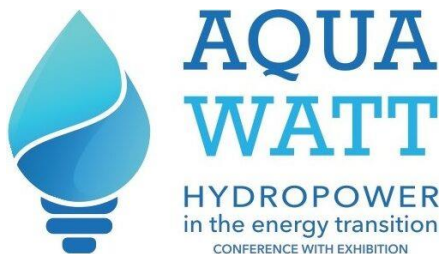




# Utility scale storage needs and market-based support scheme in Italy

**Michele Benini – director Energy Systems Development dept.**



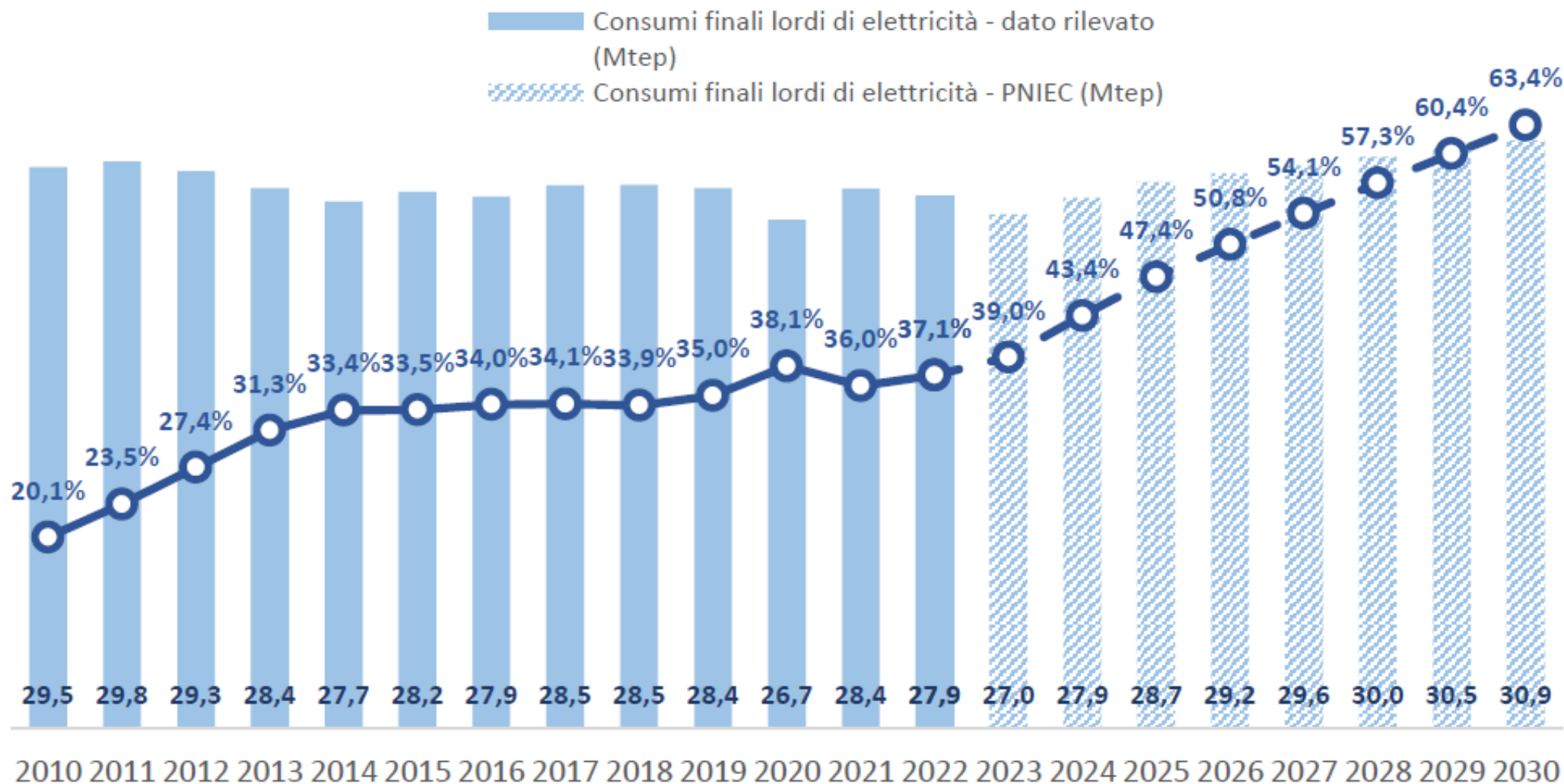
29 ottobre 2024 – Piacenza

# 2030 decarbonization targets – National Energy and Climate Plan

## Renewable Energy Sources

RES share on:	Europe	Italy	Italy 2022	NECP 2030
Gross Final Consumption	42,5%	38,7%	19%	<b>39,4%</b>
Electricity g.f.c.	-	-	37%	<b>63,4%</b>
Heating & Cooling g.f.c.	49% (indicative)	29,6%	21%	<b>35,9%</b>
Transports g.f.c.	29%	29%	8%	<b>34,2%</b>
H <sub>2</sub> in industry	42%	42%	0%	<b>54%</b>

# Trajectory of the RES share on electricity g.f.c.



## Development of electricity RES generation capacity

GW	2022	2030	Delta GW	Delta %
Hydro	19,26	19,41	0,15	-
PV	<b>30,28 (2023)</b>	79,25	<b>48,97</b>	<b>+162%</b>
Wind	<b>12,34 (2023)</b>	28,14	<b>15,8</b>	<b>+128%</b>
Bioenergy	4,05	3,24	-0,81	-20%
Geothermal	0,82	1,00	0,18	+22%
<b>TOTAL</b>	<b>66,75</b>	<b>131,04</b>	<b>64,29</b>	<b>+96%</b>

## Development of electricity RES generation

TWh	2022	2030	Delta TWh	Delta %
Hydro (normalized)	48,1	46,9	-1,2	-2%
PV	28,1	97,6	69,5	+247%
Wind (normalized)	21	64,8	43,8	+209%
Bioenergy	17,5	10,9	-6,6	-38%
Geothermal	5,8	7,5	1,7	+29%
<b>TOTAL</b>	<b>120,5</b>	<b>227,7</b>	<b>107,2</b>	<b>+89%</b>

# Development of PV & Wind in the 2030 NECP scenario vs. current trend



2023

30,3 GW



2030

79,3 GW

**+162%** **+49 GW** **+7 GW/year**  
Installed Jan÷Aug 24 = +4350 MW  
Installed 2023 = +5234 MW



2023

12,3 GW

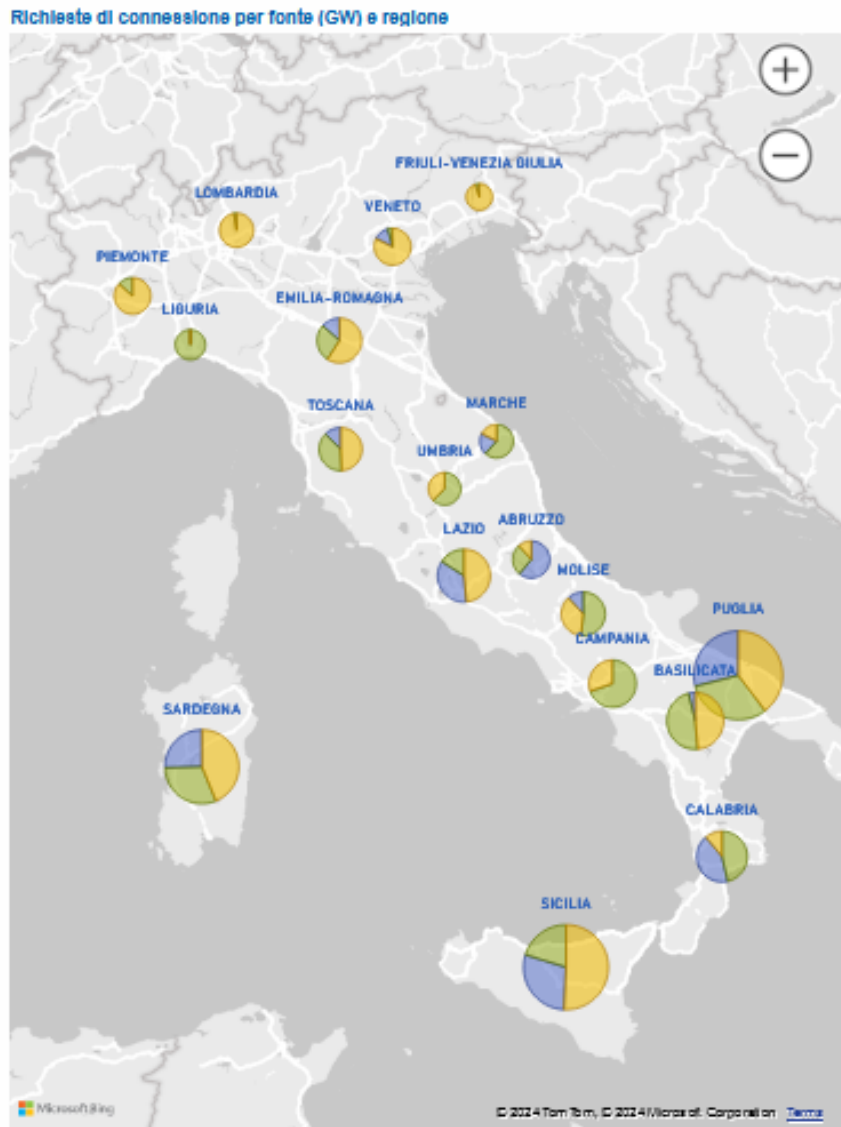
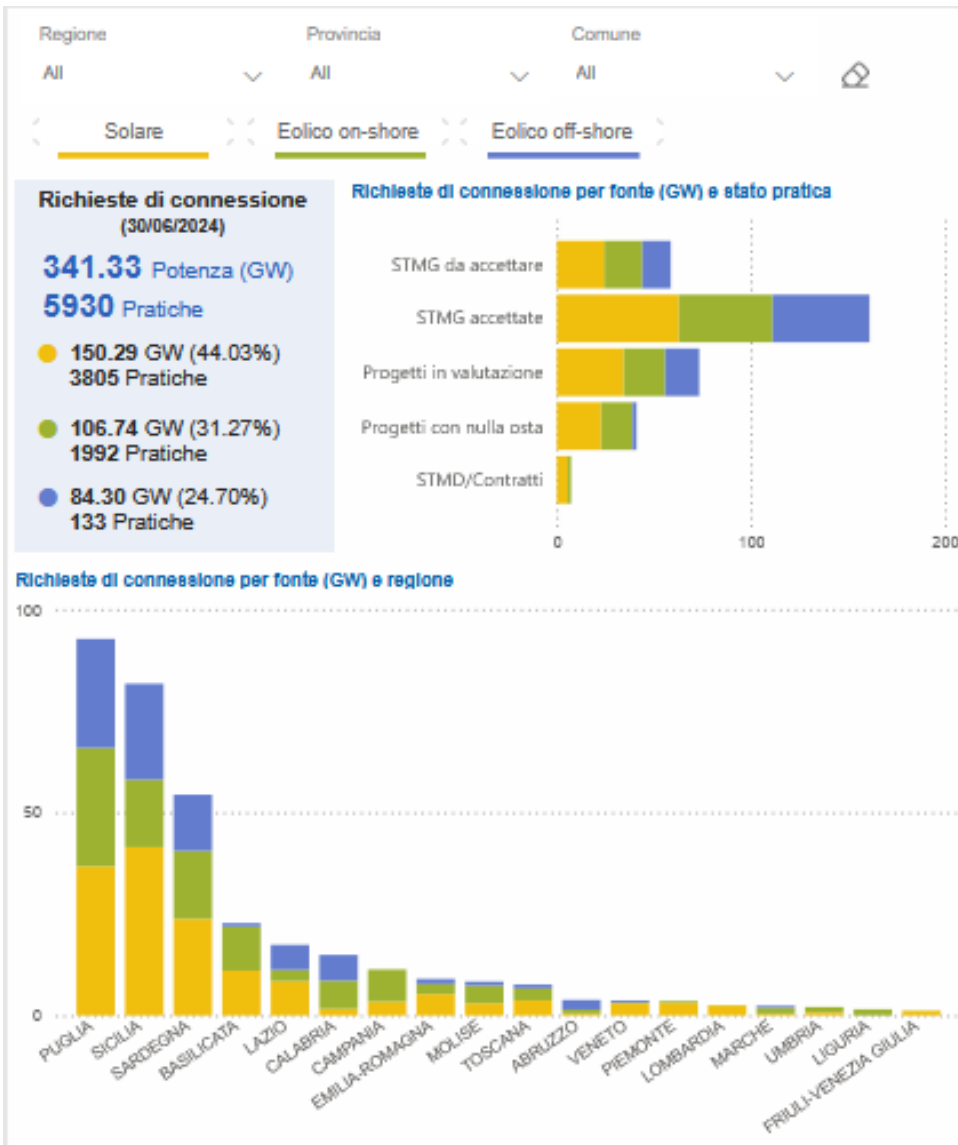


2030

28,1 GW

**+128%** **+15,8 GW** **+2,3 GW/year**  
Installed Jan÷Aug 24 = +484 MW  
Installed 2023 = +487 MW

# Requests of connection to the transmission grid



**Photovoltaic  
150 GW**

**Wind on-shore  
107 GW**

**Wind off-shore  
84 GW**



# Decree 21/6/2024 «Aree Idonee» (suitable areas)

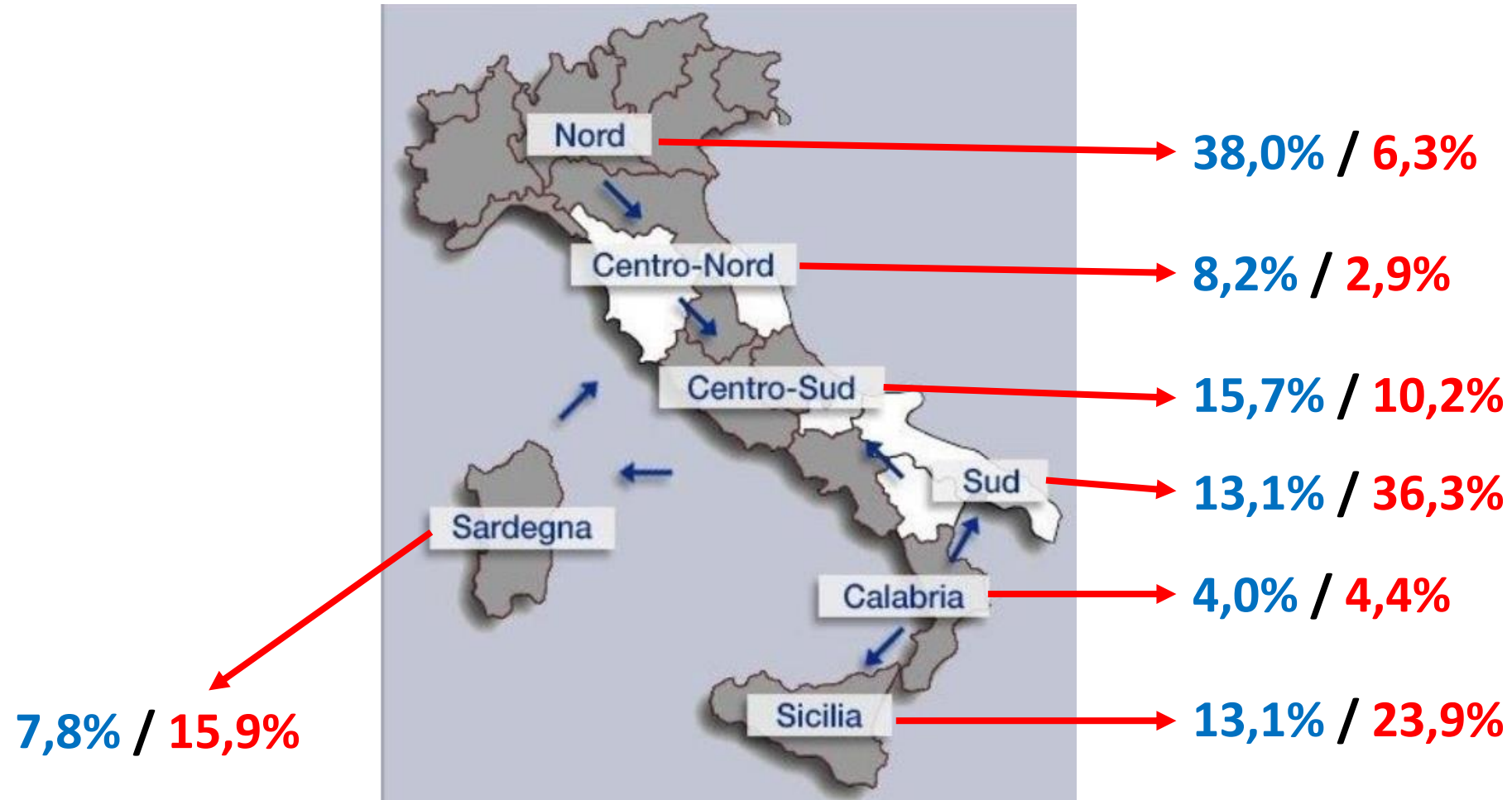
TABELLA A- RIPARTIZIONE REGIONALE DI POTENZA MINIMA PER ANNO ESPRESSA IN MW

Regione	Obiettivi di potenza aggiuntiva [MW]									
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Abruzzo	4	65	196	454	640	850	1.086	1.350	1.648	2.092
Basilicata	145	204	329	543	748	973	1.218	1.486	1.779	2.105
Calabria	45	95	210	549	857	1.206	1.603	2.055	2.568	3.173
Campania	74	237	569	909	1.297	1.728	2.206	2.736	3.325	3.976
Emilia-Romagna	100	343	860	1.288	1.851	2.504	3.263	4.143	5.164	6.330
Friuli-Venezia Giulia	30	96	321	404	573	772	1.006	1.280	1.603	1.960
Lazio	82	305	544	933	1.346	1.829	2.396	3.059	3.835	4.757
Liguria	29	80	122	198	281	382	504	653	834	1.059
Lombardia	184	622	1.521	1.963	2.714	3.592	4.616	5.812	7.208	8.766
Marche	32	110	241	457	679	930	1.217	1.544	1.916	2.346
Molise	2	38	59	175	273	383	509	651	812	1.003
Piemonte	78	285	851	1.098	1.541	2.053	2.645	3.330	4.121	4.991
Puglia	163	507	876	1.672	2.405	3.213	4.104	5.084	6.165	7.387
Sardegna	34	175	468	998	1.553	2.207	2.980	3.892	4.969	6.264
Sicilia	144	473	952	1.842	2.764	3.847	5.120	6.616	8.375	10.485
Toscana	42	150	359	667	1.019	1.444	1.958	2.580	3.332	4.250
TrAA - Bolzano	11	41	120	139	186	239	298	364	438	515
TrAA - Trento	11	41	108	140	195	258	333	419	520	631
Umbria	15	60	135	279	429	609	823	1.079	1.384	1.756
Valle d' Aosta	1	4	10	27	47	75	112	162	231	328
Veneto	125	413	1.088	1.373	1.889	2.483	3.164	3.947	4.847	5.828
<b>Totale</b>	<b>1.348</b>	<b>4.344</b>	<b>9.940</b>	<b>16.109</b>	<b>23.287</b>	<b>31.578</b>	<b>41.160</b>	<b>52.243</b>	<b>65.075</b>	<b>80.001</b>

**Targets of renewable generation capacity development till 2030 assigned to each Italian Region (regional «burden sharing»)**



# Regional *Burden Sharing* - decree «Aree Idonee» vs requests of connection to the transmission grid





## Storage needs ...

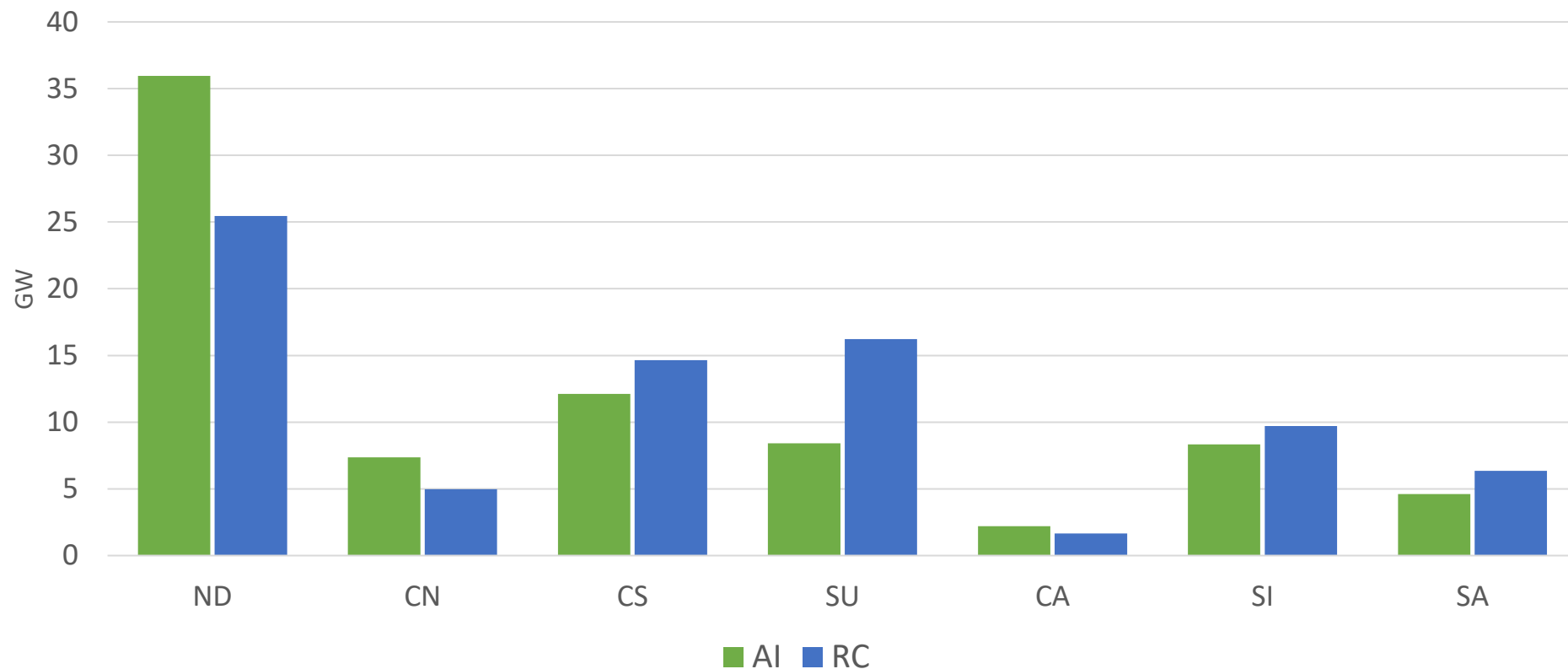
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- ✓ The huge increase of non-programmable renewable sources requires a significant increase of storage capacity to **time-shift renewable generation** and limit **overgeneration**
  
- ✓ In order to estimate the needed amount of new storage systems we analyzed **two different scenarios**, characterized by **different distributions of renewables** in the national territory:
  - one in line with the **requests of connections to the transmission grid**, mostly concentrated in the southern part of Italy
  - the other in line with the **regional «burden sharing»**, with a more homogeneous distribution all over Italy
  
- ✓ In both scenarios we also assume the **full implementation of TERNA's 2023 network development plan**

## Assumptions: PV in the two scenarios

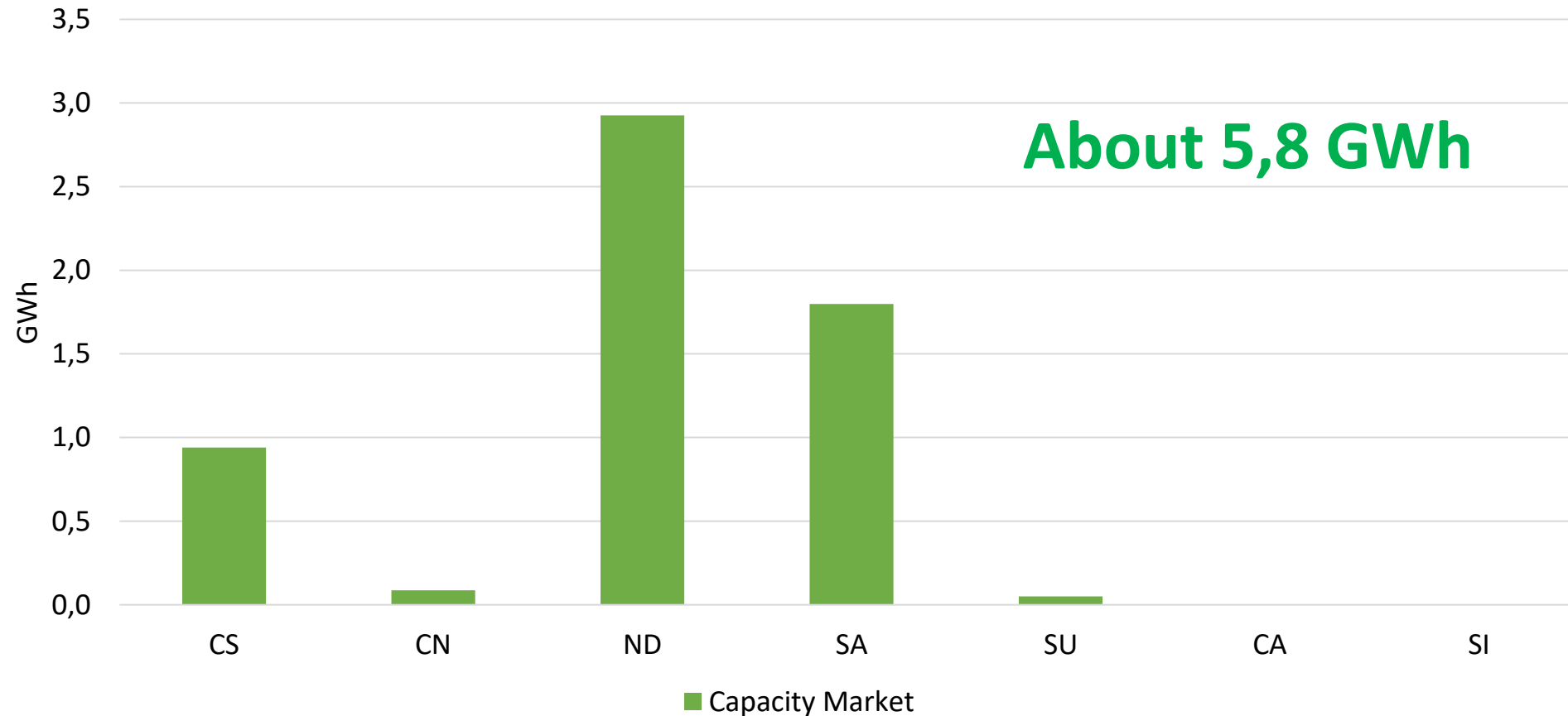
«AI» - Aree Idonee - regional «burden sharing»

«RC» – Requests of Connections





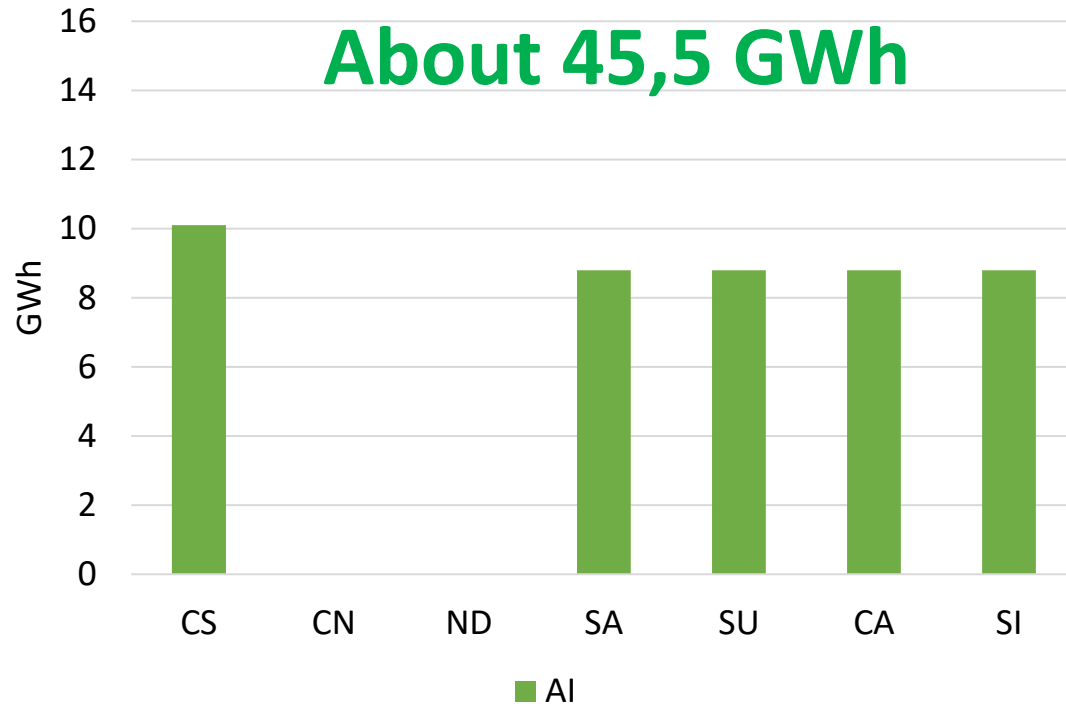
# Assumptions: storage capacity already awarded by the Capacity Market



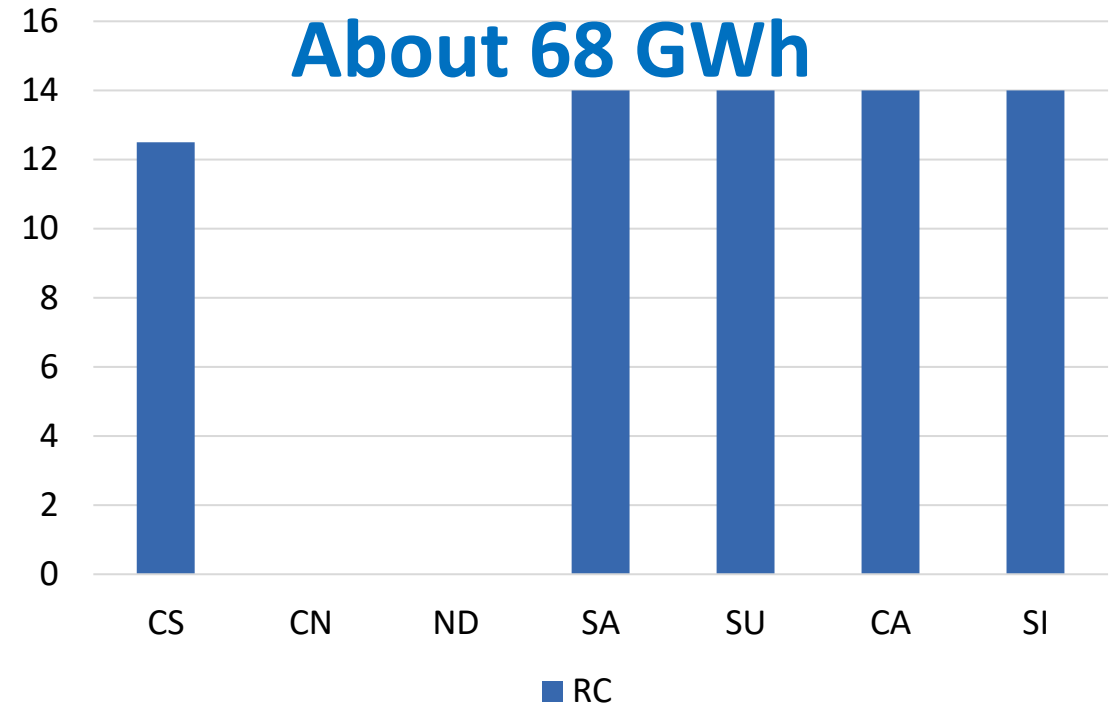


# Results: new utility scale storage needs (8h capacity)

Scenario AI



Scenario RC



- ✓ Due to the foreseen transmission network developments, there are no significant congestions among the South, Calabria, Sicily and Sardinia market zones, therefore they play as a single zone
- ✓ North and Center-North market zones do not need new storage, considering the already available pumped storage hydro power plants and the BESS awarded by the Capacity Market

- ✓ Utility scale storage systems **are not profitable in the current electricity market context**
- ✓ **Long term price signals** are needed for their development
- ✓ Decree 210/21 introduced the **MACSE - Meccanismo di Approvvigionamento di Capacità di Stoccaggio Elettrico** (Mechanism for the Procurement of Electricity Storage Capacity)
- ✓ Starting from the second quarter of 2025, there will be **auctions**, specifically dedicated to BESS and to pumped storage hydro, where:
  - investors will bid for an **annual «premium» (in €/MWh-year)**, that will remunerate the investment in new storage capacity along its technical life
  - In exchange, their new storage capacity **will be made available to market players in a specific market**, where **time-shifting products** will be traded

**Google «APE MACSE» for a detailed description provided by RSE**



**Thank you for your attention!**

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