

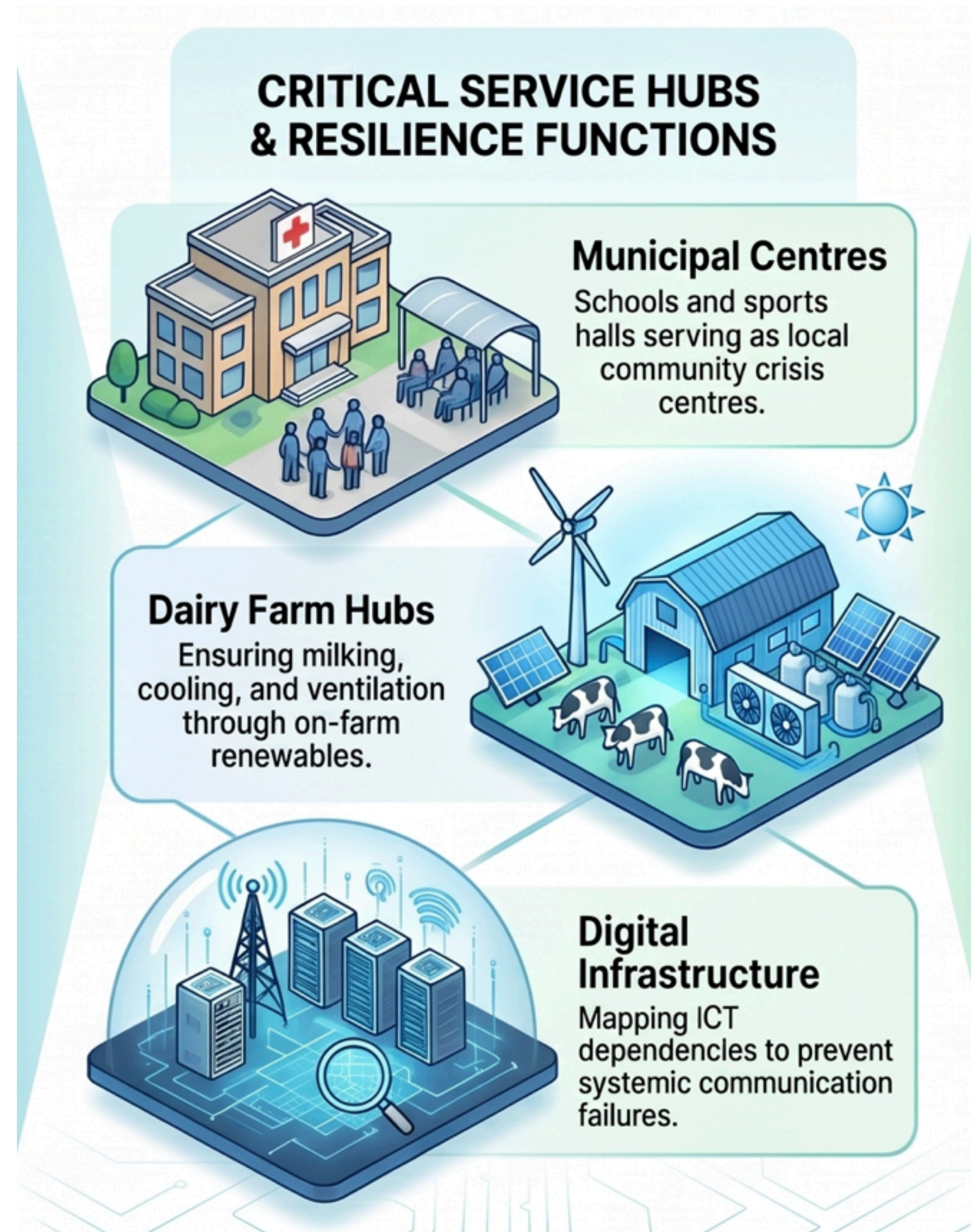
UNIVERSITY OF OSLO

Researchers Night
25Sep2026, Lillestrøm

**Kan vi være trygge at
lyset kommer på?**

Josef Noll

Professor, University of Oslo,
Department of Technology Systems
Kjeller, Norway, m: +47 9083 8066



Murphy's law



 Baker Institute

Center for Energy Studies | Commentary

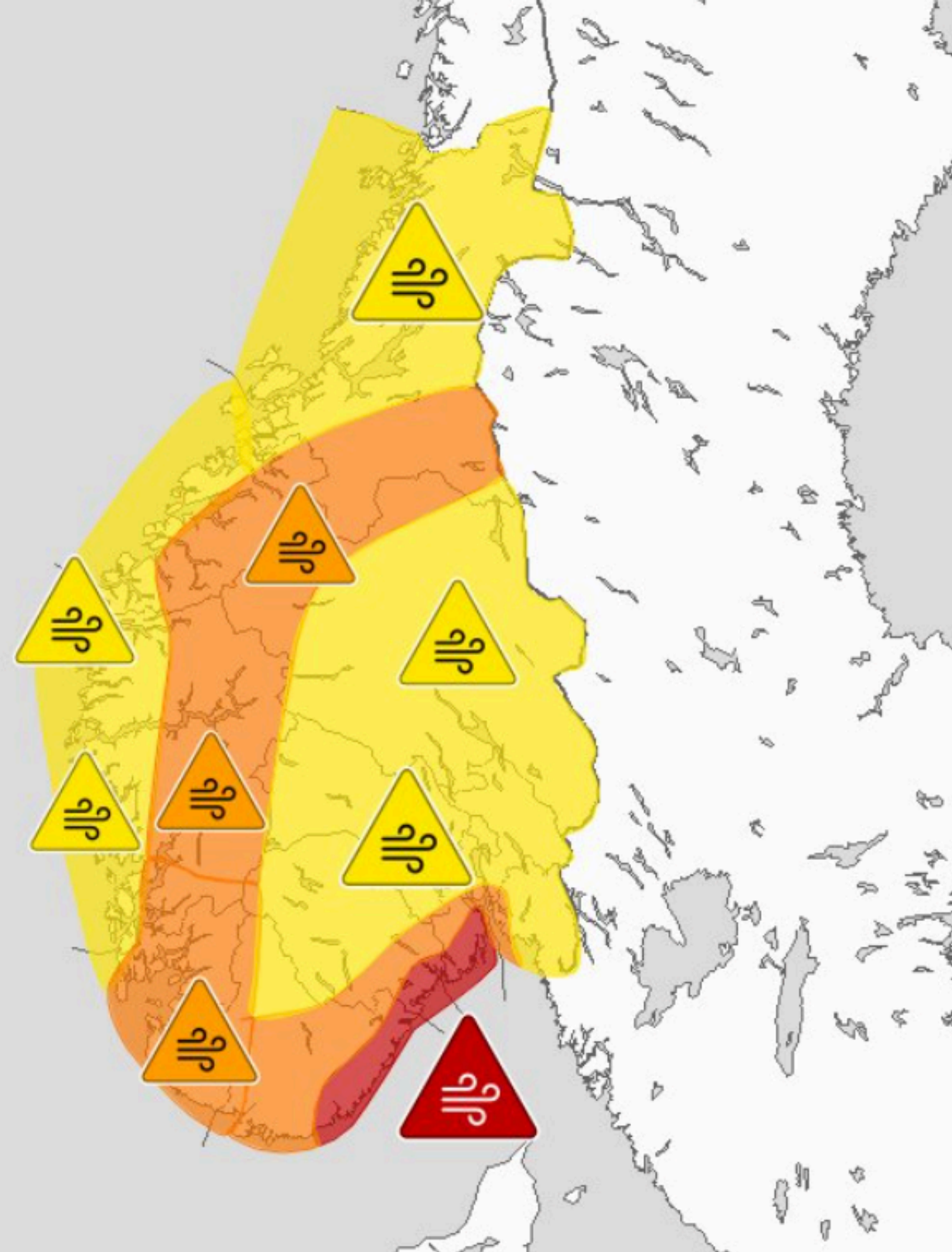
The Iberian Peninsula Blackout – Causes, Consequences, and Challenges Ahead

May 2, 2025 | Raúl Bajo Buenestado

Stormen Amy

155.000 husholdninger

"Amy"



ao.no

"349 mNOK" Gjensidige Årsrapport 2025

I oktober ble flere land i Nord-Europa rammet av stormen Amy. I Skandinavia ble Norge hardest rammet, med over 10 000 skader. Gjensidiges kostnader knyttet til stormen ble beregnet til cirka 349 millioner

"3 milliarder NOK" Naturskade, KLP Årsrapport 2025

De samlede kostnadene rapportert til Norsk Naturskadepool for alle naturskader i 2025 var om lag 3 milliarder kroner, opp fra 1,4 milliarder kroner i 2024. Den største enkelthendelsen i 2025 var stormen Amy, som traff store deler av Sør-Norge i oktober.

214% opp (NOK 1,4 Mrd) i 2014

if.no



expressen.se



500 år gammel eike



Hvor mye (elektrisk) energy trenger vi?

Energy usage	Total [TWh]	Electrical [TWh]
Production	2 593,0	160,5
Import		11,5
Export		34,3
Netto Norway access		137,7
Transformation		1,1
Own usage in energy producing sector		13,7
Losses		7,5
Netto Norway usage	211,0	117,8
Industry and mining	73,0	47,0
Transport	50,0	4,5
Others	43,0	30,5
Households	45,0	35,8

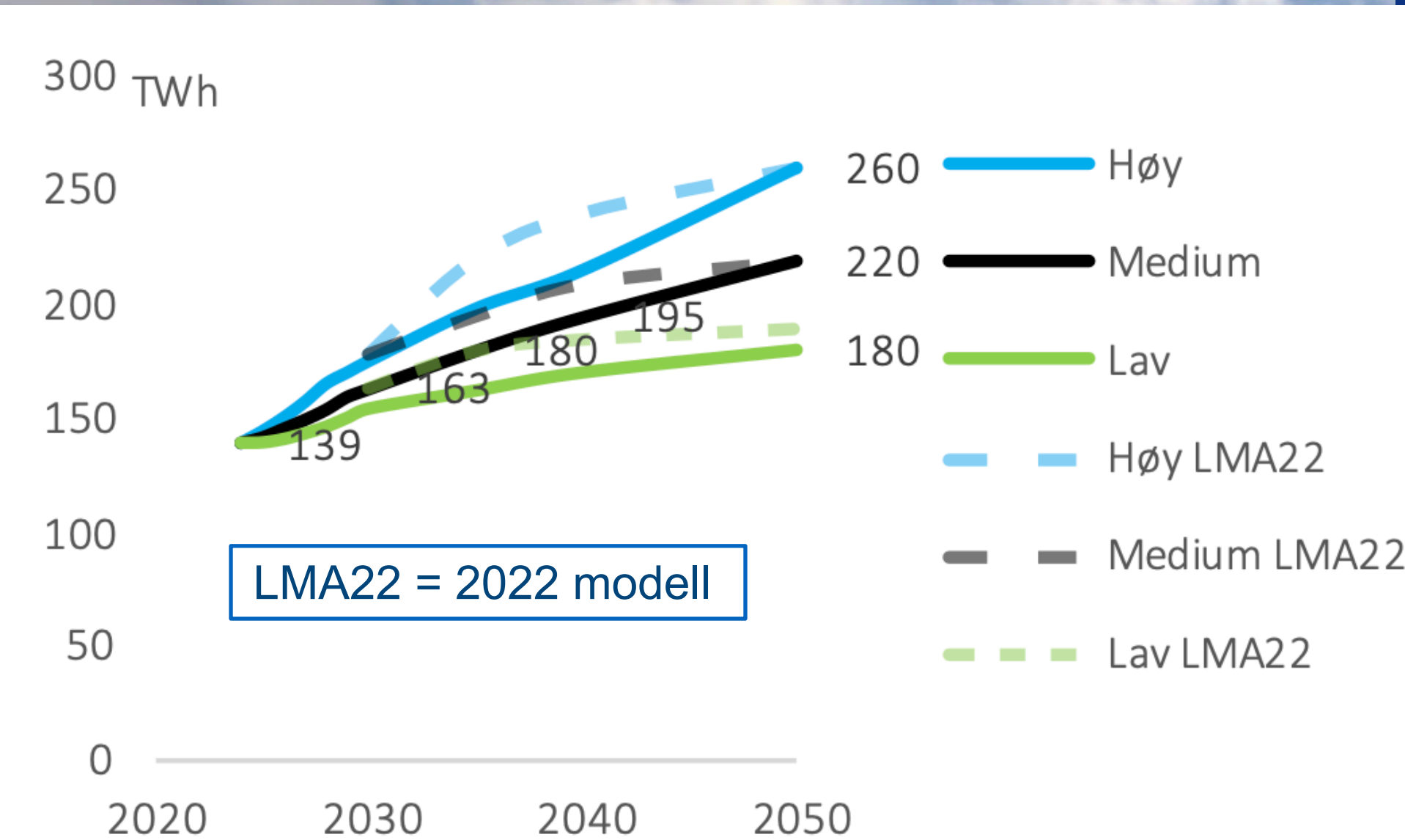
Diff: ~90 TWh
50% effektivt omvandling
> 180 TWh mer elektrisk energi

Total: 340 TWh elektrisk

<https://www.ssb.no/energi-og-industri/energi/statistikk/produksjon-og-forbruk-av-energi-energibalanse-og-energiregnskap>

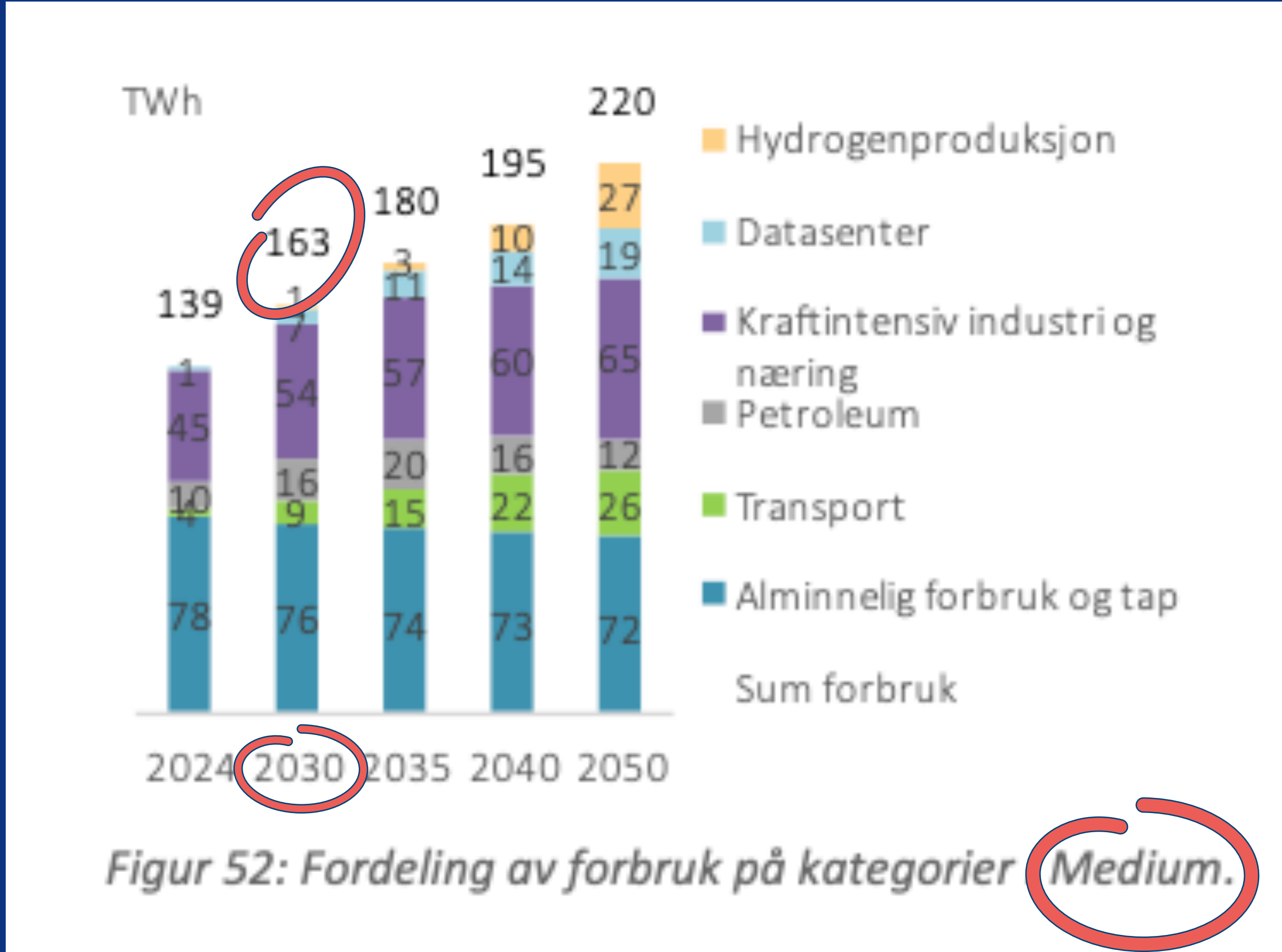
Langsiktig Markedsanalyse

Norge, Norden og Europa 2024-2050



Realitetssjekk Statnett prognose

“160 TWh in 2026”
SSB



“163 TWh in 2030”
Statnett langsiktig markedsanalyse 2024

Hva gjør vi i dag?



takk til NTNU
“varme opp bolig med strøm
er som å vaske gulvet med
sjampagne”

Vår reaksjon

“Norgespris”



kilde: Ole Berg-Rusten (NTB)



<https://www.nhh.no/nhh-bulletin/artikkelarkiv/2026/februar/aasland-snakker-usant-om-norgespris/>

Regjeringen har over tid kommet med usanne påstander om norgespris, senest i «Politisk kvarter» på NRK onsdag 10. desember, skriver Isabel Hovdahl og Maren Holthe Hedne i Aftenposten. Foto: pxhere

Ærlig talt, Terje Aasland!

Energiministeren bruker så villedende tall at det grenser til desinformasjon

<https://www.aftenposten.no/meninger/leder/i/RjmMkO/aerlig-talt-terje-aasland>

Feilinformasjon fra Aasland om Norgespris

Når energiminister Terje Aasland avviser dokumentasjon som viser at Norgespris øker strømforbruket, tåkelegger han en avgjørende energipolitisk debatt.

<https://www.energiogklima.no/meninger-og-analyse/debatt/feilinformasjon-fra-aasland-om-norgespris>



Kilde: nrk.no

Norges mål 2030 - 2050

"we picked the low-
hanging fruits"
(~97% nye elbiler)

kutte 95% CO₂ trenger
samfunnsomstilling

Resiliens og energitransformasjon er **samfunnsomstilling**

vi mangler insentiver for
resilient og kvalitet

Distributed and decentralised



[Source: TU Oct2024, Willy Kramer]

**DE: 1.6 Million
+ 5 Million roofs**



BG: #1 battery = 16% of energy production



**Syria: 10x growth solar
PK: #1 PV/person**

Vi må forberede oss

Resiliens = “minimum energi”

- WiFi: 20-50 W
- heis: 4 kW_p(?), 10% aktiv
- kopp kaffe: 1.5 kW, 5% aktiv
- ...

Aasland, Støre...

- tar oss med
- “skattefunn til private”

Vedum

“framtidens bonde er
energibonde”

NVE, Stoltenberg...

- insentiver & regulering
for kvalitet og resilient

hvordan er vi styrt?

- autonomi
- angst
- nabo

Tesla and Sunrun’s virtual power plant dispatch record 580 MW to California grid



Fred Lambert | Sep 21 2026 - 6:03 am PT

8 Comments



Sunrun and Tesla pulled a record 580 megawatts of power from home batteries onto California’s grid during a heat wave on September 9, the largest residential distributed power plant event ever recorded.

The dispatch pooled more than 140,000 home batteries across the state and ran for a three-hour window in the evening, when the grid was straining under air-conditioning load.

<https://electrek.co/2026/09/21/sunrun-tesla-580-mw-california-grid-record/>

Supplementary slides



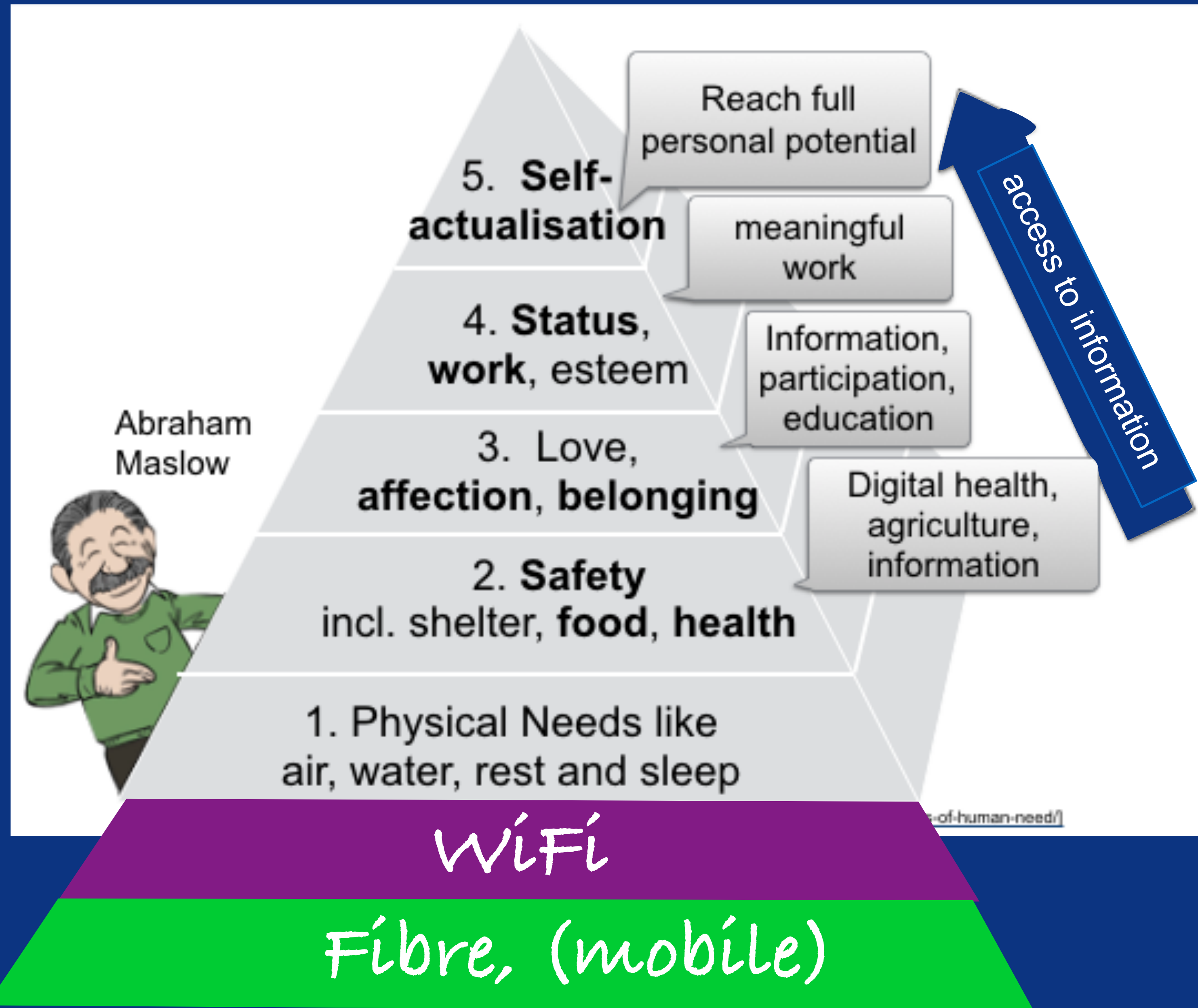
kilde: Juliana Zhang, UiO

Societal transformation

**Digital Transformation,
Resilient Communities,
Empowered People**

Digital Inclusion

Societal Empowerment



The Energy Preparedness Framework: Securing Local Resilience

PHASE 1: IDENTIFYING VULNERABILITIES & STRATEGIC PLANNING

Addressing Compound Crises



Mitigating risks from war, cyberattacks, and extreme weather that disrupt food and health.

Mapping Critical Dependencies



Identifying the vital links between energy, ICT, and essential municipal service continuity.

Local Energy & Storage Design



Planning backup capacity and battery storage for schools, sports halls, and farms.

A systematic approach for transforming local energy vulnerabilities into validated, resilient infrastructure for municipalities and food systems, addressing compound crises through mapped dependencies and tested hubs.

CRITICAL SERVICE HUBS & RESILIENCE FUNCTIONS



Municipal Centres
Schools and sports halls serving as local community crisis centres.

Dairy Farm Hubs
Ensuring milking, cooling, and ventilation through on-farm renewables.



Digital Infrastructure
Mapping ICT dependencies to prevent systemic communication failures.

PHASE 2: VALIDATION, TOOLS, & SOCIETAL IMPACT

Validated Crisis-Centre Concepts



Testing schools and farms as energy-independent hubs during simulated and real outages.

Data-Driven Decision Support



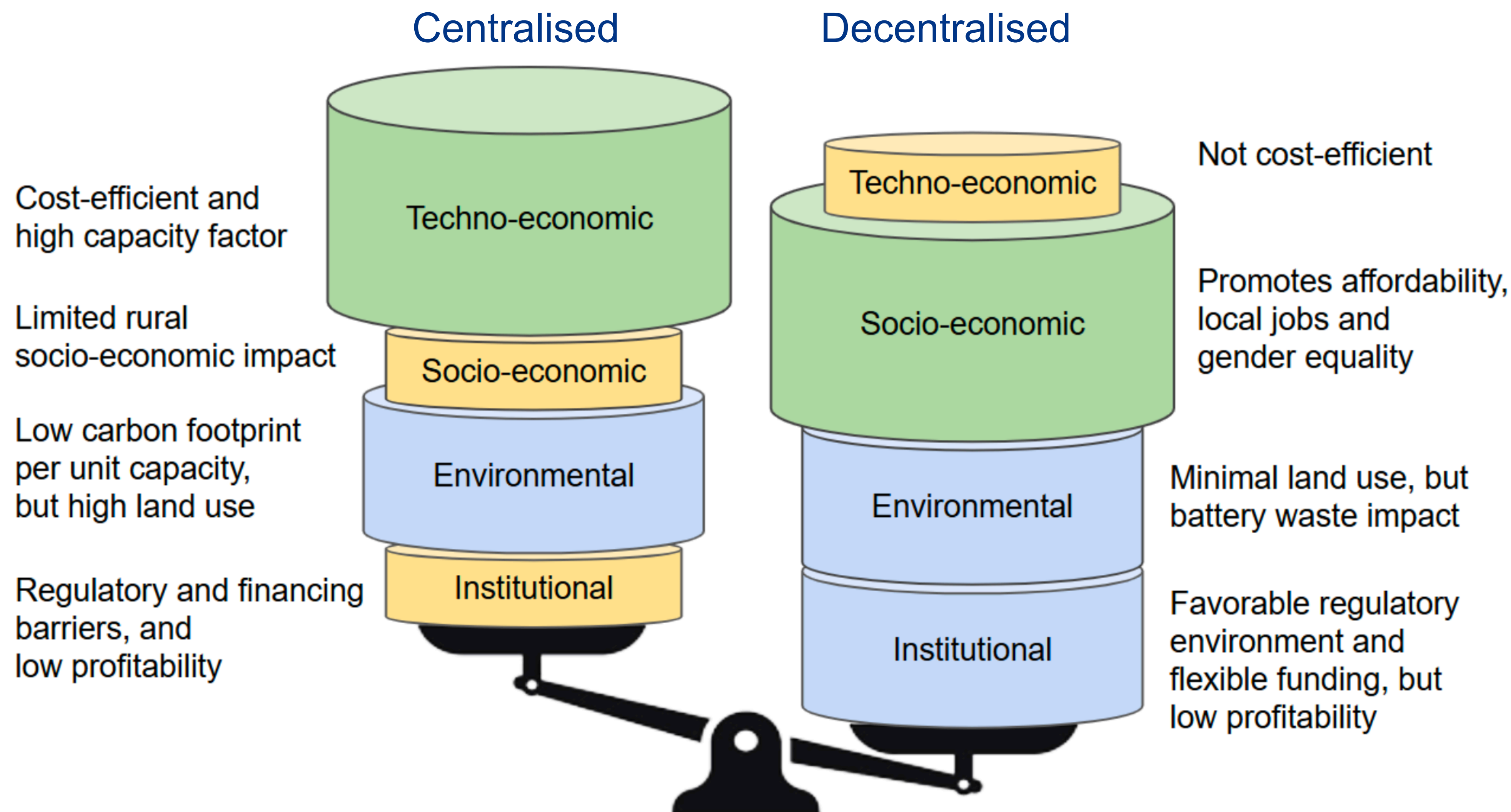
Using 0.1s load data and GIS mapping to size PV-battery-biogas systems accurately.

National Scaling & Policy Impact



Establishing governance models and preparedness guidelines to reduce crisis costs and build trust.

Resilient infrastructures



28Apr2025 Spain & Portugal blackout

- Cause:
 - 60% solar energy,
 - 1. solar park switched off, 1.5 s later 2. solar park
 - interconnection to France stopped ($f < 48,0$ Hz)
- Conventional: inertia (rotating generators)
- Solar: sudden death (DC/AC converters)
- Challenge:
 - distributed respond to grid fluctuations

 Baker Institute

12:20 Oscillations across Europe

12:40 Nuclear outage FR

12:32:57 generation trips (20 s)

total 2200 MW deducted

12:33:18 freq 48,0 Hz

12:33:21 AC to France stopped

12:33:24 blackout (incl HVDC)

2025: ES, PT

2025: CL Chile

2023: PK

2022: BD

2021: PK

2020: LK Sri Lanka

...



Center for Energy Studies | Commentary

The Iberian Peninsula Blackout – Causes, Consequences, and Challenges Ahead

May 2, 2025 | Raúl Bajo Buenestado

<https://www.entsoe.eu/news/2025/05/09/entso-e-expert-panel-initiates-the-investigation-into-the-causes-of-iberian-blackout/>

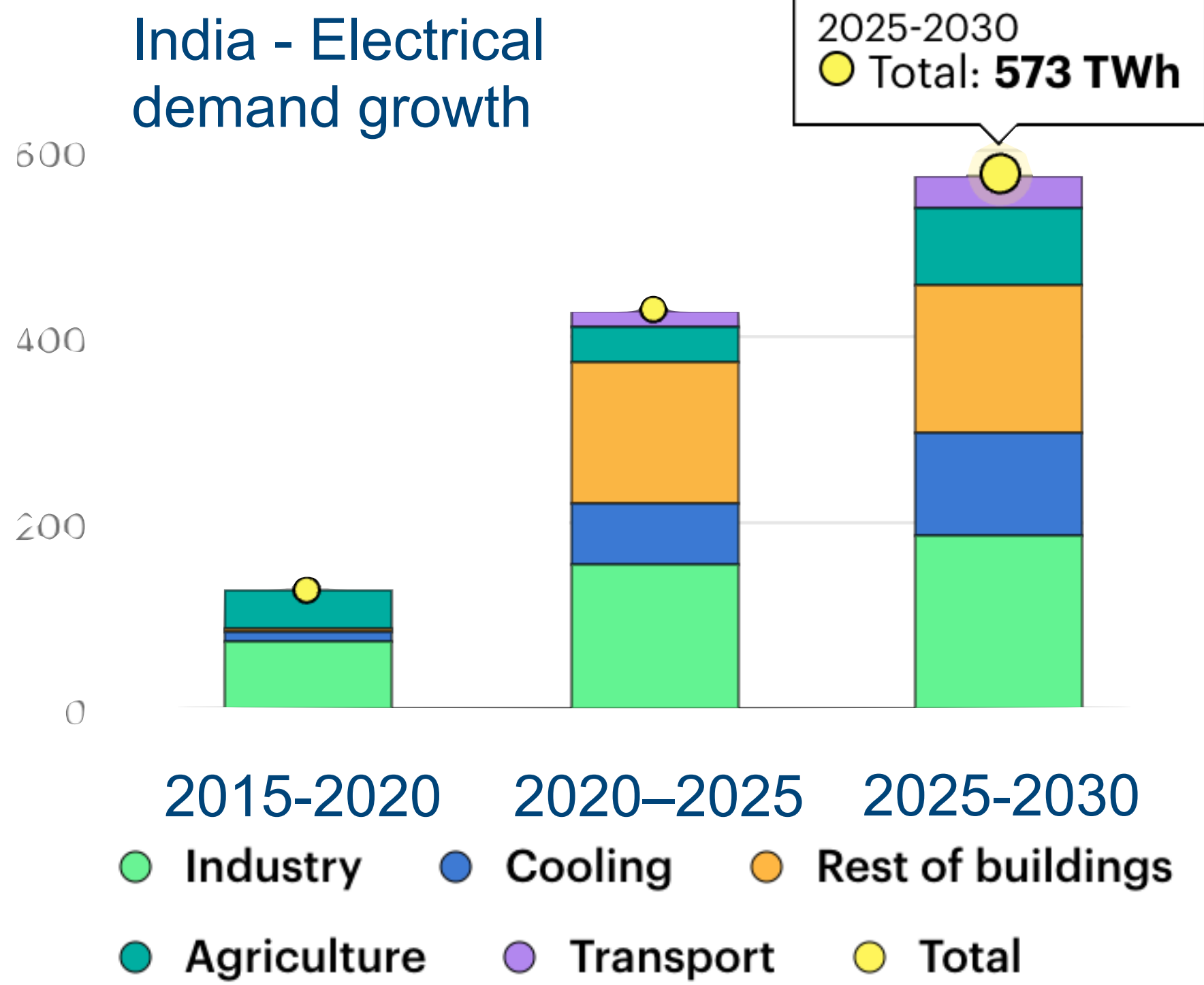
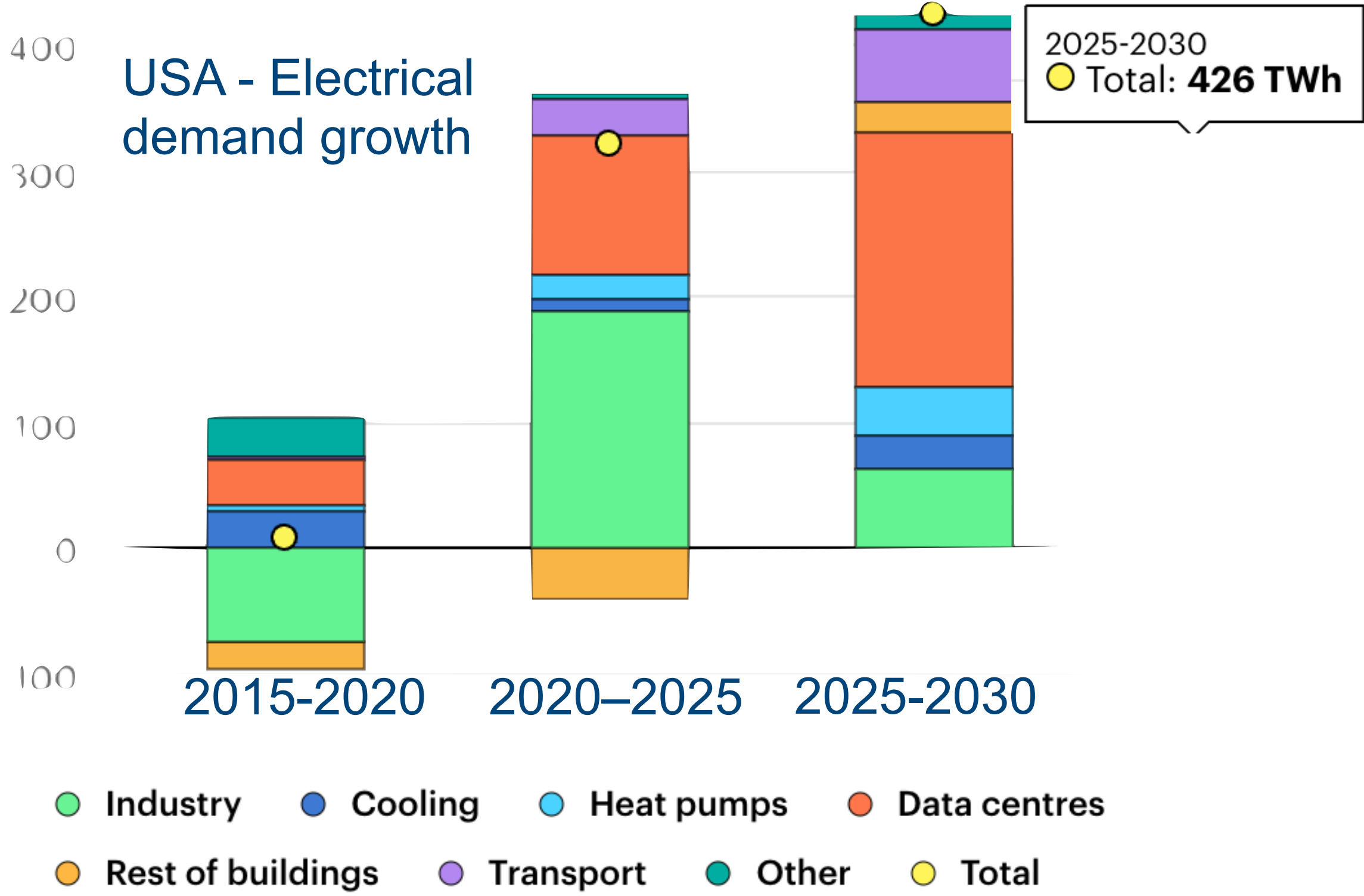
<https://www.bakerinstitute.org/research/iberian-peninsula-blackout-causes-consequences-and-challenges-ahead>

https://en.wikipedia.org/wiki/List_of_major_power_outages

International Energy Agency (IEA, 2026)

→ “all electric” Electrical energy demand is 2.5 times other energy demand

→ ~3.6% el. energy growth/year 2026-2030

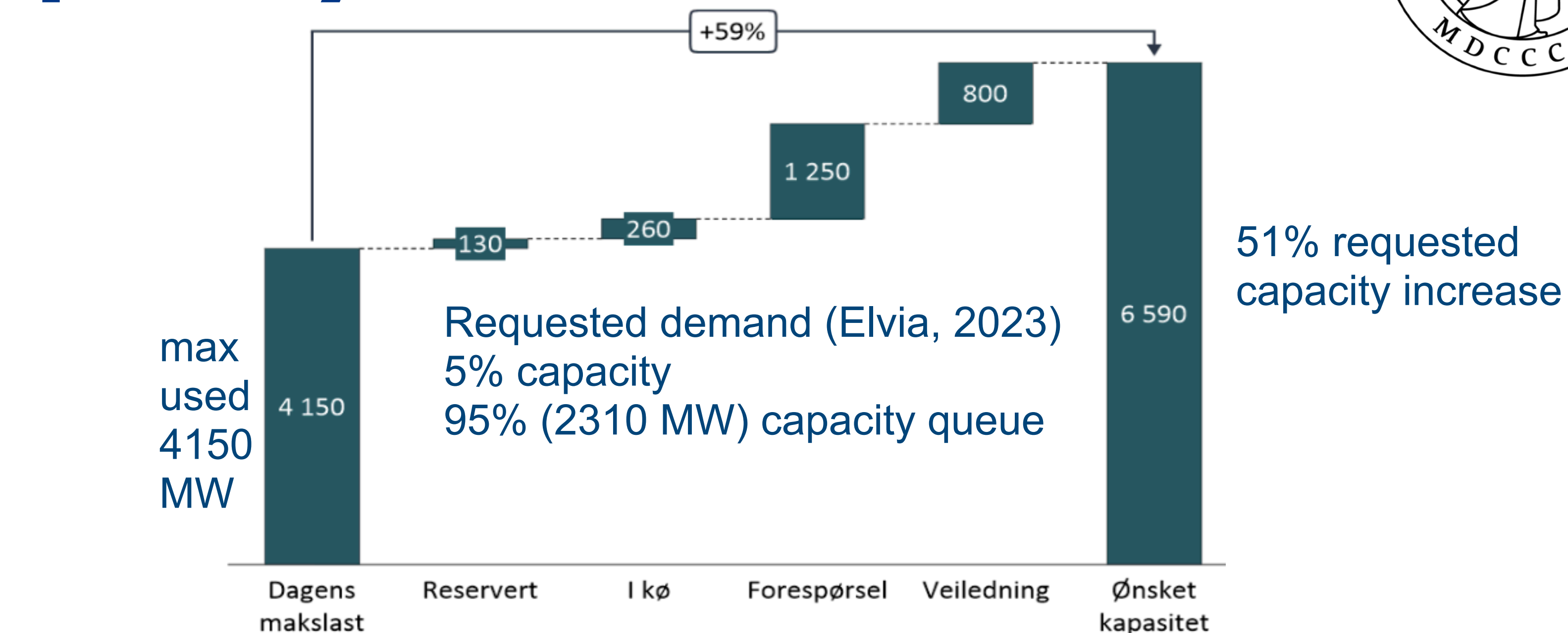


IEA (2026), *Electricity 2026*, IEA, Paris <https://www.iea.org/reports/electricity-2026> ,

Limited Grid-capacity

[SSB, <http://ssb.no/stabank/table/10314/>]

→ “No capacity for new usage in Oslo, Østfold and Akershus until 2030-2035”



[Kraftløftet Oslo Akershus, LO & NHO, 2023]

→ Green business development?

