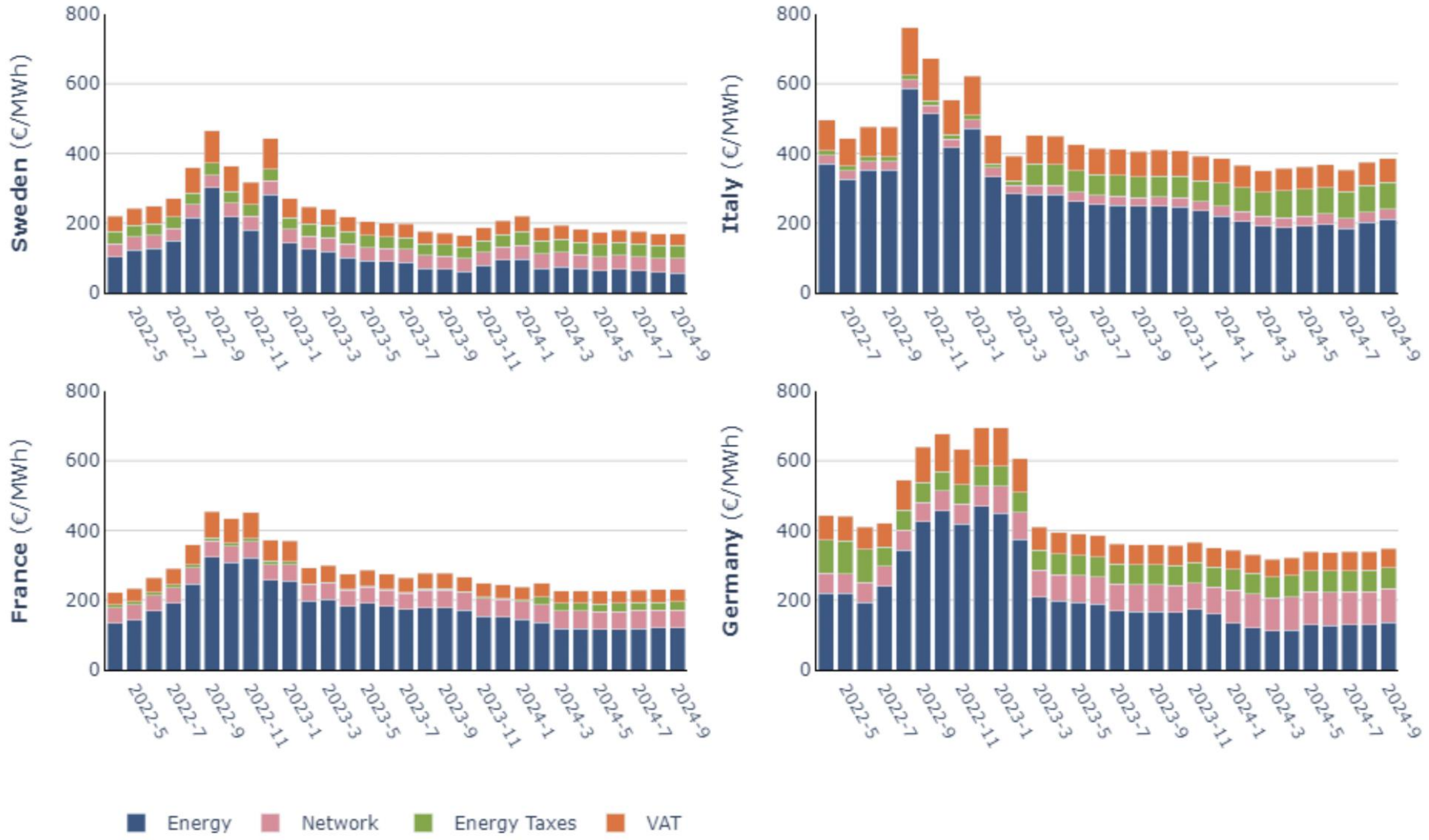
eia MENU

| | | | |
|---|---|---|---|
| **Mountain** | **13.33** | **12.78** | **10.48** |
| Arizona | 14.11 | 12.62 | 11.46 |
| Colorado | 14.26 | 14.20 | 10.84 |
| Idaho | 10.79 | 10.58 | 8.64 |
| Montana | 11.98 | 10.73 | 11.62 |
| Nevada | 16.38 | 16.81 | 11.15 |
| New Mexico | 13.76 | 13.53 | 10.54 |
| Utah | 10.85 | 10.65 | 8.04 |
| Wyoming | 10.86 | 10.28 | 9.52 |
| **Pacific Contiguous** | **21.11** | **19.48** | **19.11** |
| California | 29.49 | 26.48 | 22.93 |
| Oregon | 13.84 | 12.04 | 11.20 |
| Washington | 11.09 | 10.48 | 10.52 |
| **Pacific Noncontiguous** | **34.01** | **33.37** | **31.16** |
| Alaska | 23.78 | 21.68 | 21.31 |
| Hawaii | 44.28 | 44.96 | 42.20 |
| **U.S. Total** | **15.45** | **15.47** | **12.68** |

See Technical notes for additional information on the Commerc
Industrial, and Transportation sectors.
Notes: - See Glossary for definitions. - Values are preliminary e
based on a cutoff model sample.
See Technical Notes for a discussion of the sample design for
EIA-826.
Utilities and energy service providers may classify commercial

# Lezioni dall'estero

**Figure 28 –Industrial retail prices for SMEs in selected EU countries**




*Source: Vaasaett*

# Lezioni dall'estero

# Lezioni dall'estero

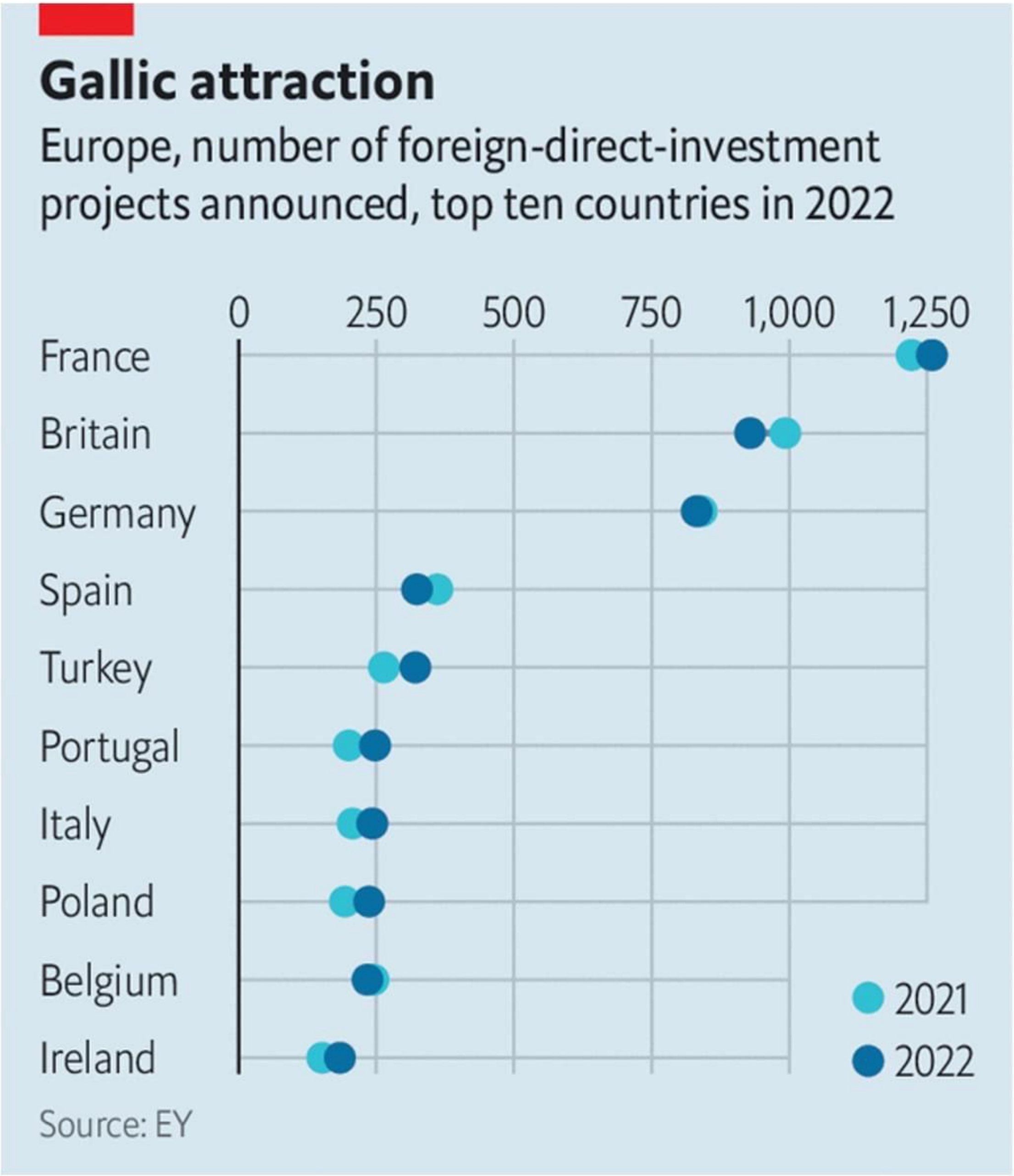
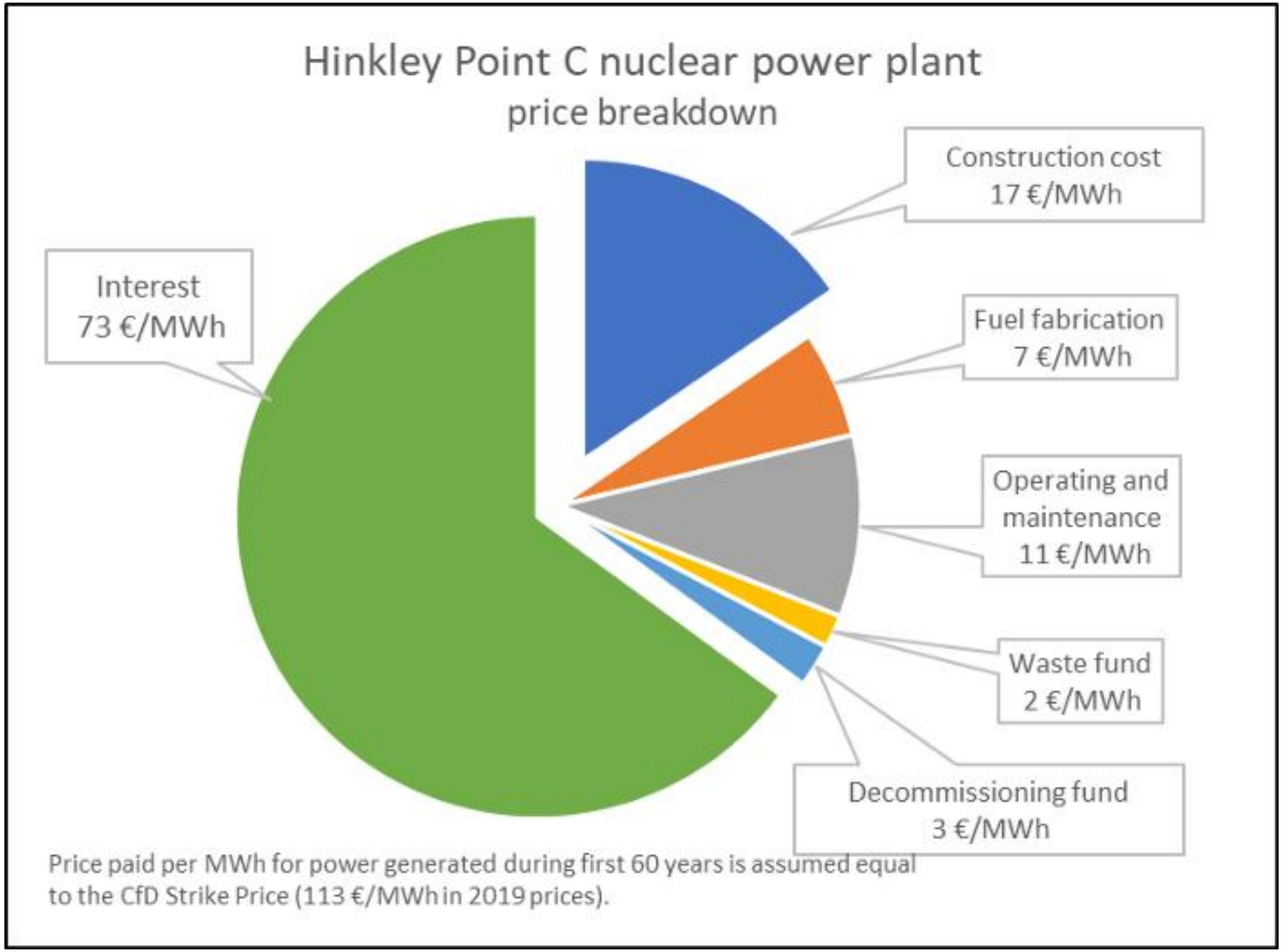
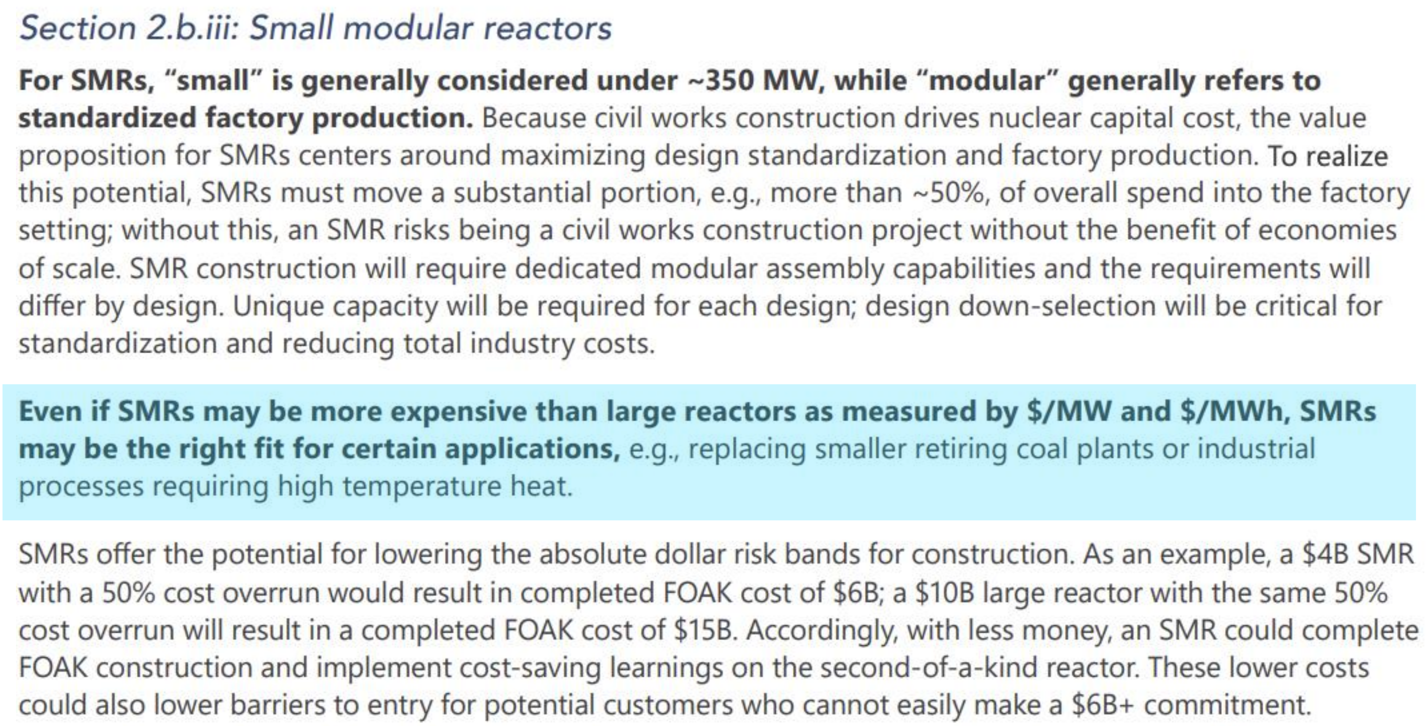



IMAGE: THE ECONOMIST

# Nucleare sì, ma quale?



# Nucleare sì, ma quale?

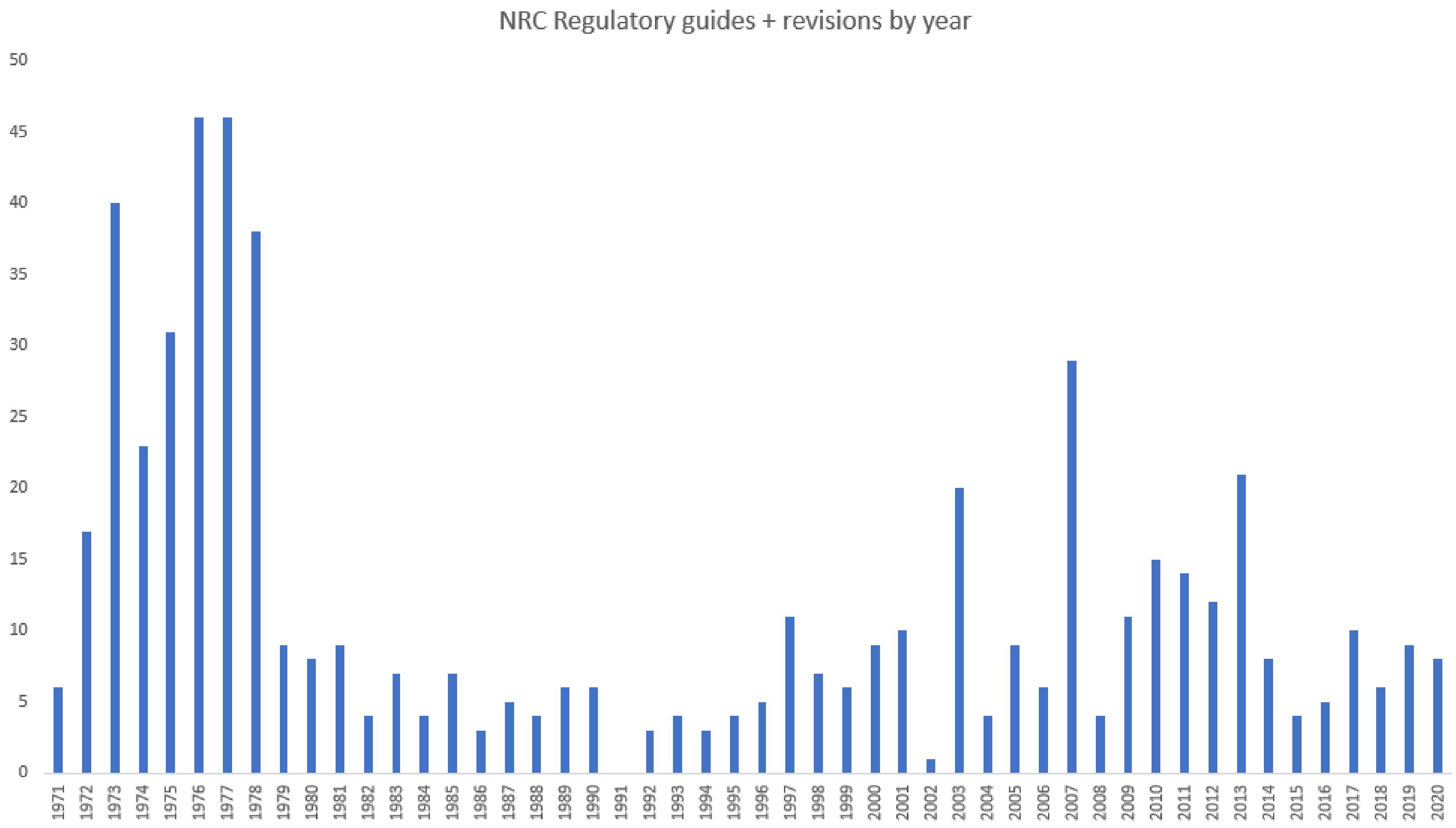

Section 2.b.iii: Small modular reactors

**For SMRs, "small" is generally considered under ~350 MW, while "modular" generally refers to standardized factory production.** Because civil works construction drives nuclear capital cost, the value proposition for SMRs centers around maximizing design standardization and factory production. To realize this potential, SMRs must move a substantial portion, e.g., more than ~50%, of overall spend into the factory setting; without this, an SMR risks being a civil works construction project without the benefit of economies of scale. SMR construction will require dedicated modular assembly capabilities and the requirements will differ by design. Unique capacity will be required for each design; design down-selection will be critical for standardization and reducing total industry costs.

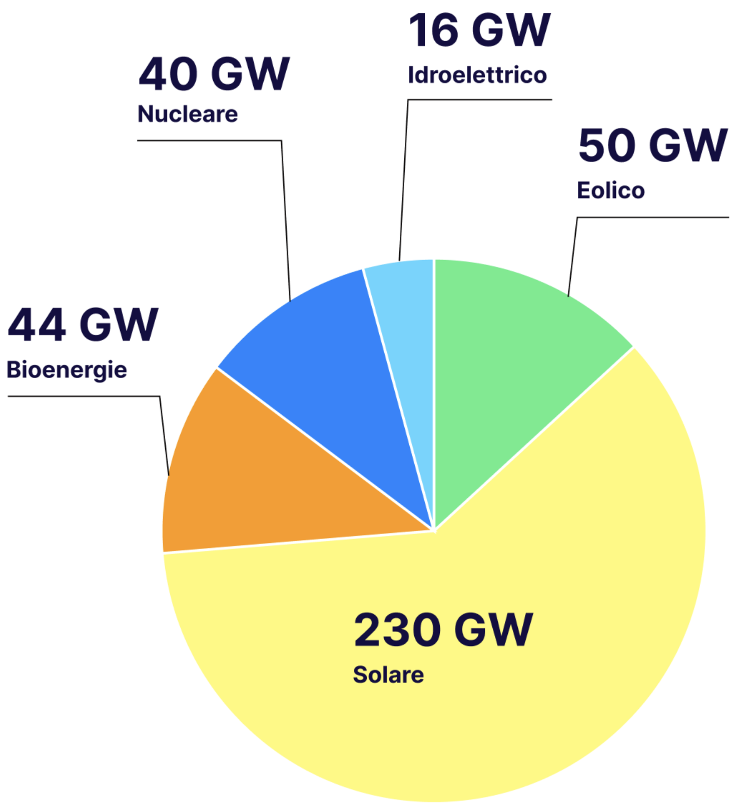
**Even if SMRs may be more expensive than large reactors as measured by $/MW and $/MWh, SMRs may be the right fit for certain applications,** e.g., replacing smaller retiring coal plants or industrial processes requiring high temperature heat.

SMRs offer the potential for lowering the absolute dollar risk bands for construction. As an example, a $4B SMR with a 50% cost overrun would result in completed FOAK cost of $6B; a $10B large reactor with the same 50% cost overrun will result in a completed FOAK cost of $15B. Accordingly, with less money, an SMR could complete FOAK construction and implement cost-saving learnings on the second-of-a-kind reactor. These lower costs could also lower barriers to entry for potential customers who cannot easily make a $6B+ commitment.

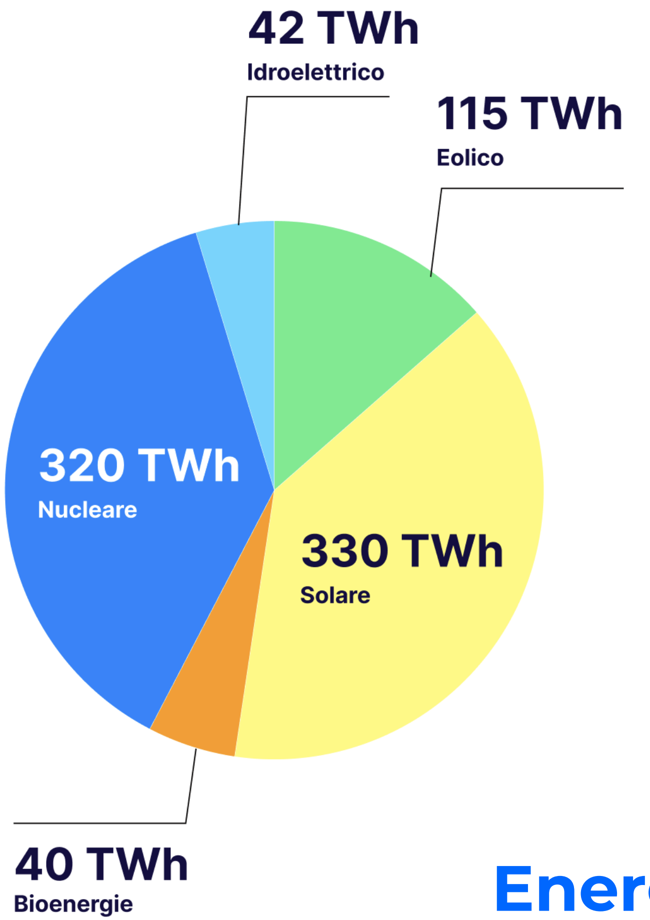
# Come abbattere i costi



# Proposta mix ottimizzato 2050




## Potenza installata




## Energia prodotta

**Grazie dell’attenzione.**