

# STATKRAFT IN GERMANY

AND HOW WE SEE RENEWABLES INTEGRATING  
CURRENTLY

DECEMBER 2010



**Statkraft**  
PURE ENERGY

# KEY AREAS



**Flexible European generation and market operations**



**International hydro power**



**Wind power**



**District heating**



**Regional companies**

# GAS-TO-POWER

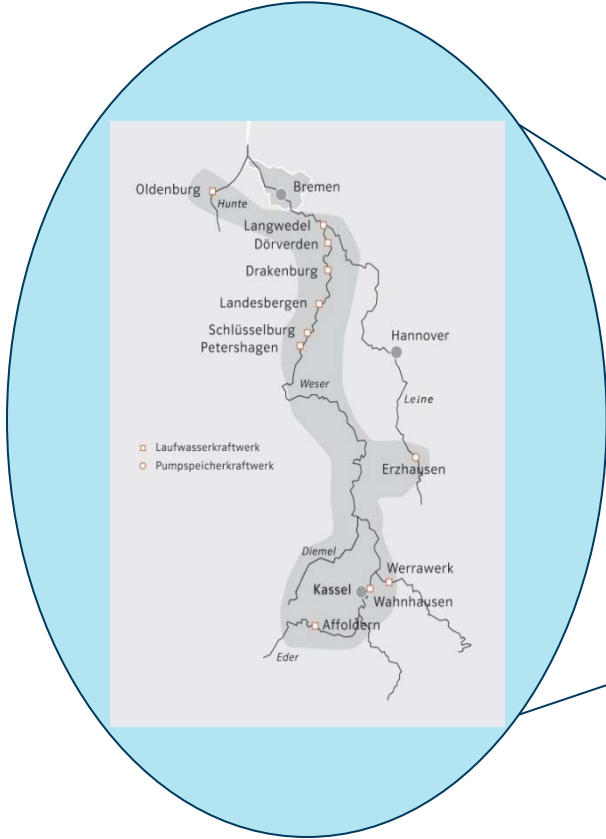


- > **Knapsack** – Germany
  - 100 % ownership
  - Installed capacity: 800 MW
  
- > **Herdecke** – Germany
  - 50 % ownership
  - Installed capacity: 400 MW
  
- > **Robert Frank** – Germany
  - 100 % ownership
  - Installed capacity: 487 MW
  
- > **Emden** – Germany
  - 100 % ownership
  - Installed capacity: 452 MW
  
- > **Kårstø** – Norway
  - 50 % ownership
  - Installed capacity: 420 MW

# OUR GERM

 Head office

 Offices



# PUMPSTORAGE ERZHAUSEN



220 MW turbines/pumps, 1035 MWh storage

# TRADING IN EUROPE

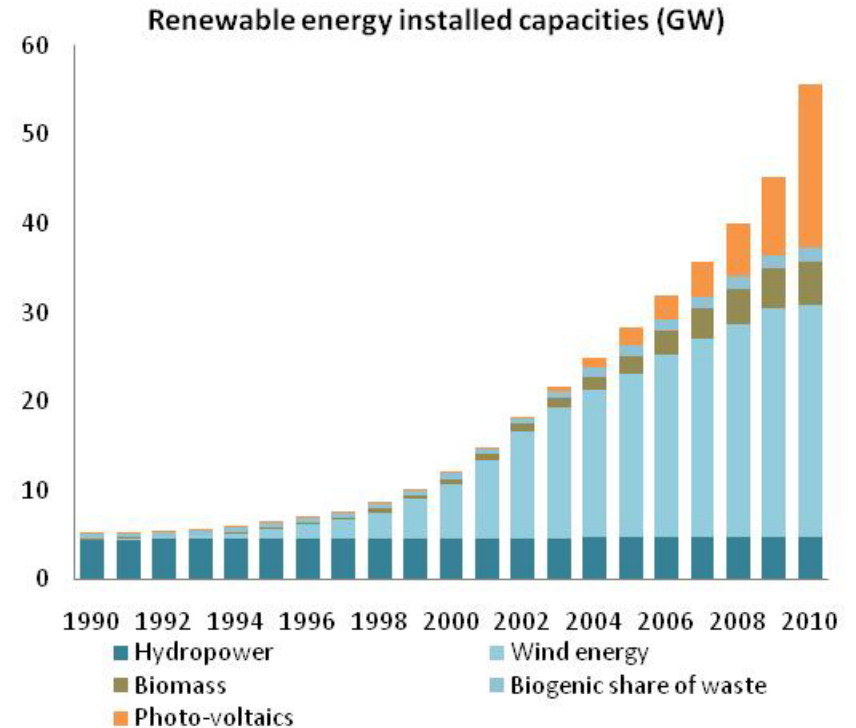
- > > 70 persons
- > 50m EUR risk capital
- > >30% return on capital
- > Active in 25 countries, 28 borders, 20 exchanges!



# RENEWABLE ENERGY IN GERMANY

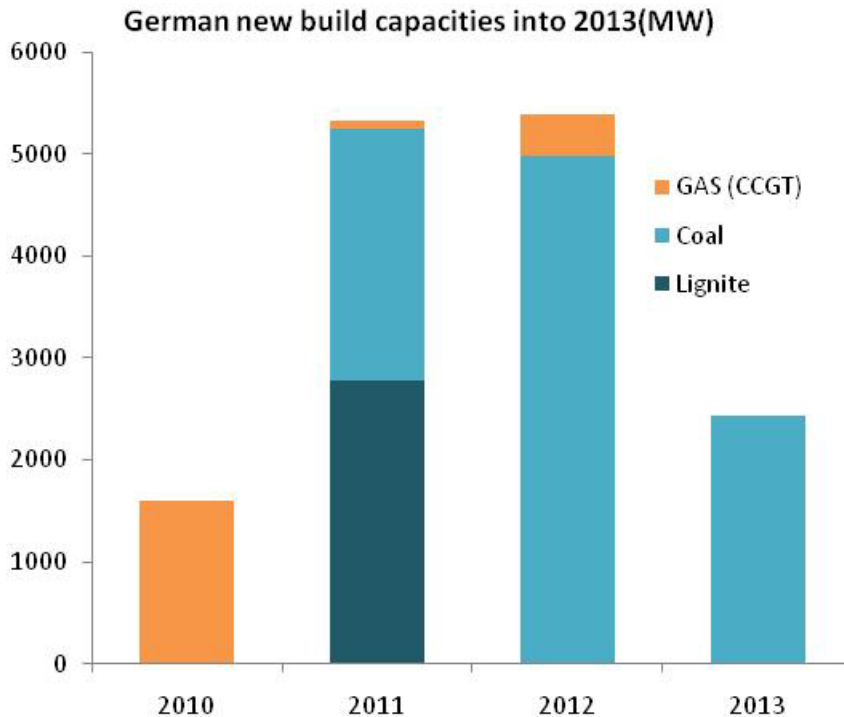


Renewable energy reached 93.5 TWh production in 2009, equivalent of 16% of total electricity consumption.



Wind & solar are among the fastest developing renewable energy sources.

# EXPECTED ADDITIONS IN GERMANY



1300MW new gas fired capacity was added in 2010. (E.ON & RWE). More of coal to come.

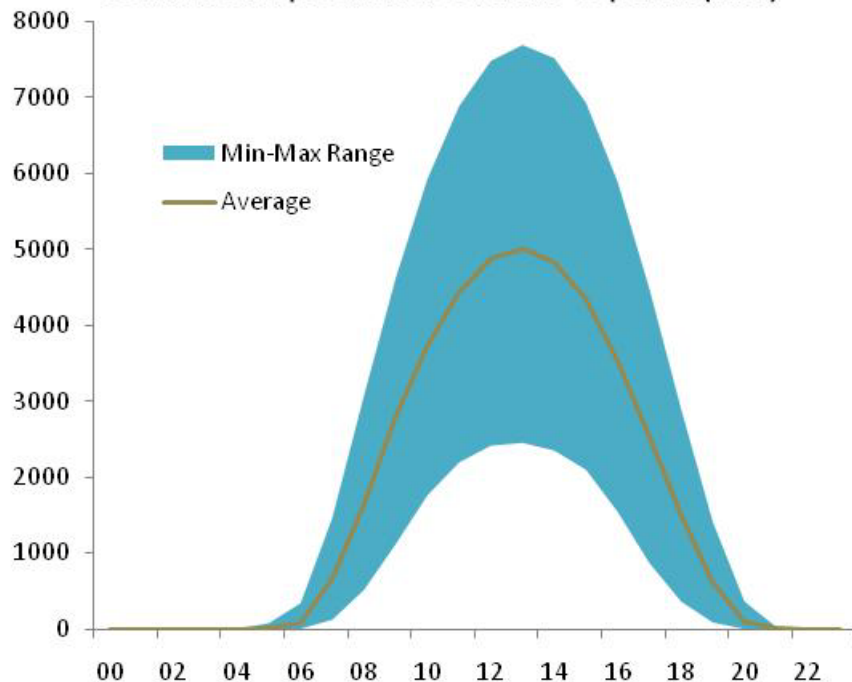


Offshore wind farm is one of the biggest uncertainties...



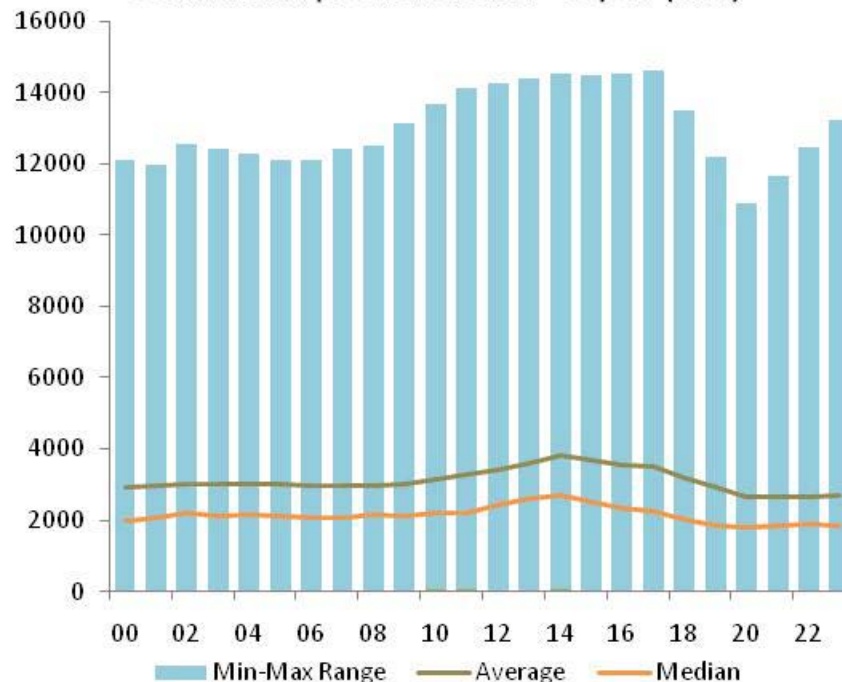
# IMPACT OF SOLAR & WIND ON SPOT PRICE: SUMMER SCENARIO (I)

German solar production Jul 17th - Sep 16th (MW)



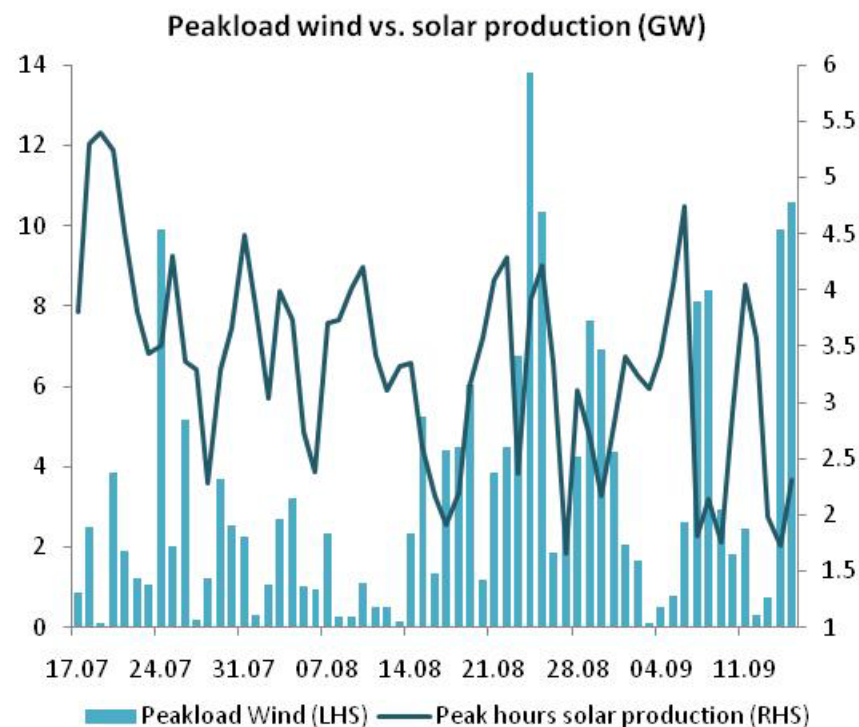
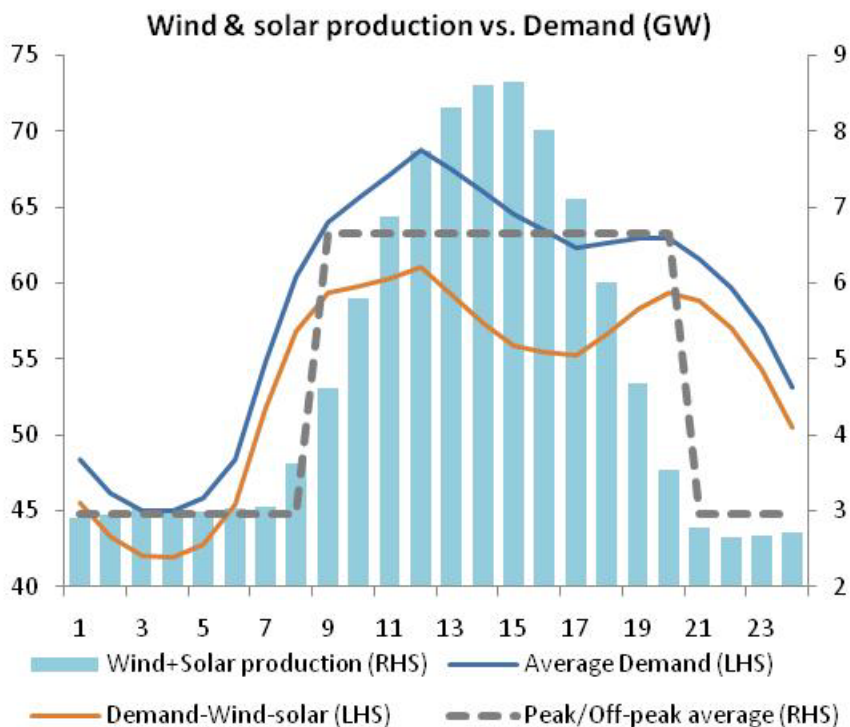
EEX started reporting solar production/forecast since July 2010.

German wind production Jul 17 - Sep 16 (MW)



Wind production is much less predictable than solar.

# IMPACT OF SOLAR & WIND ON SPOT PRICE: SUMMER SCENARIO (II)

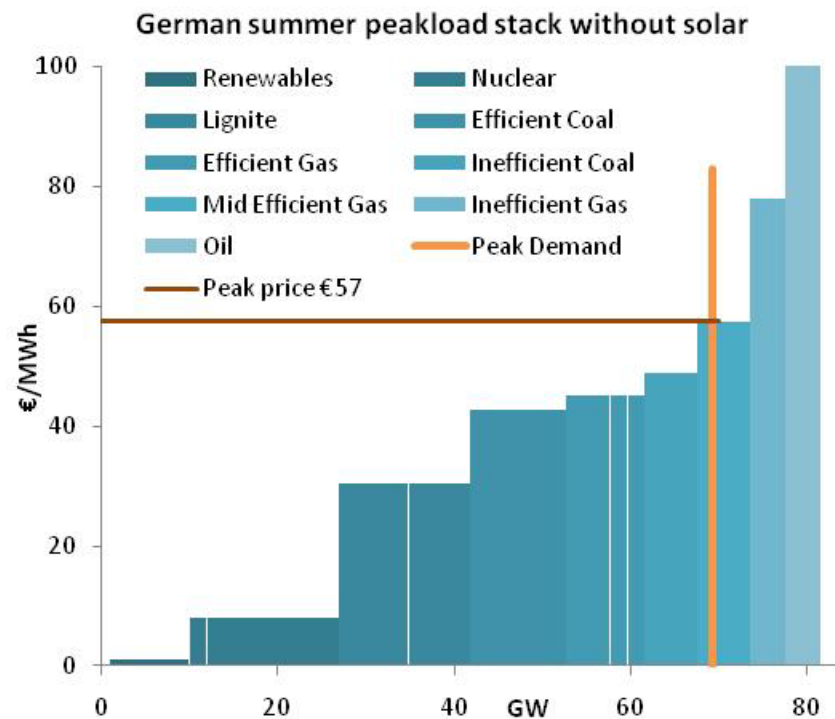
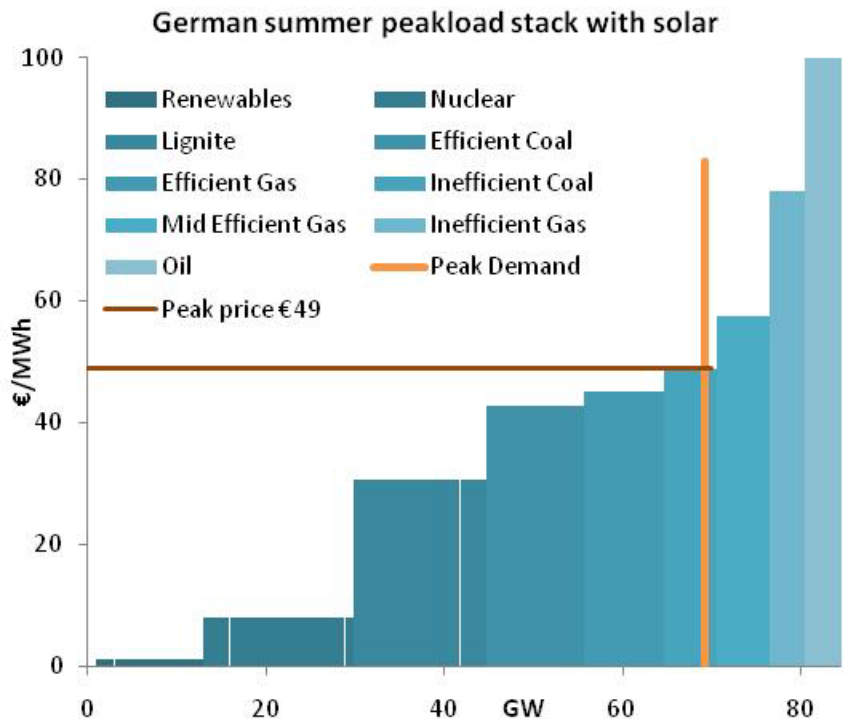


Solar + wind production averaged 6.7GW during peak hours in the past 2 months.

	Wind	Solar	Wind+Solar
"Volatility"	1.39	0.29	0.47

Solar production mitigated volatile behavior of wind production.

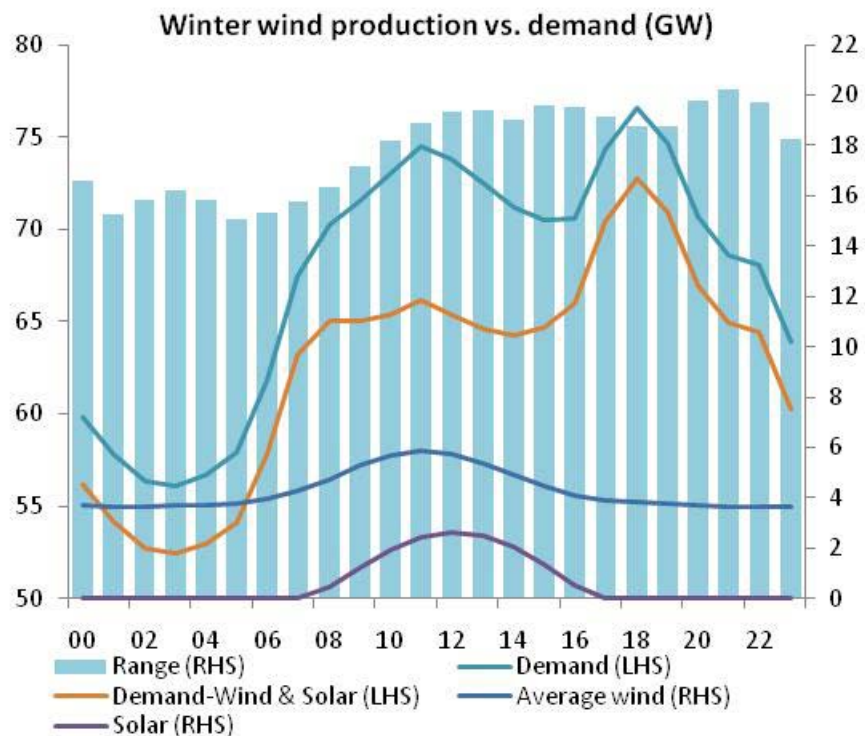
# IMPACT OF SOLAR POWER ON SPOT PRICE: SUMMER SCENARIO



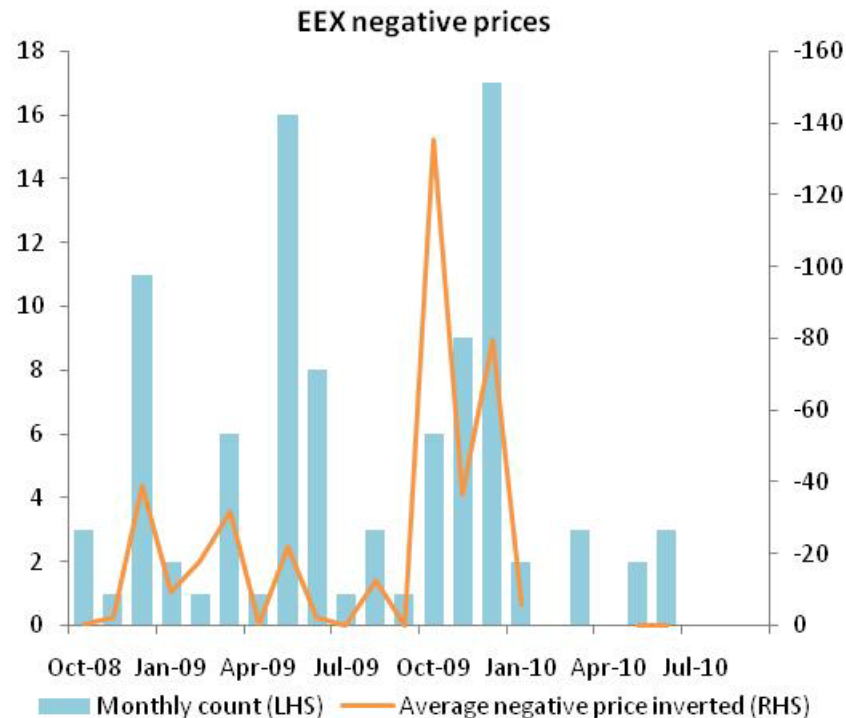
By adding **3.3GW** of peak-load solar production, a simple stack model shows €8 reduction in peak-load price. Actual delivery for the observation period was at €50.8

	Coal (€/GJ)	Gas (€/GJ)	Base	Peak	Peak/Base
2009	1.95	2.53	35.8	47.1	1.32
2010	2.87	5.22	42.8	52.7	1.23

# IMPACT OF WIND & SOLAR ON SPOT PRICE: WINTER SCENARIO



The drop of solar power after short daylight hours creates tension in supply-demand balance for second peak of winter times.



Negative price is becoming far less frequent this year.

# PURE ENERGY

Stefan-Jörg Göbel  
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# THE STATKRAFT GROUP

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- > Environment-friendly power generation: 56.9 TWh\*
- > Total assets 2009: NOK 144 billion
- > 3,400 employees in more than 20 countries
- > Gross operating revenues 2009: NOK 25,7 billion
- > EBITDA 2009: NOK 9,8 billion
- > Net profit 2009: NOK 6,5 billion



**Statkraft**  
PURE ENERGY

No. **1** WITHIN RENEWABLES  
IN EUROPE

**90%** RENEWABLE  
ENERGY

**277** POWER AND DISTRICT  
HEATING PLANTS

**35%** OF NORWAY'S  
POWER  
GENERATION

**3400** EMPLOYEES...  
**20** COUNTRIES

