



Data collection on grid-scale battery storage

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Outline



Overview and key trends



Data collection

Overview and key trends

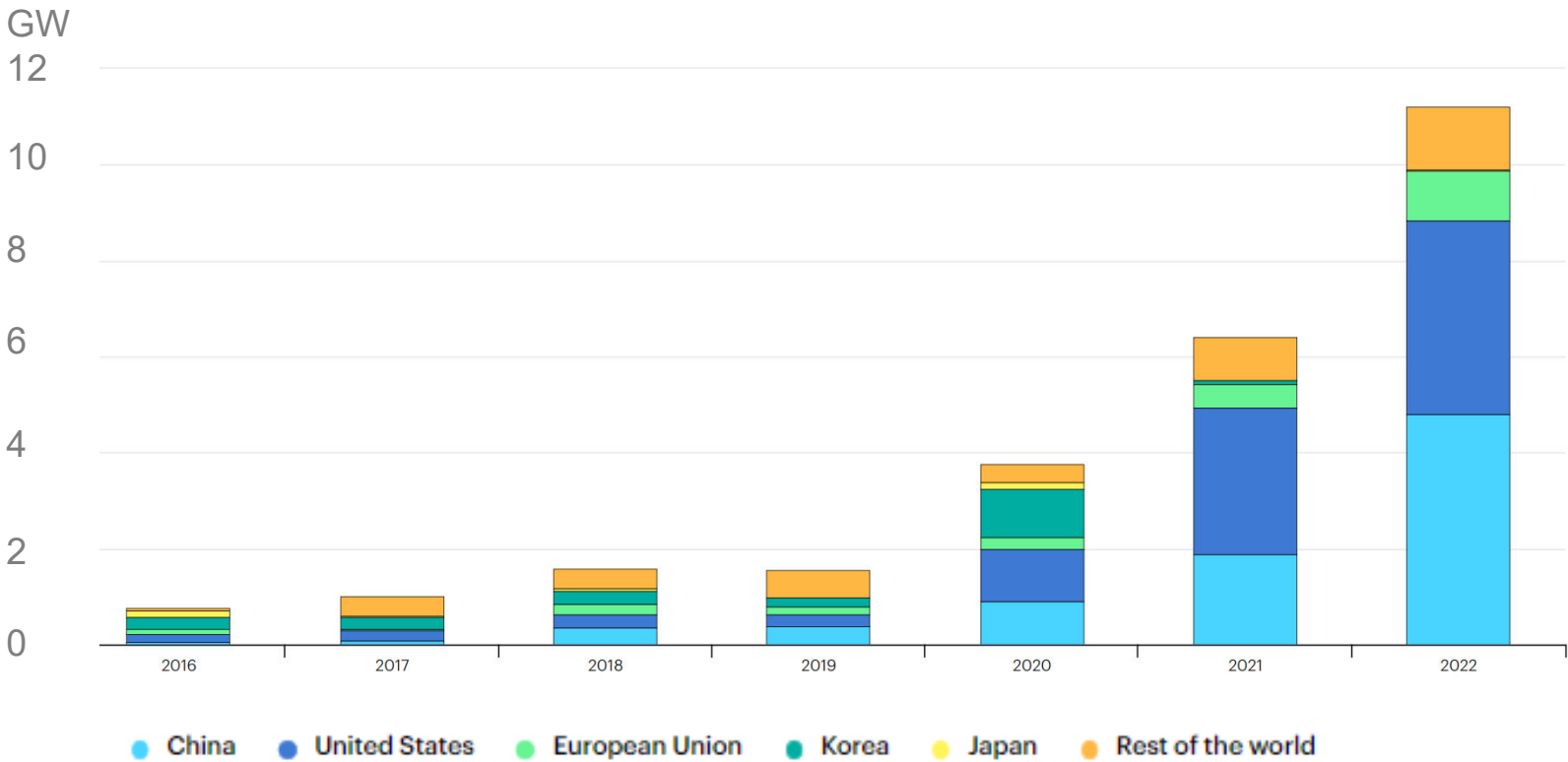
Grid-scale storage overview

- What is grid-scale storage?
 - Grid-scale storage refers to technologies **connected to the power grid** that can store energy and then supply it back to the grid at a more advantageous time
 - **Batteries** are now playing a growing role as they can be installed anywhere in a wide range of capacities in a modular way
- What is the role of energy storage in clean energy transitions?
 - Grid-scale storage will be **essential to provide key services** to the grid such as
 - Stabilize the electricity grid for **sub-hourly and hourly variations**
 - Manage the impact of **daily production variations**
 - Smooth **seasonal variations**
 - Batteries are typically employed for sub-hourly, hourly and daily balancing

Implementation of grid-scale batteries has grown fast



Annual grid-scale battery storage additions, 2017-2022

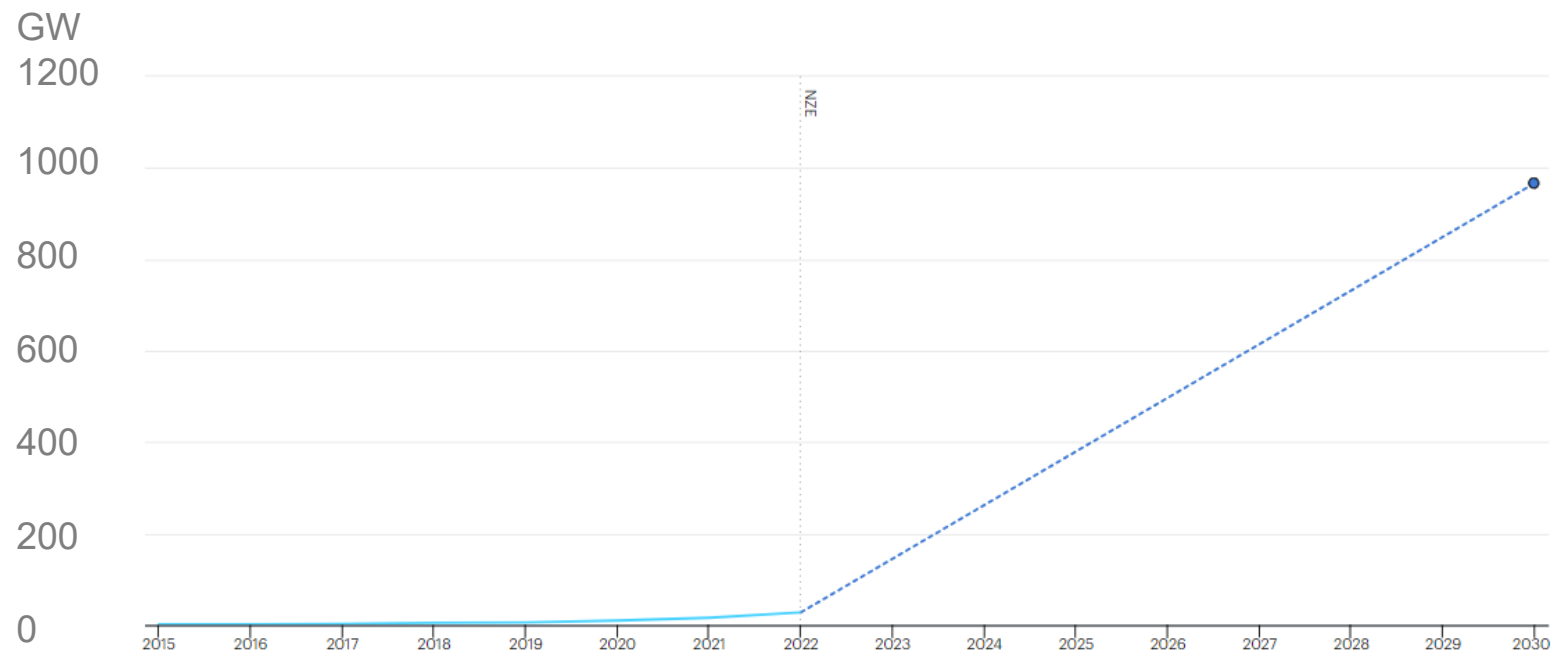


Grid-scale batteries are projected to account for the majority of storage growth world wide. Lithium-ion battery storage continued to be the most widely used.

Grid-scale battery storage needs to grow significantly



Global installed grid-scale battery storage capacity in the Net Zero Scenario, 2015-2030



In the Net Zero Scenario, installed grid-scale battery storage capacity expands 35-fold between 2022 and 2030 to nearly 970 GW. To get on track, annual additions must pick up significantly, to an average of close to 120 GW per year over the 2023-2030 period.

Data collection

Electricity & Heat AQ

10 Tables

covering

- Electricity and heat data generation by:

- 47 individual fuels
- type of producer
- type of plant/unit

- Consumption data by sector

- Technical information on electrical systems

- Download from here

<https://www.iea.org/about/data-and-statistics/questionnaires>

Menu	MAIN ACTIVITY PRODUCER PLANTS						AUTOPRODUCER PLANTS						TOTAL	
	ELECTRICITY (OMLY)			HEAT (OMLY)			ELECTRICITY (OMLY)			HEAT (OMLY)			MAIN ACTIVITY PRODUCER	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Electricity UNIT: GWh (10 ⁶ kWh)	1	16 394	226				1 227	2 887					15 620	4 061
Nuclear	2												0	0
Hydro	3	23 772					421						23 772	421
Geothermal	4												0	0
Solar	5												0	0
Tide, Wave and Ocean	6												0	0
Wind	7	30											30	0
Combustible Fuels	8	21 554					806	857					21 810	3 963
Heat from Chemical Sources	9												0	0
Other Sources	10												0	0

HEAT UNIT: TJ													
Heat	11	0	0	0	0	0	0	0	0	0	0	0	0
Nuclear	12												0
Geothermal	13												0
Solar	14												0
Combustible Fuels	15												0
Heat Pumps	16												0
Electric Boilers	17												0
Heat from Chemical Sources	18												0
Other Sources	19												0

2012													
ELECTRICITY DATA													
Total gross production	1	100 704											
Gross use	2	100 704											
Total net production	3	100 704											
Total imports (Chapters 1-4)	4	1 124											
Total exports (Chapters 5-6)	5												
Used for heat pumps	6												
Used for electric boilers	7												
Used for industrial activities	8												
Used for electricity production	9												
Electricity/Heat supply	10	100 704											
Distribution losses	11	100 704											
Final consumption (Chapters 1-10)	12	100 704											
Production differences	13												
Final c	14												
Energy	15												
Trans	16												
Loss	17												
Other	18												
Not elsewhere specified (Other sectors)	19												

IN ELECTRICITY AND CHP PLANTS

Unit = GWh

Menu	ELECTRICITY PLANTS			CHP PLANTS			TOTAL		
	A			B			C		
	1	2	3	4	5	6	7	8	9
Total net production	1	4 305		0			4 305		
Energy sector	2	1 074		0			1 074		
Coal mines	3						0		
Oil and gas extraction	4						0		
Patent fuel plants (Energy)	5						0		
Coke ovens (Energy)	6						0		
BKB / PB plants (Energy)	7						0		
Gas works (Energy)	8						0		
Blast furnaces (Energy)	9						0		
Oil refineries	10						1 074		
Coal liquefaction plants (Energy)	11						0		
Liquefaction (LNG) / Regasification plants	12						0		
Gasification plants for biogas	13						0		
Gas-to-liquids (GTL) plants (Energy)	14						0		

TABLE 9. BATTERY STORAGE													
Country 2022													
Menu													
Storage capacity of	1												
Below 1 MWh	2												
From 1 MWh to 10 M	3												
From more than 10 M	4												
More than 100 MWh	5												

TABLE 6a. GROSS ELECTRICITY AND HEAT PRODUCTION FROM COMBUSTIBLE FUELS (TRANSFORMATION SECTOR)

Menu	MAIN ACTIVITY PRODUCER PLANTS						AUTOPRODUCER PLANTS						TOTAL	
	ELECTRICITY (OMLY)			HEAT (OMLY)			ELECTRICITY (OMLY)			HEAT (OMLY)			MAIN ACTIVITY PRODUCER	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
Fuels	1	100 704											100 704	
Heat input	2	100 704											100 704	
Heat input	3	100 704											100 704	
Heat input	4	100 704											100 704	
Heat input	5	100 704											100 704	
Heat input	6	100 704											100 704	
Heat input	7	100 704											100 704	
Heat input	8	100 704											100 704	
Heat input	9	100 704											100 704	
Heat input	10	100 704											100 704	
Heat input	11	100 704											100 704	
Heat input	12	100 704											100 704	

TABLE 7a. NET MAXIMUM ELECTRICAL CAPACITY AND PEAK LOAD

Unit = MW													
Menu													
CLASSIFICATION	1												
Capacity	2	1 387											
Capacity	3	1 387											
Capacity	4	1 387											
Capacity	5	1 387											
Capacity	6	1 387											
Capacity	7	1 387											
Capacity	8	1 387											
Capacity	9	1 387											
Capacity	10	1 387											
Capacity	11	1 387											
Capacity	12	1 387											

TABLE 8. IMPORTS BY ORIGIN AND EXPORTS BY DESTINATION OF ELECTRICITY AND HEAT

Menu	ELECTRICITY (GWh)				HEAT (TJ)			
	IMPORTS		EXPORTS		IMPORTS		EXPORTS	
	A	B	C	D	E	F	G	H
Albania	1							
Argentina	2							
Armenia	3							
Austria	4							
Azerbaijan	5							
Belarus	6							
Belgium	7							
Bolivia	8							
Bosnia and Herzegovina	9							
Bulgaria	10							
Canada	11							
Chile	12							

TABLE 10. ELECTRICITY PRODUCTION BY SECTOR AND SOURCE

Country 2022													
Menu													
NET ELECTRICITY PRODUCTION (GWh)	1												
NET ELECTRICITY PRODUCTION (GWh)	2												
NET ELECTRICITY PRODUCTION (GWh)	3												
NET ELECTRICITY PRODUCTION (GWh)	4												
NET ELECTRICITY PRODUCTION (GWh)	5												
NET ELECTRICITY PRODUCTION (GWh)	6												
NET ELECTRICITY PRODUCTION (GWh)	7												
NET ELECTRICITY PRODUCTION (GWh)	8												
NET ELECTRICITY PRODUCTION (GWh)	9												
NET ELECTRICITY PRODUCTION (GWh)	10												
NET ELECTRICITY PRODUCTION (GWh)	11												
NET ELECTRICITY PRODUCTION (GWh)	12												

Production by sector & source

Batteries in generation and commodity balance

- In the gross electricity production by source table 1: 'Of which: from batteries'

Country		TABLE 1. GROSS ELECTRICITY AND HEAT PRODUCTION: (TRANSFORMATION SECTOR)										
Menu	2022	MAIN ACTIVITY PRODUCER				AUTOPRODUCER					TOTAL	
		ELECTRICITY	CHP	of which in full CHP mode	HEAT	ELECTRICITY	CHP	of which in full CHP mode	HEAT	of which auto- consumed heat	MAIN ACTIVITY PRODUCER	AUTOPRODUCER
ELECTRICITY UNIT: GWh (10*6 kWh)		A	B	C	D	E	F	G	H	I	J(=A+B+D)	K(=E+F+H)
Other sources	11	0.000	0.000	0.000		0.000	0.000	0.000			0.000	0.000
Of which: from (derived/district) heat	12	0.000	0.000	0.000		0.000	0.000	0.000			0.000	0.000
Of which: from batteries	13	0.000	0.000	0.000		0.000	0.000	0.000			0.000	0.000

TABLE 3. ELECTRICITY AND HEAT SUPPLY AND CONSUMPTION

Country					ELECTRICITY (GWh)		HEAT (TJ)	
Menu	2022				A		B	
Total gross production	1	(=)			0.000		0.000	
Own use	2	(-)			0.000		0.000	
Total net production	3	(=)			0.000		0.000	
Total imports (balance)	4	(+)			0.000		0.000	
Total exports (balance)	5	(-)			0.000		0.000	
Used for heat pumps	6	(-)			0.000			
Used for electric boilers	7	(-)			0.000			
Used for pumped storage in pure hydro pumping plants	8	(-)			0.000			
Used for pumped storage in mixed plants	9	(-)			0.000			
Used for charging batteries	10	(-)			0.000			
Used for electricity production	11	(-)					0.000	

- In the electricity balance table 3: 'Used for charging batteries'

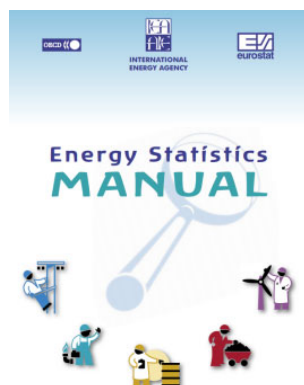
Battery storage table

TABLE 9. BATTERY STORAGE	
Country 2022 Menu	
Storage capacity of batteries (MWh)	0.000
Below 1 MWh	0.000
From 1 MWh to 10 MWh	0.000
From more than 10 MWh to 100 MWh	0.000
More than 100 MWh	0.000
Rated power capacity of batteries (MW)	0.000
Below 1 MWh	0.000
From 1 MWh to 10 MWh	0.000
From more than 10 MWh to 100 MWh	0.000
More than 100 MWh	0.000
Electricity injected in the grid from batteries (GWh)	0.000
Below 1 MWh	0.000
From 1 MWh to 10 MWh	0.000
From more than 10 MWh to 100 MWh	0.000
More than 100 MWh	0.000
Electricity used from the grid to charge batteries (GWh)	0.000
Below 1 MWh	0.000
From 1 MWh to 10 MWh	0.000
From more than 10 MWh to 100 MWh	0.000
More than 100 MWh	0.000

- In this table the **storage capacity of batteries**, the **rated power capacity of batteries**, the **electricity injected in the grid from batteries** and the **electricity used from the grid to charge batteries** are reported
- The information should be declared for batteries connected to the grid and used as storing/balancing element. **Only exchanges with the grid** need to be declared.
- Each of the elements above should be split in the following size groups of storage capacity:
 - Below 1 MWh
 - From 1 MWh to 10 MWh
 - From more than 10 MWh to 100 MWh
 - More than 100 MWh.

Learn more about energy statistics

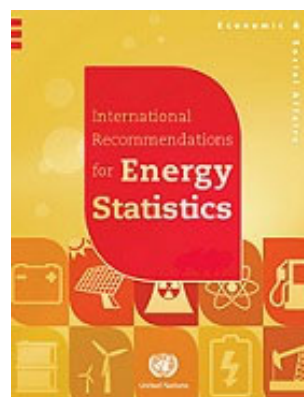
Energy Statistics Manual



- Available in 10 languages
- Data collection methodologies
- Consistent with the IRES framework

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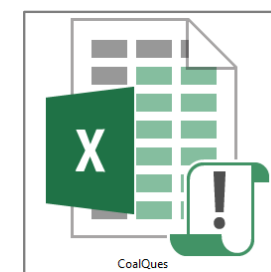
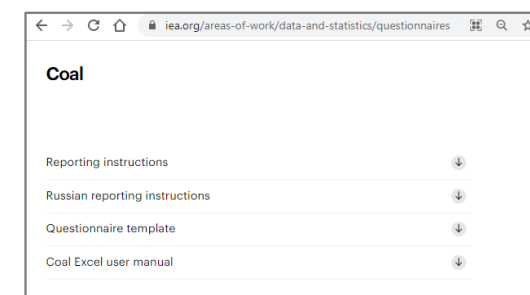
United Nations' International Recommendations for Energy Statistics (IRES)



- Available in 6 languages
- International framework for energy statistics

[Click here](#)

IEA Statistics website

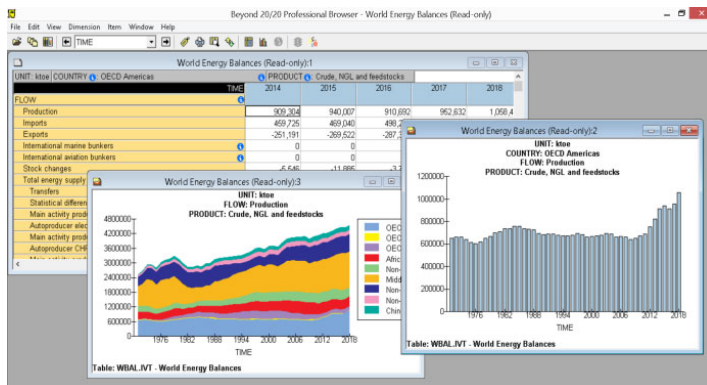


- Questionnaires
- Reporting instructions

[Click here](#)

Beyond data collection

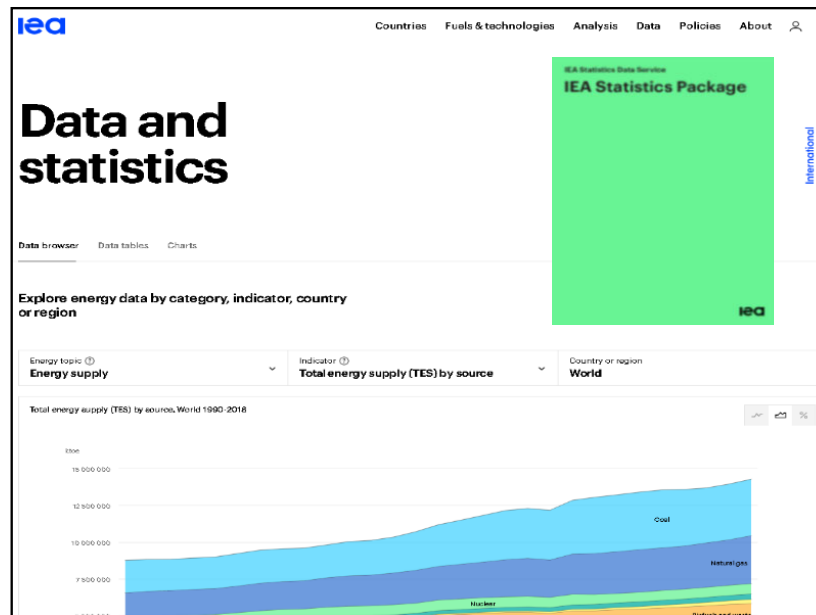
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Data support for the Agency

