



**EUROPEAN  
BATTERY  
ALLIANCE**

**EBA250**

## Utmaningarna i kraftsystemet

VBIK 100 år; 2022-09-17

Bo Normark; Industrial Strategy Executive EIT InnoEnergy



## VBIK fyller 100 år!

Vi firar det med en högtidsdag den 17 september i Folkets Hus i Ludvika.

### Tidsprogram:

- 15:00 - 16:30 Estraddebatt (Aveny) om utmaningarna, nu och framåt, inom elkraftsystemen.  
Bo Normark kommer att leda diskussionen med Gunnar Asplund, Harry Frank, Sonja Berlijn, Bertil Moritz.
- 16:30 - 17:30 Mingelstund med bubbel (Foajén)
- 17:30 - 21:00 Middag (tre rätter + dryck) med underhållning och kåserier (Festsalen)

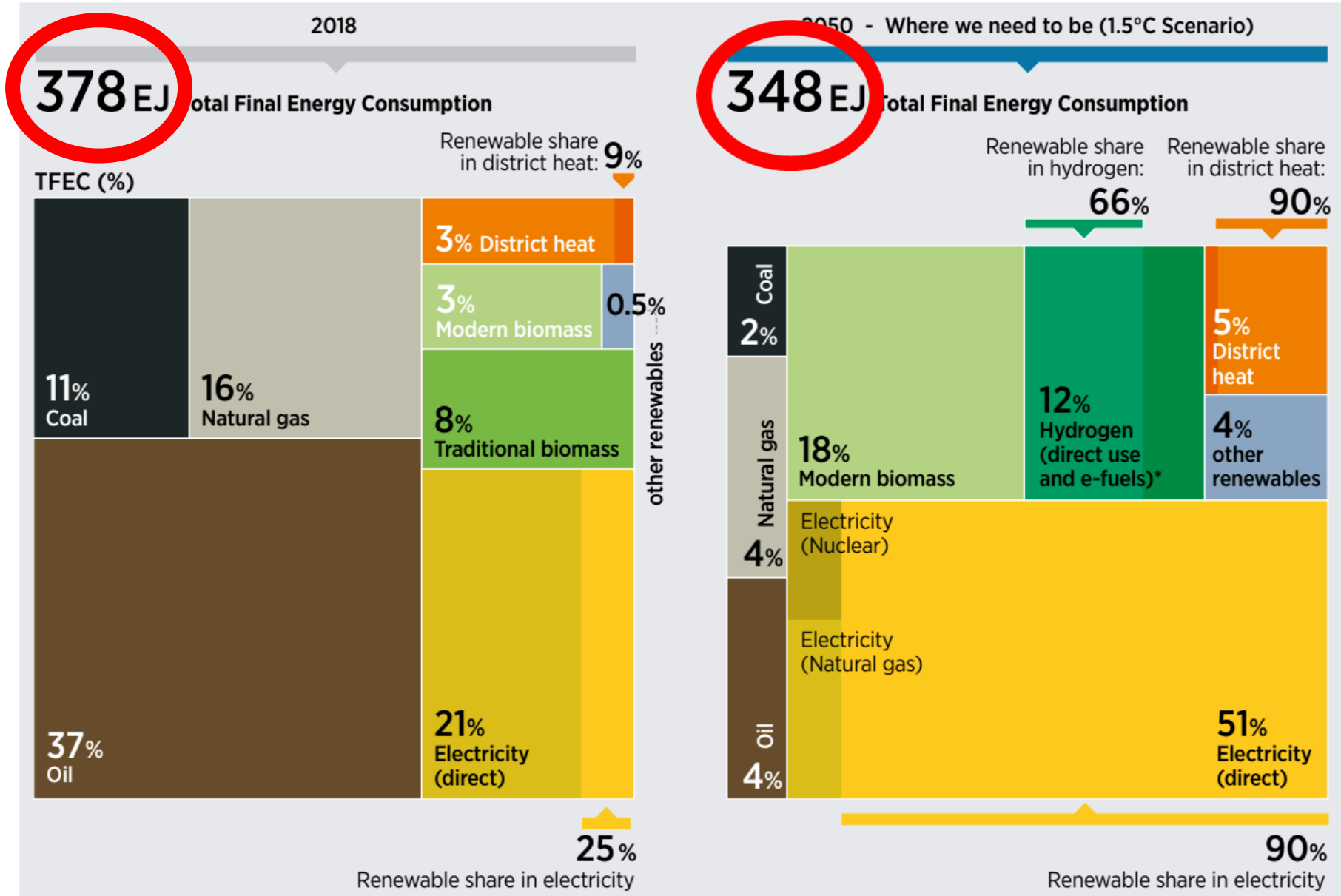
[Se inbjudan!](#)

# Ämne 1

## Elektricitetens roll i energisystemet

– Vi har pratat med barnen om att man måste hushålla med elen och nu har vi haft en hel dag när vi inte använde elektricitet alls. Vi lagade till exempel mat ute på gasolkök, säger

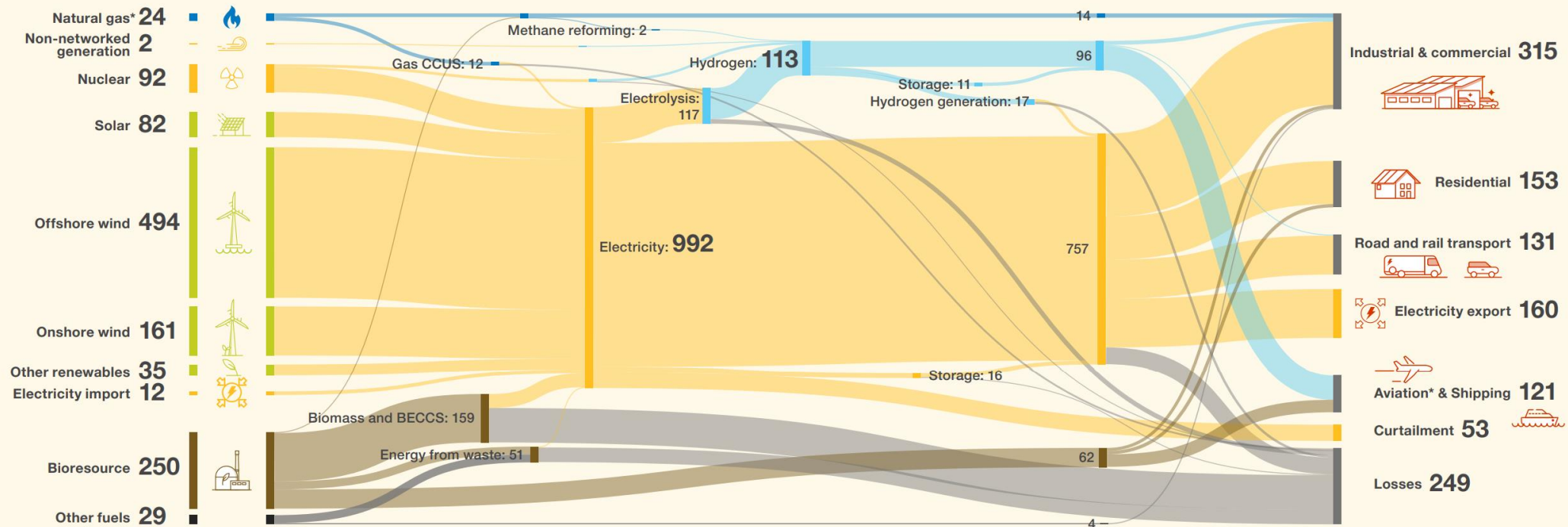
# Development global energy system..



## 2050 energy flows

### Consumer Transformation (1182 TWh)

- Home heating, transport and industry largely electrified
- High levels of energy efficiency combined with large-scale electrification lead to lowest end user energy demands across the scenarios
- Electricity generation capacity and output is highest in this scenario to meet high annual electricity demands
- High levels of renewable generation with low hydrogen production leads to highest levels of electricity curtailment across the scenarios



\*excluding exports

\*Aviation excludes some demand met by petroleum products

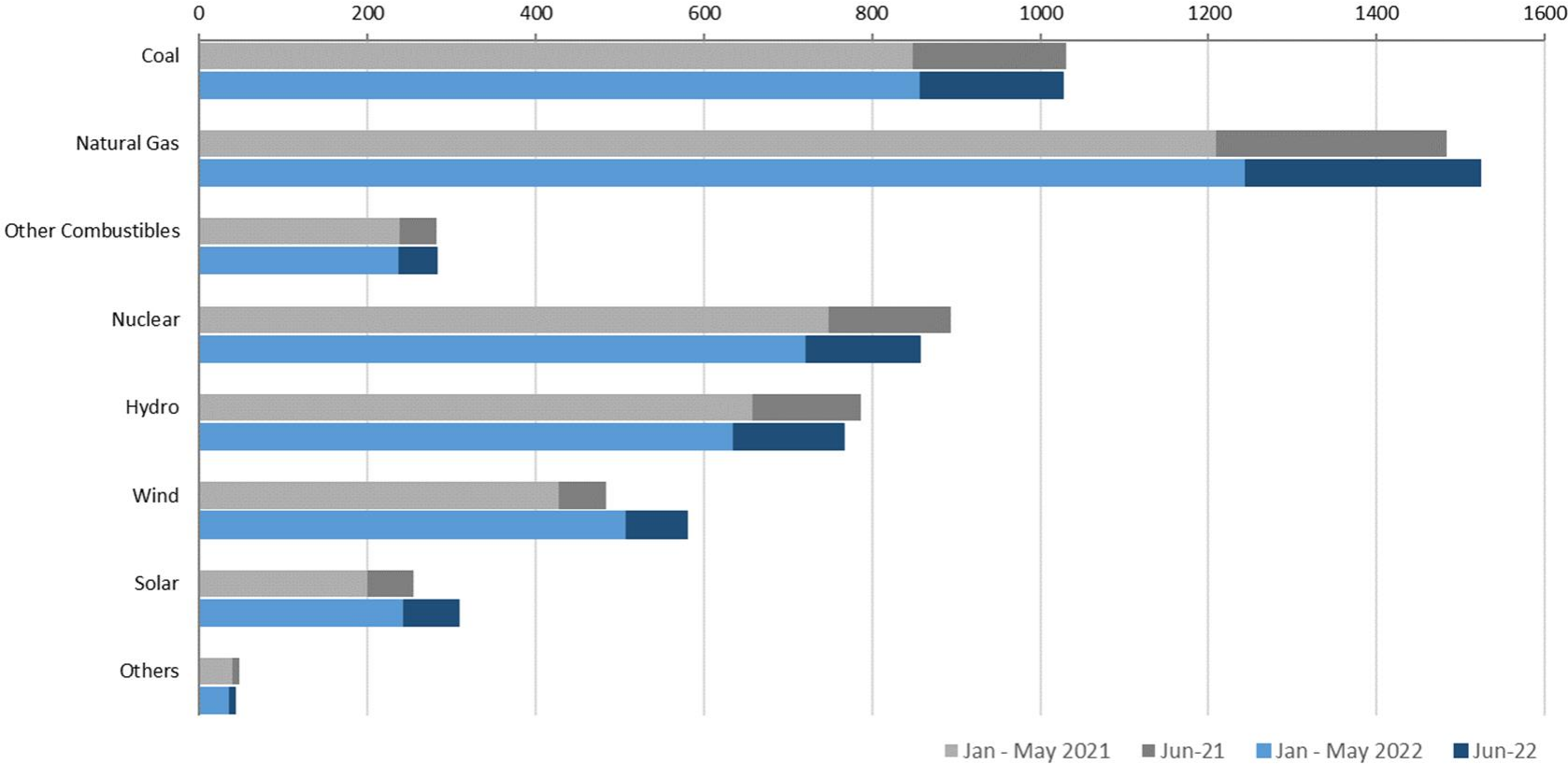
# Ämne 2

# Dagens Europeiska Kraftsystem

# Elkrisen

OECD Electricity Production by Fuel Type Year-to-Date Comparison

Electricity Production (TWh)



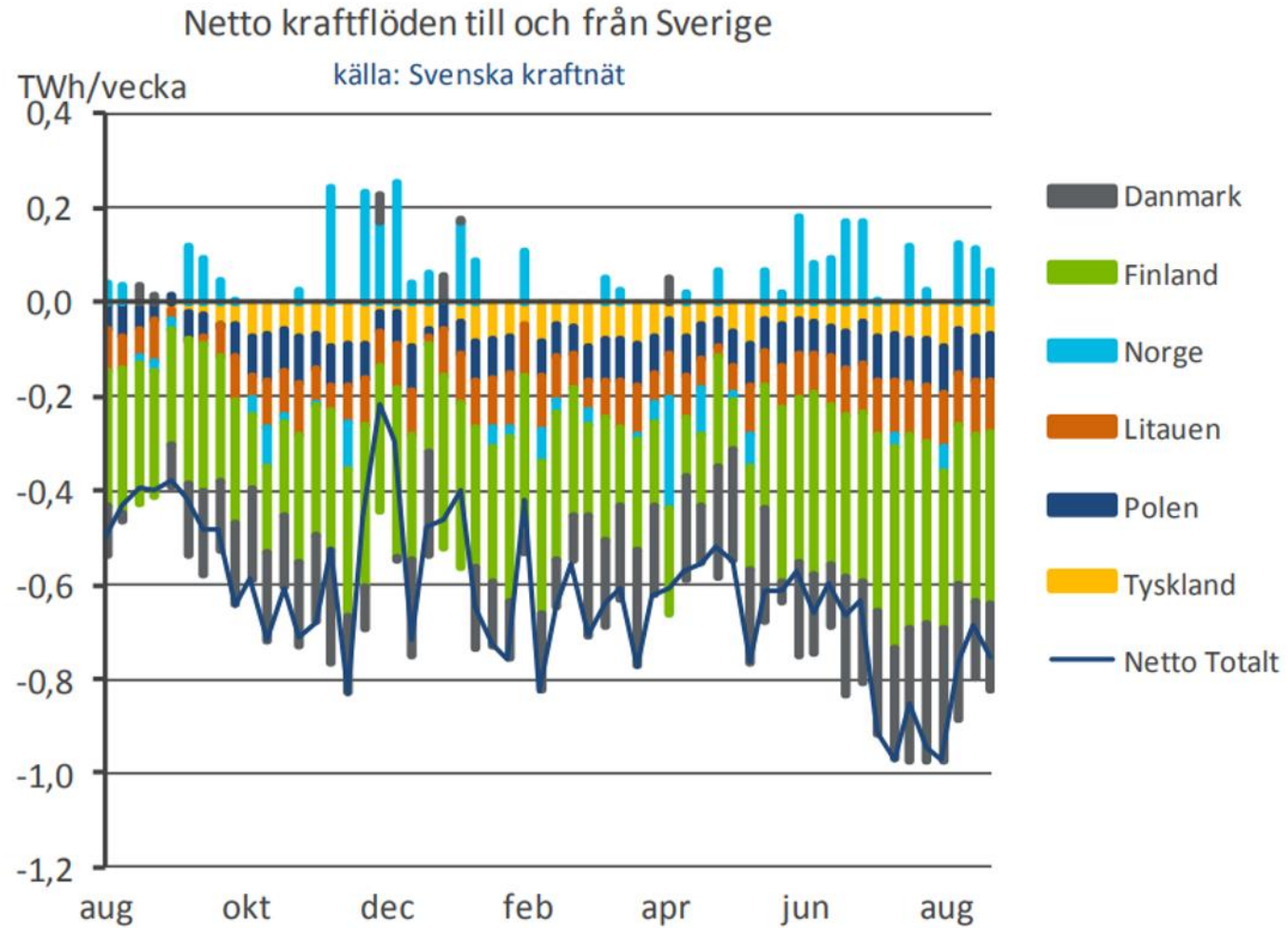
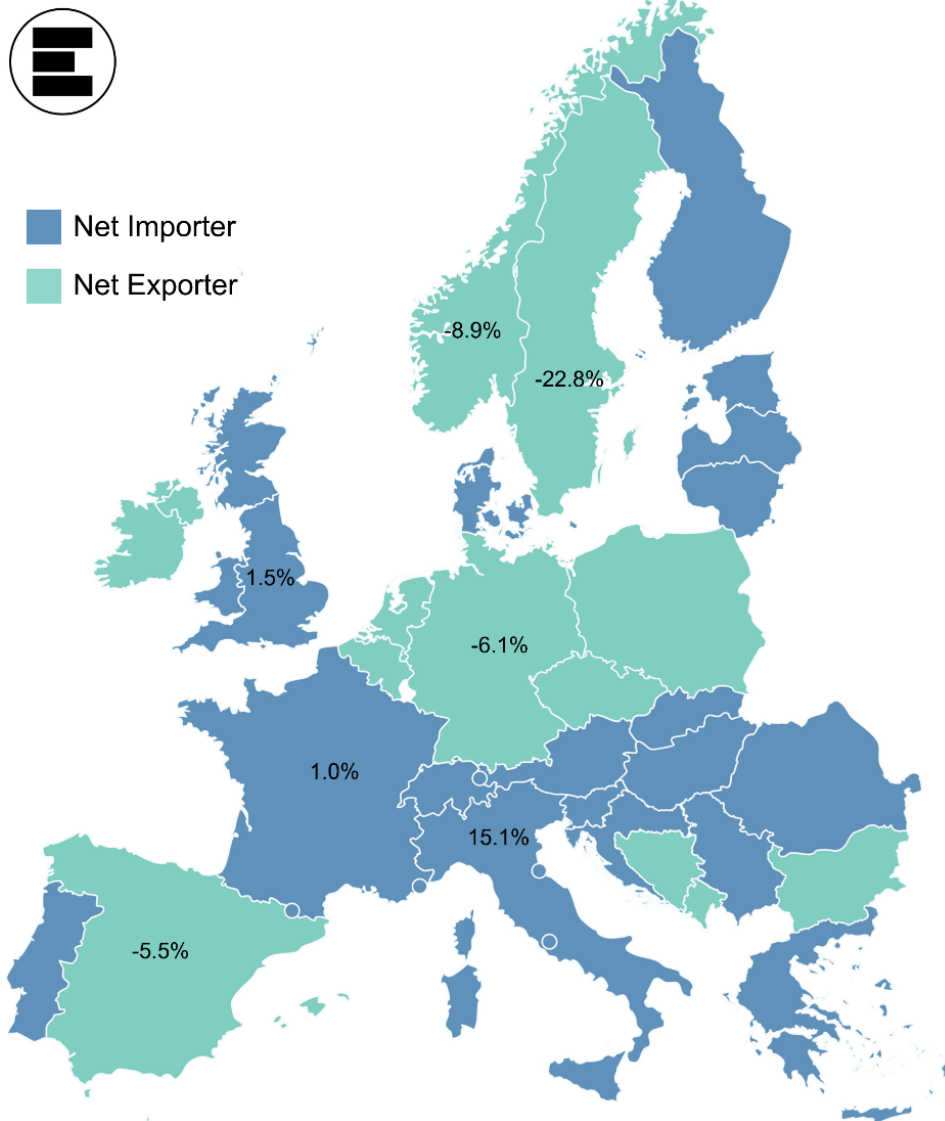
## Europe has more than a gas crisis...

	Annual change power production				
	2019	2020	2021	H1 2022	2019 - 2022 H1
Coal	-43,6	-37,5	33,6	4,4	-43,1
Nuclear	-10,8	-54,3	30,2	-43,7	-78,6
Gas	18,7	-2,7	-3,5	3,8	16,3
RES	21,3	21,3	-18,2	20,0	44,4
Misc	-5,5	-1,8	1,0	0,1	-6,2

Source: BDEW Germany; Energy-Charts France



# Har vi elbrist i Sverige...



## Average monthly wholesale electricity prices



Max EU price |x| Min EU price |x| Germany |x| France |x| Italy |x| Spain |x| Sweden |x| Enter series to show

Max EU price Min EU price France Germany Italy Spain Sweden



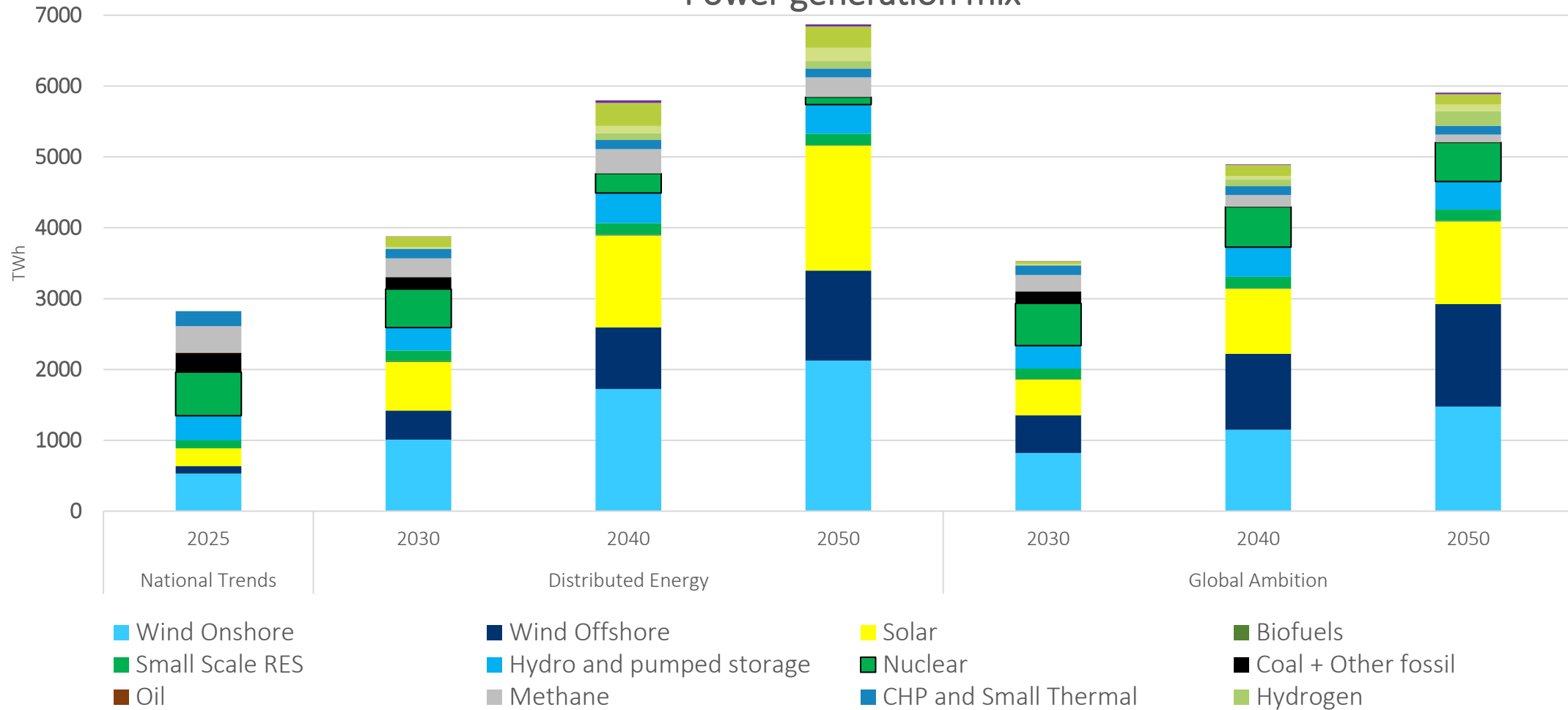
**Ursula van der Leyen**  
**“The market was developed under completely different circumstances and for completely different purposes. It is no longer fit for purpose”**

# Ämne 3

## Morgondagens Europeiska Kraftsystem

# Två scenarios för Europa...

## Power generation mix



## EU unveils €300bn plan to quit Russian fossil fuels by 2027 and boost clean energy

Published on 19/05/2022, 10:28am



Energy & Environment

📅 17 maj 2022

### Netherlands to ban fossil heating from 2026, make heat pumps mandatory

The Dutch government intends to ban new fossil fuel-centric heating system installations as of 2026, while introducing the mandatory use of heat pumps or connections to heat networks.

- **Double solar photovoltaic capacity by 2025** and install 320 GW by 2025 and 600GW by 2030.
- **A Solar Rooftop Initiative** with a phased-in legal obligation to install solar panels on new public and commercial buildings and new residential buildings.
- **Doubling of the rate of deployment of heat pumps**, and measures to integrate geothermal and solar thermal energy in modernised district and communal heating systems.
- **Tackle slow and complex permitting for major renewable projects**, and a to recognise renewable energy as an overriding public interest.
- **A target of 10 million tonnes of domestic renewable hydrogen** production and 10 million tonnes of imports by 2030.
- **A new Biomethane Industrial Alliance** and financial incentives to increase production to 35bcm by 2030

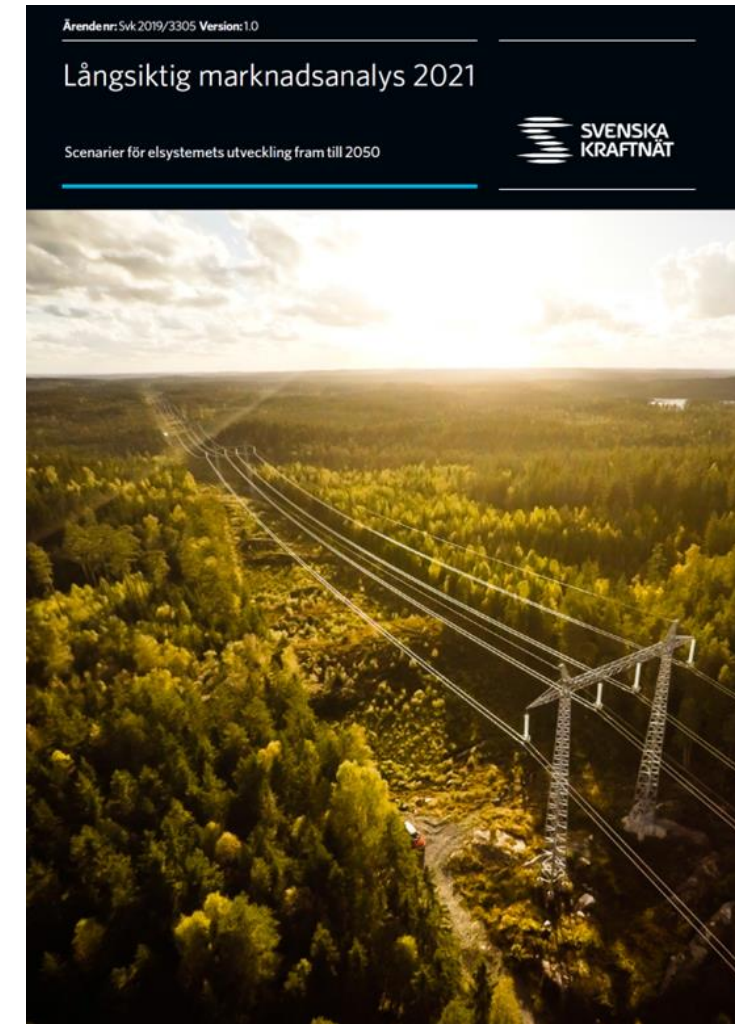
# Ämne 4

# Morgondagens Svenska Kraftsystem

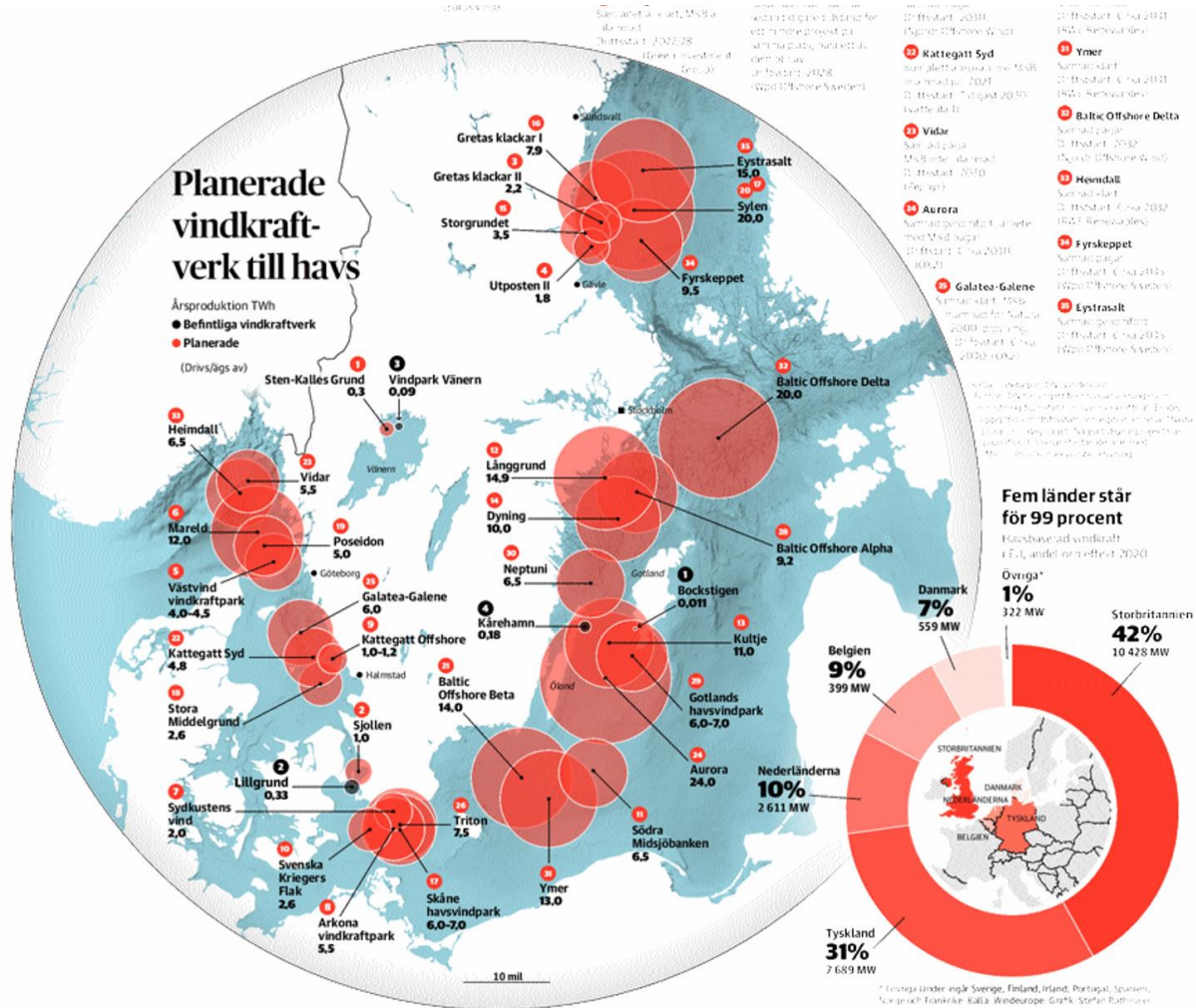
# Marknadsrapport SVK Maj 2021

14

	2025	Planerbart		Förnybart	
		2035	2045	2035	2045
Solar	3	8	11	11	18
Wind	49	82	124	103	211
Thermal	11	11	10	10	9
Nuclear	51	47	55	47	0
Hydro	68	68	68	67	66
Electricity to H2 Prod	2	24	69	39	85
Electricity remaining	145	176	197	177	201
Spill	0	0	1	1	16
Production Total	182	216	268	238	304
Consumption Total	147	200	267	217	302
Balance	35	16	1	21	2



# Offshore vind / Kärnkraft



## Små reaktorer kan ge kärnkraften nytt liv

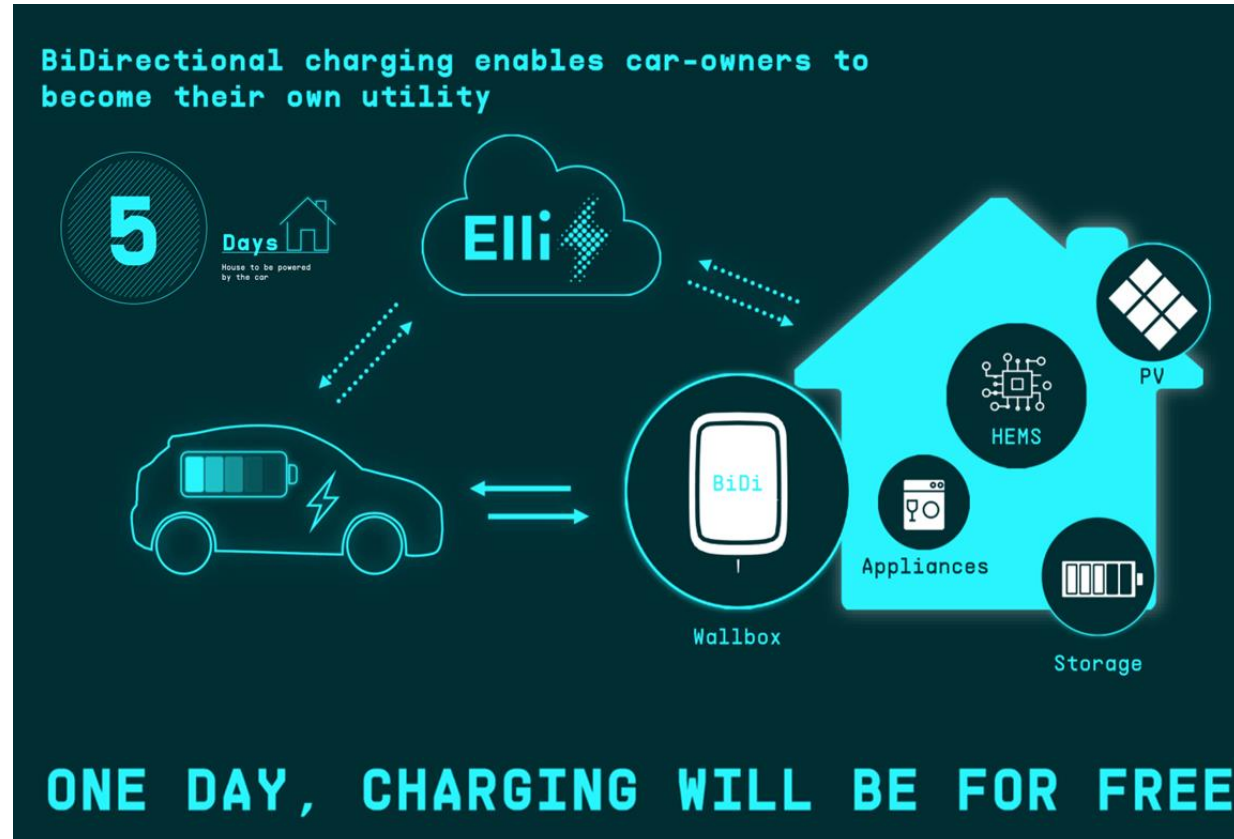
Den globala klimatpolitiken ändrar förutsättningarna för små modulära reaktorer (SMR). Internationella marknader bubblar idag av nya initiativ. Även svenska SMR-projekt ligger långt fram i utvecklingen – men avsaknaden av regulatoriska förutsättningar gör det svårt för investerare.

Senast uppdaterat: 2022-01-17 10:04



## Tesla Grid Storage Australia

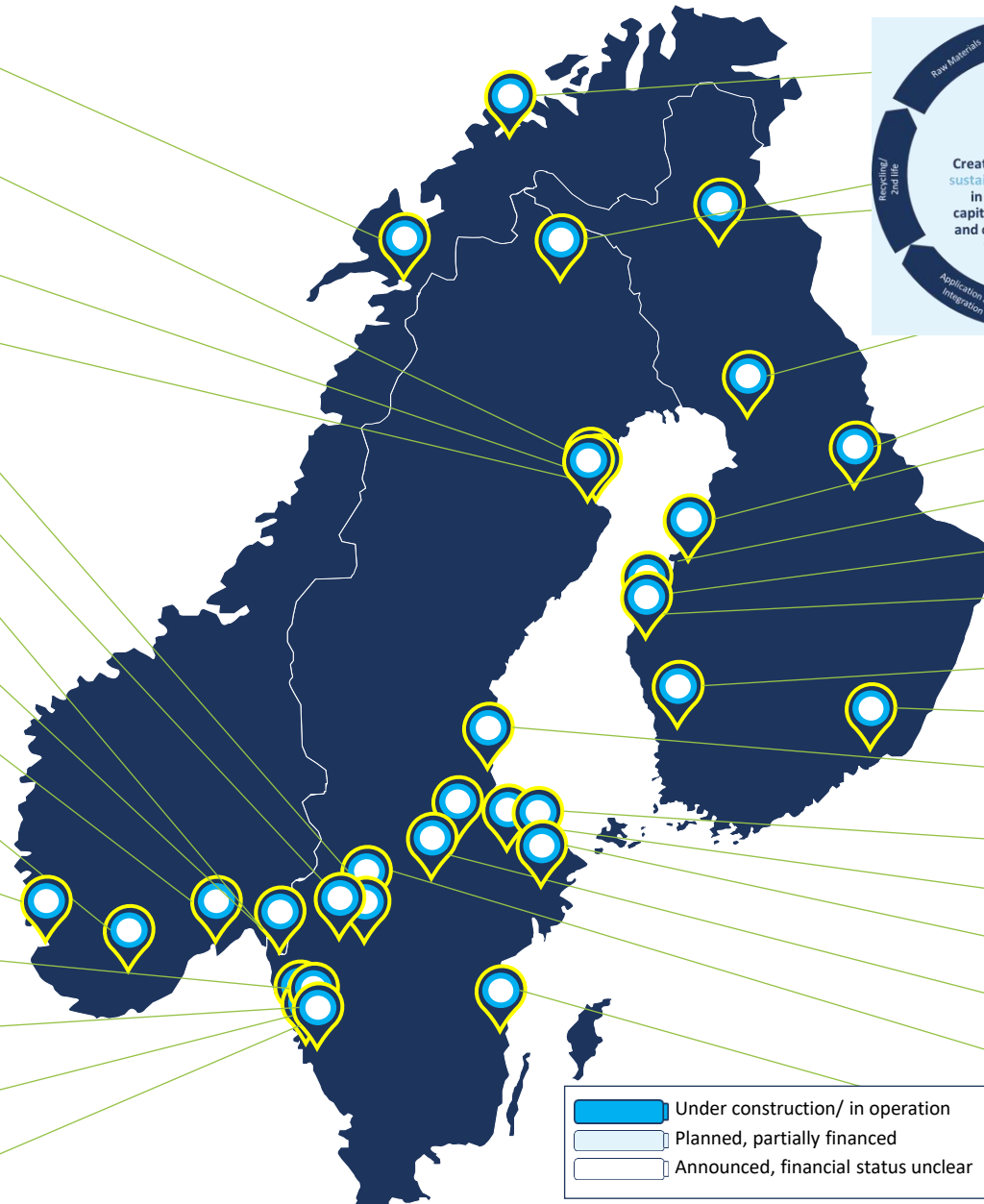
Known as virtual synchronous machines or grid forming inverters, this technology gives batteries the capacity to help stabilize the grid by providing inertia. Along with frequency control services, inertia is necessary for operating a stable grid and is especially important after major disturbances. Until now, inertia services have only been provided by gas or coal-fired generators



# Ämne 5 Industrialisering

# Selection of new industrial projects along the battery value chain in Norway, Sweden, Finland

- FREYR**  
Battery Cell Production
- NORTHVOLT**  
Battery cell production, Precursor and Cathode Materials & Full-scale Recycling Plant
- Dongjin Sweden AB**  
CAM Production
- Kedali Sweden AB**  
Battery housings
- NORTHVOLT**  
Active Materials, Borås
- EPIROC**  
Electrified Mining Equipment
- HYDROVOLT**  
Battery Recycling
- CENATE**  
Silicon Anode production
- MORROW**  
Battery production
- ELKEM/ VIANODE**  
Pilot plant for graphite anode
- BEYONDER**  
Battery production
- EINRIDE**  
Electrified transport Solutions
- VOLVO**  
Battery Cell Production
- SEEL**  
Swedish Electric Transport Lab
- Heart Aerospace**  
Electrical Aviation



- MRC SKALAND**  
Graphite Mine
- TALGA**  
Graphite Mine & Anode Prod.
- BOLIDEN**  
Nickel mine
- KELIBER**  
Lithium mine & refinery
- TERRAFAME**  
Nickel and Cobalt mine and refinery
- UMICORE, FREEPORT & MC MORAN**  
Cobalt refinery & precursor plant
- BASF**  
Precursor Plant
- FORTUM, BASF & NORNICKEL**  
Recycling Center
- NORNICKEL**  
Nickel & Cobalt Refinery
- BOLIDEN**  
Nickel Refinery
- CNGR**  
Precursor Plant
- NILAR**  
NiMH Batteries
- NORTHVOLT Labs**  
Including Recycling Pilot Plant
- ALTRIS**  
Sodium-Ion Batteries
- SCANIA**  
Electrical Engines for HDV
- SENIOR Material**  
Separator Films
- Dana TM4**  
Electrical Engines
- SAFT**  
Nickel-Cadmium Batteries

Under construction/ in operation  
 Planned, partially financed  
 Announced, financial status unclear



# Ämne 6 Miljödilemmat

## Just 5 Percent of Power Plants Release 73 Percent of Global Electricity Production Emissions

Targeting the world's worst emitters could offer disproportionate benefits when it comes to fighting climate change

### Worlds largest emitter is Belchatow i Polen

- Annual production                      **28 TWh**
- Annual CO-2 emissions                **38 million ton**

### Swedish clean electricity export 2022 forecast

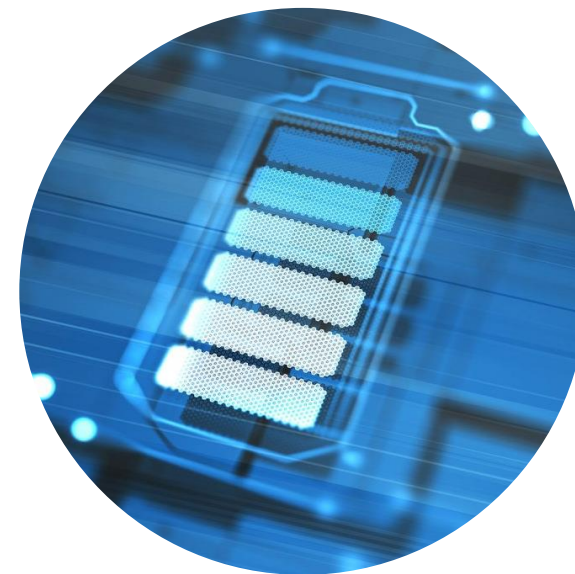
- Total                      **33 TWh**
- Poland                    **5 TWh ( 6 million ton CO-2 )**



EIT InnoEnergy is the innovation engine for sustainable energy across Europe supported by the European Institute of Innovation and Technology.

EIT InnoEnergy's role in the European Battery Alliance is to provide background data, collect and formulate key questions, recommendations and actions.

EIT InnoEnergy also support the establishment of a European Battery eco-system by promoting a meeting place for key players along the entire value with our EBA250 Workshops.



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