

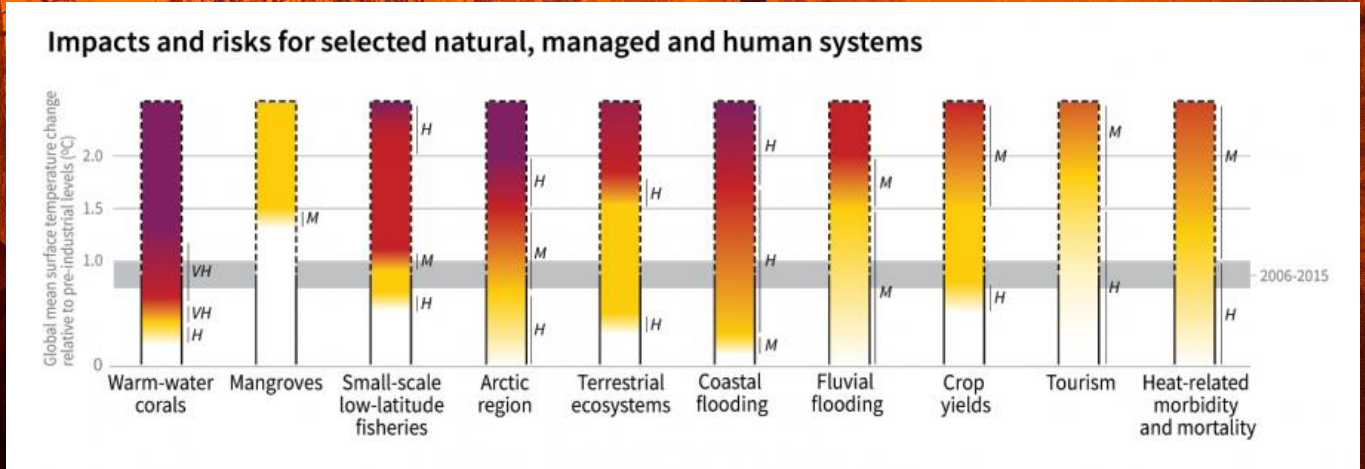
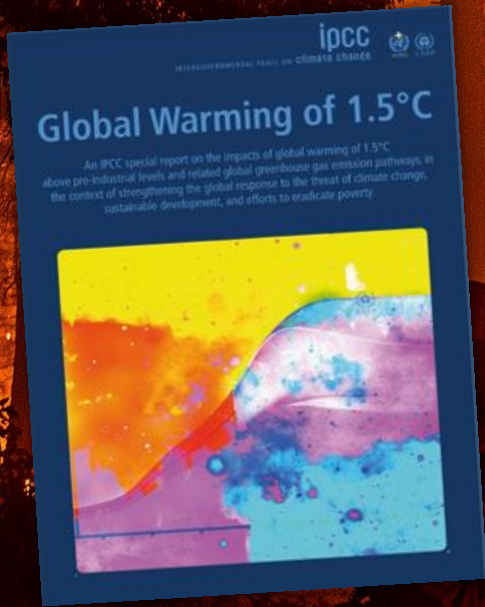


**Flexible, blue and green:**

**Hydropower and Europe's energy future.**

**Jon Vatnaland**

EVP, Corporate Staff and Industrial Ownership, Statkraft  
Blue Growth Forum, Paris, May 24, 2019



**2018: The year climate change really hit**



IKKE ØDELEGG  
FRAMTIDEN  
VÅR

STOPP  
ENTIDTS TYVERIET

SKJERPINGS!  
DEN BERØMTE  
JONAS KOMMER IKKE  
TIL Å REDDE OSS

IKKE KØDD  
MED PLANETEN  
VÅR

CHANGE THE SYSTEM  
NOT  
THE CLIMATE

One Planet. One Chance...  
STOP!

DAGENS  
KIMAPOLITIKK

Vi har ingen  
Plan(et)  
B

BELIEVE IN  
CHANGE?  
NO.  
BE THE  
CHANGE.

Æ VIL  
PUDDING  
FRAMTIDEN

INGEN FREMSKRITT  
INGEN FREM  
NO PLANET

DROPPE MILJØ ER VERRE  
ENN Å DROPPE SKOLE

MILJØ KREVER  
HANDLING!

DINOSAURENE  
TRODDE DE  
HADDE TID  
D VI STREIKER  
FORDI DET IKKE ER  
VITS Å GÅ PÅ SKOLE OG  
VI IKKE HAR EN  
FRAMTID

IKKE STJEL  
FREMTIDEN VÅR!

DET ER  
INGEN  
PLANE

DERES IGNORANSE  
ER VÅR  
DØDSDOM

WHICH GREEN  
DO YOU WANT  
TO SEE?

SCIENCE  
NOT  
SILENCE

WHY THE  
SHIT ARE WE  
STUDYING FOR A  
FUTURE  
WE WONT EVEN HAVE

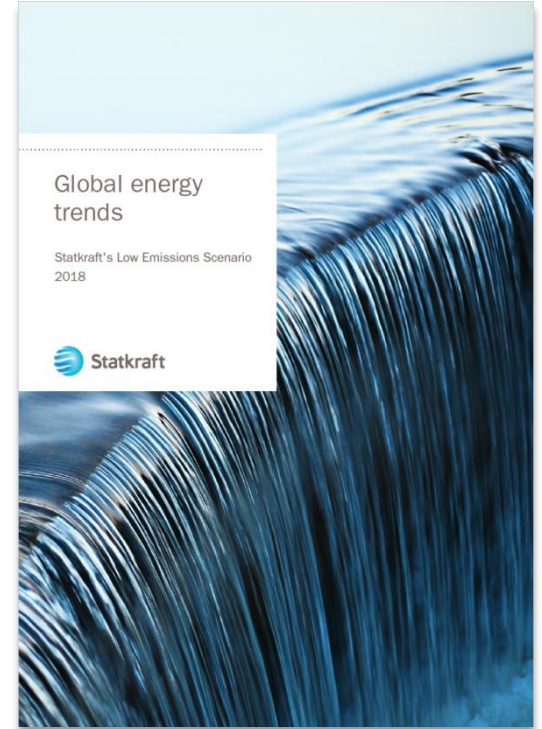
# Statkraft's Low Emission Scenario



2016



2017



2018

# Even the Kentucky Coal Museum is going solar

Morgan Watkins | The (Louisville) Courier-Journal  
Published 7:23 AM EDT Apr 8, 2017

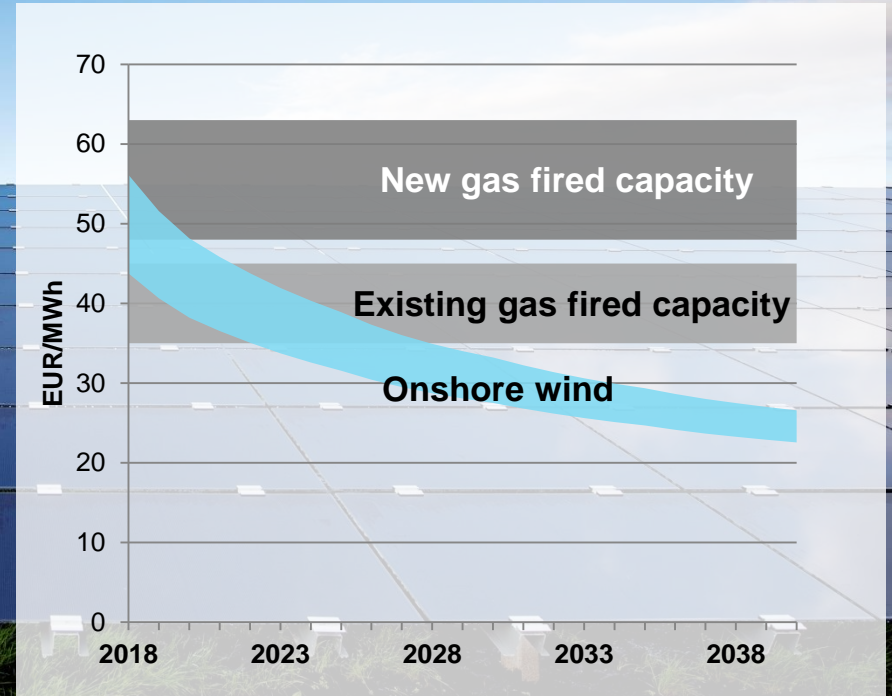
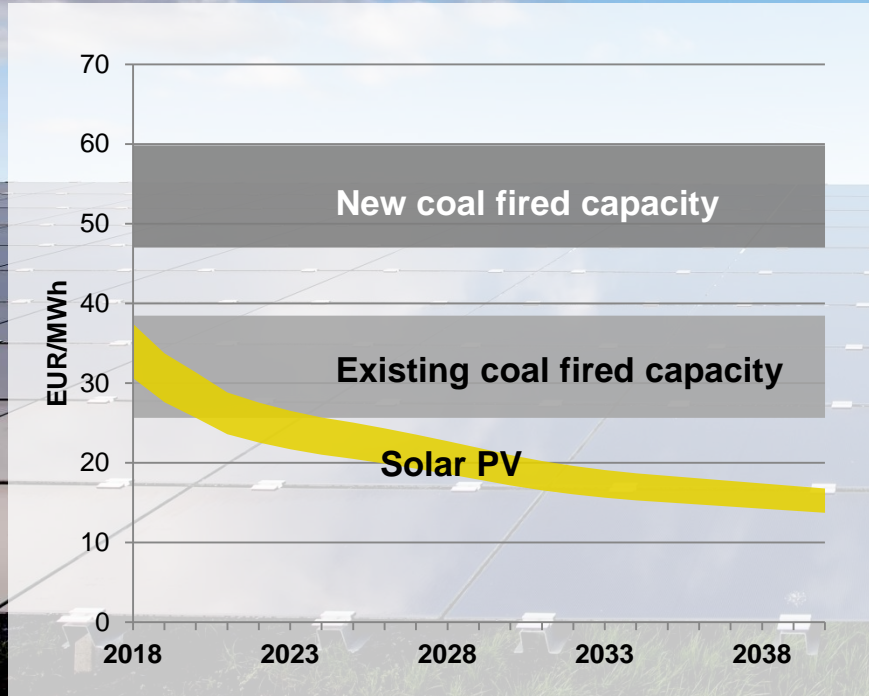


The Kentucky Coal Museum recently added solar panels to its roof.  
Courtesy of Bluegrass Solar

BENHAM, Ky. — Inside the Kentucky Coal Museum, visitors can peruse plenty of memorabilia on mining and the commonwealth's coal camps. But on the roof, they'll find a display dedicated to an unexpected industry: Solar power.

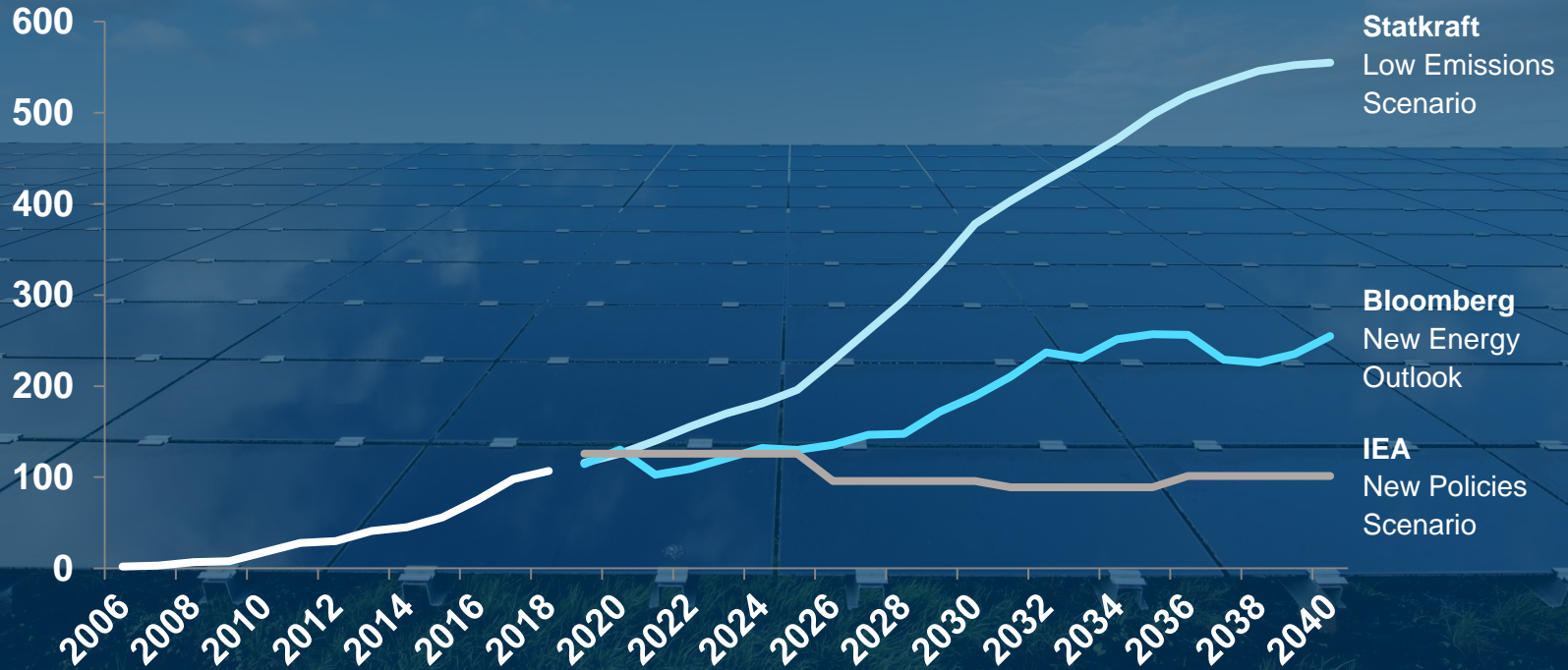
In a cost-saving move, this museum in eastern Kentucky is embracing the sun as a source of affordable energy and installing approximately 80 solar panels on its roof.

# Falling technology costs

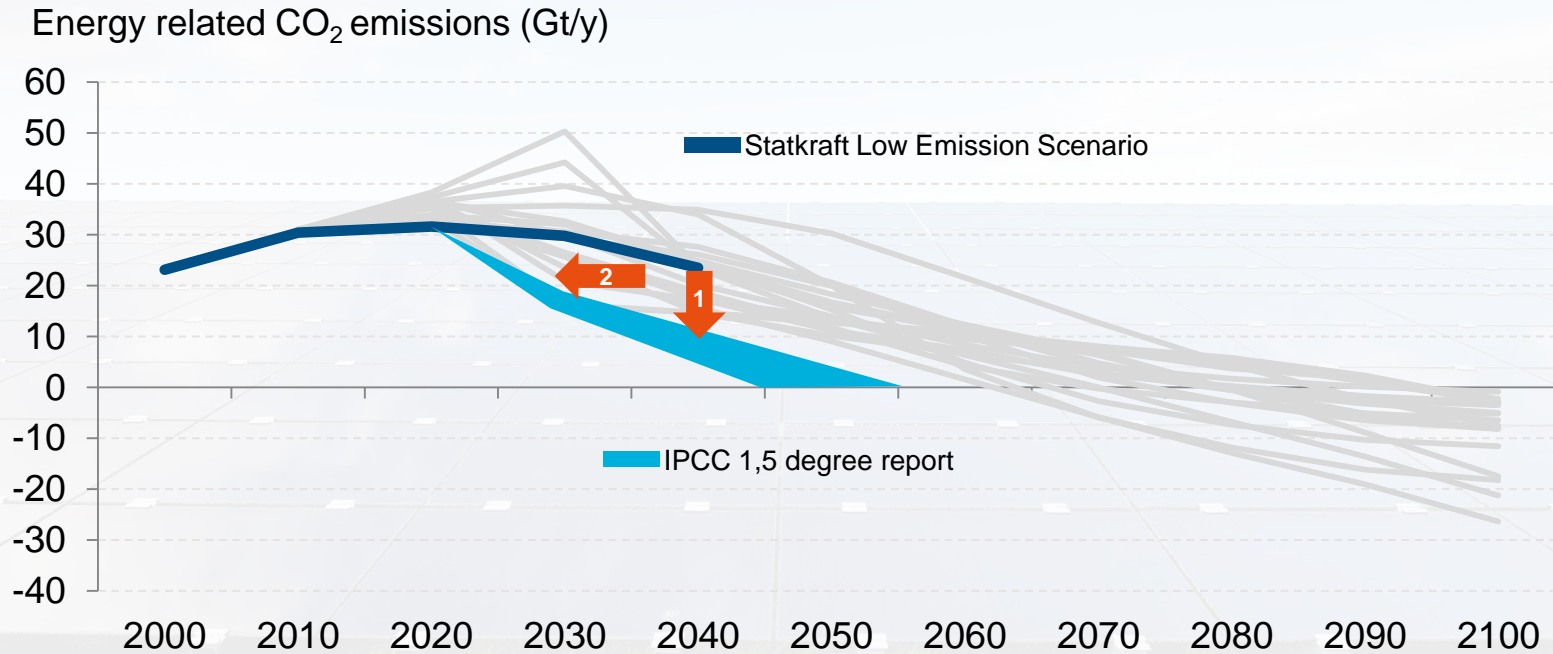


# Strong growth in renewables

Annual installations of solar (GW)



# The challenge



Source: Statkraft, IPCC Special report on 1.5 degrees



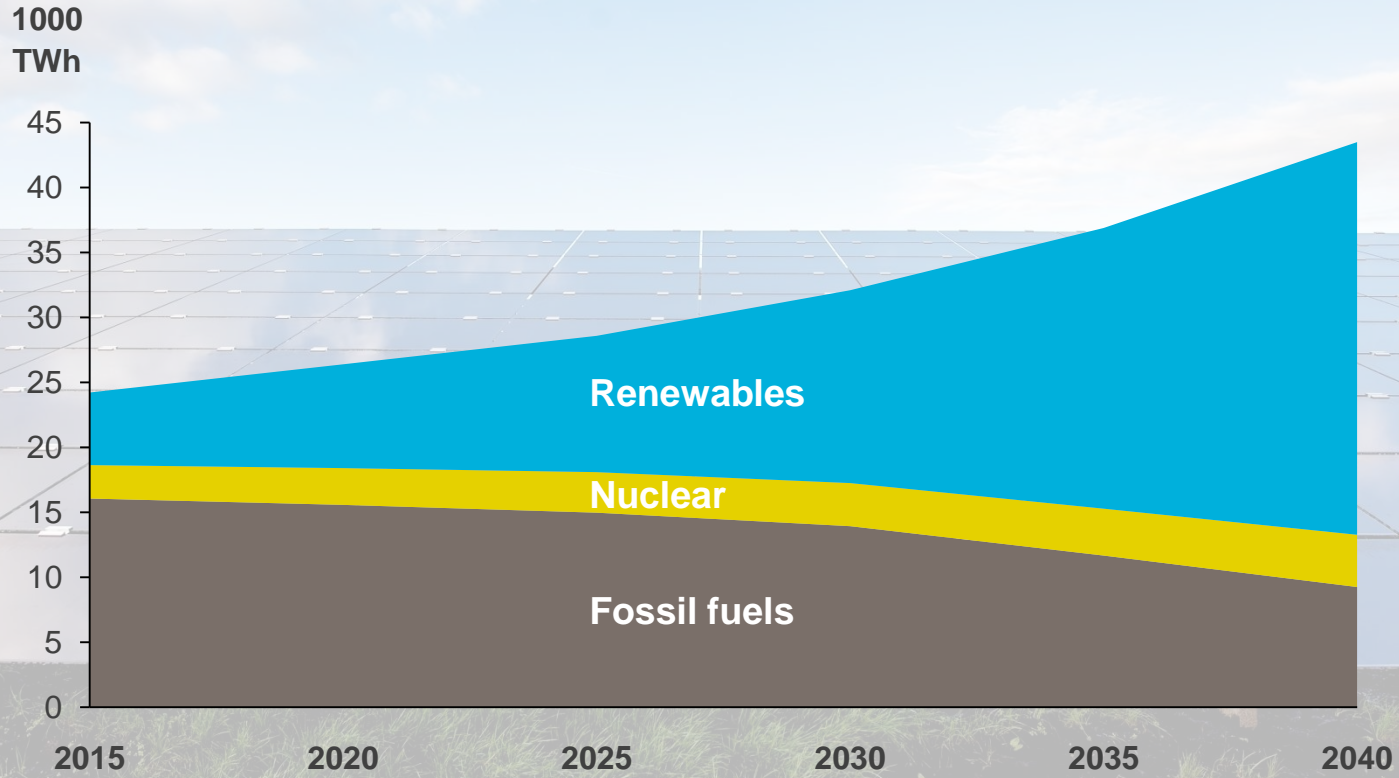
# \$ 30 000 000 000 000

## Hitting toughest climate target will save world \$30tn in damages, analysis shows

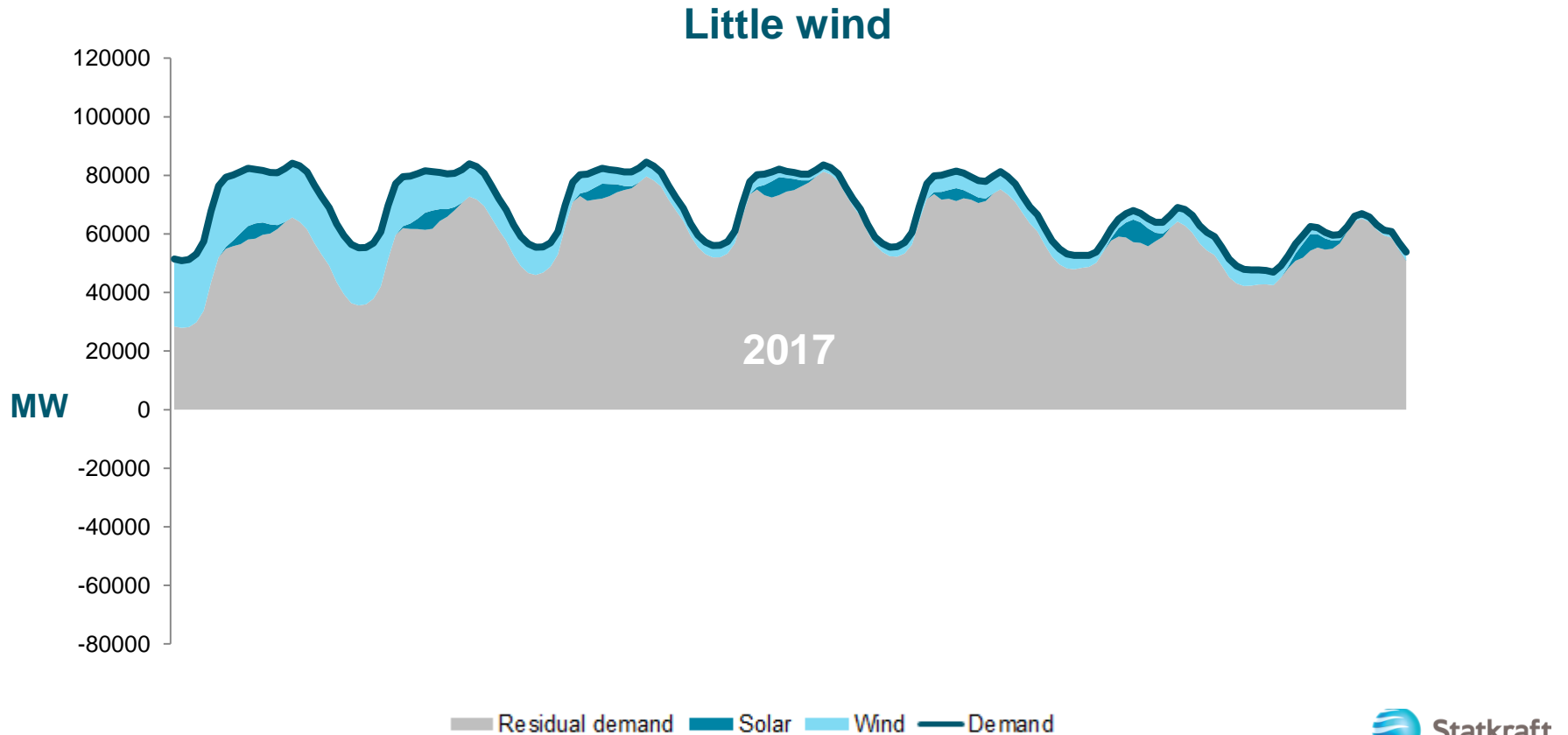
Almost all nations would benefit economically from keeping global warming to 1.5C, a new study indicates



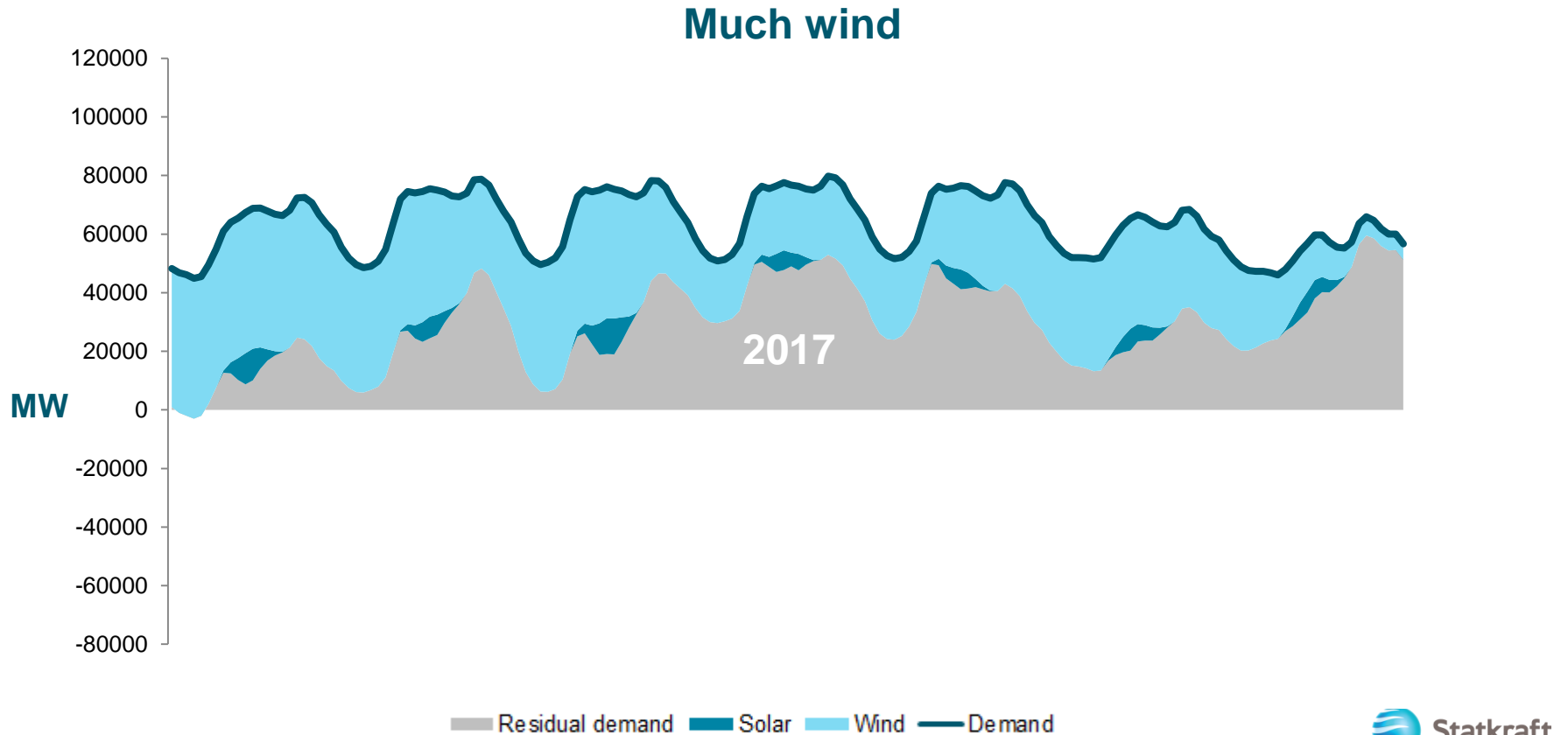
# Strong growth in renewables



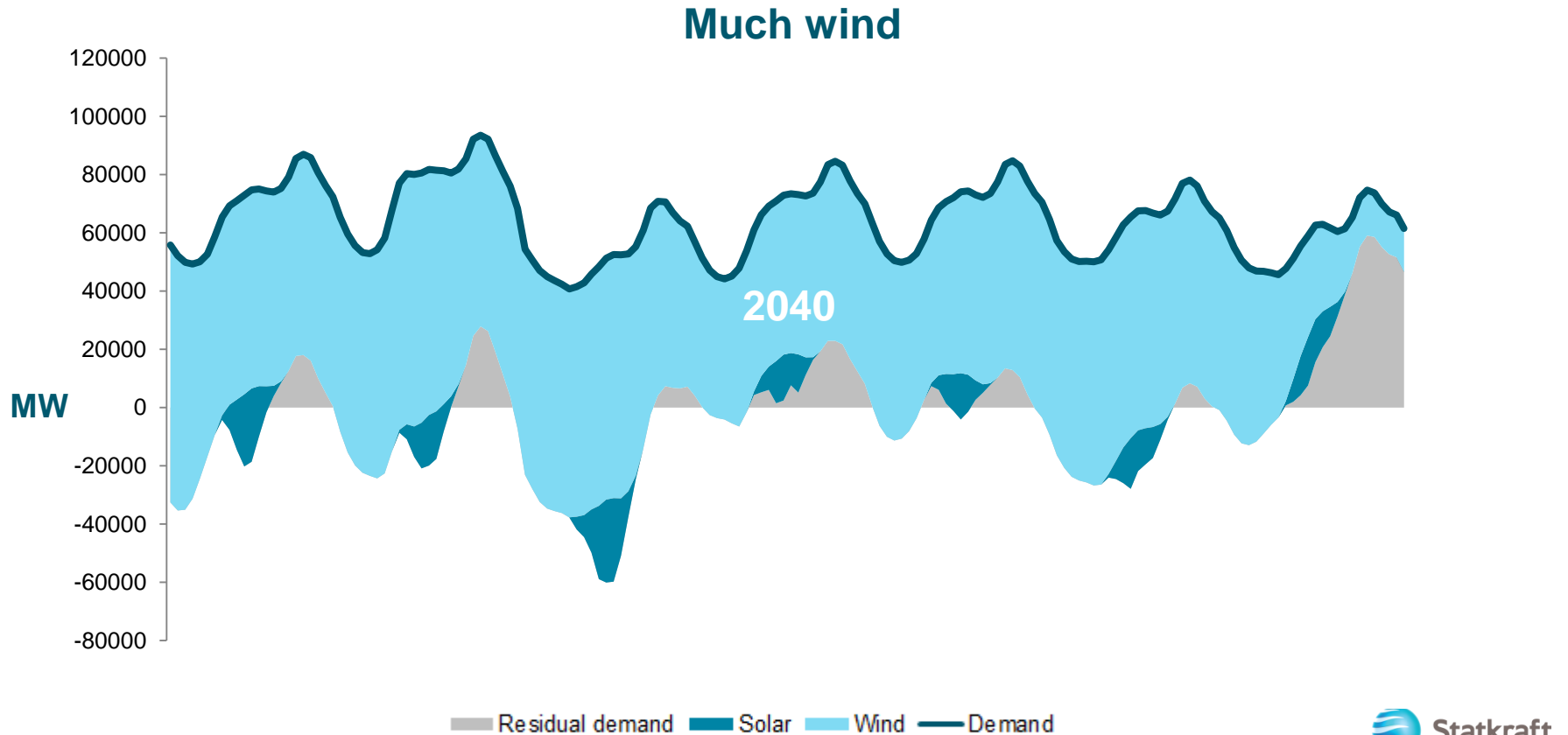
# Intermittency increases flexibility need



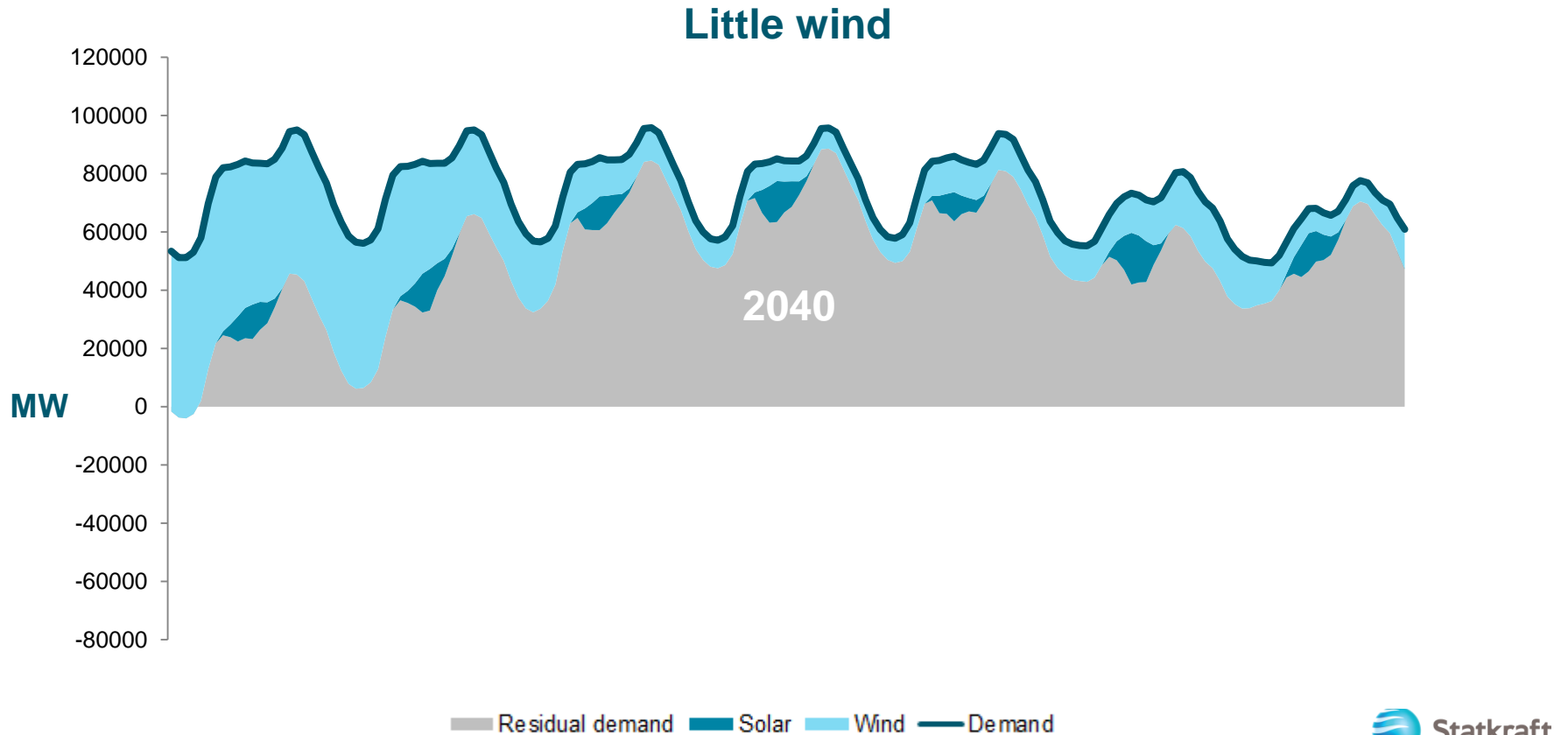
# Intermittency increases flexibility need






















# Intermittency increases flexibility need



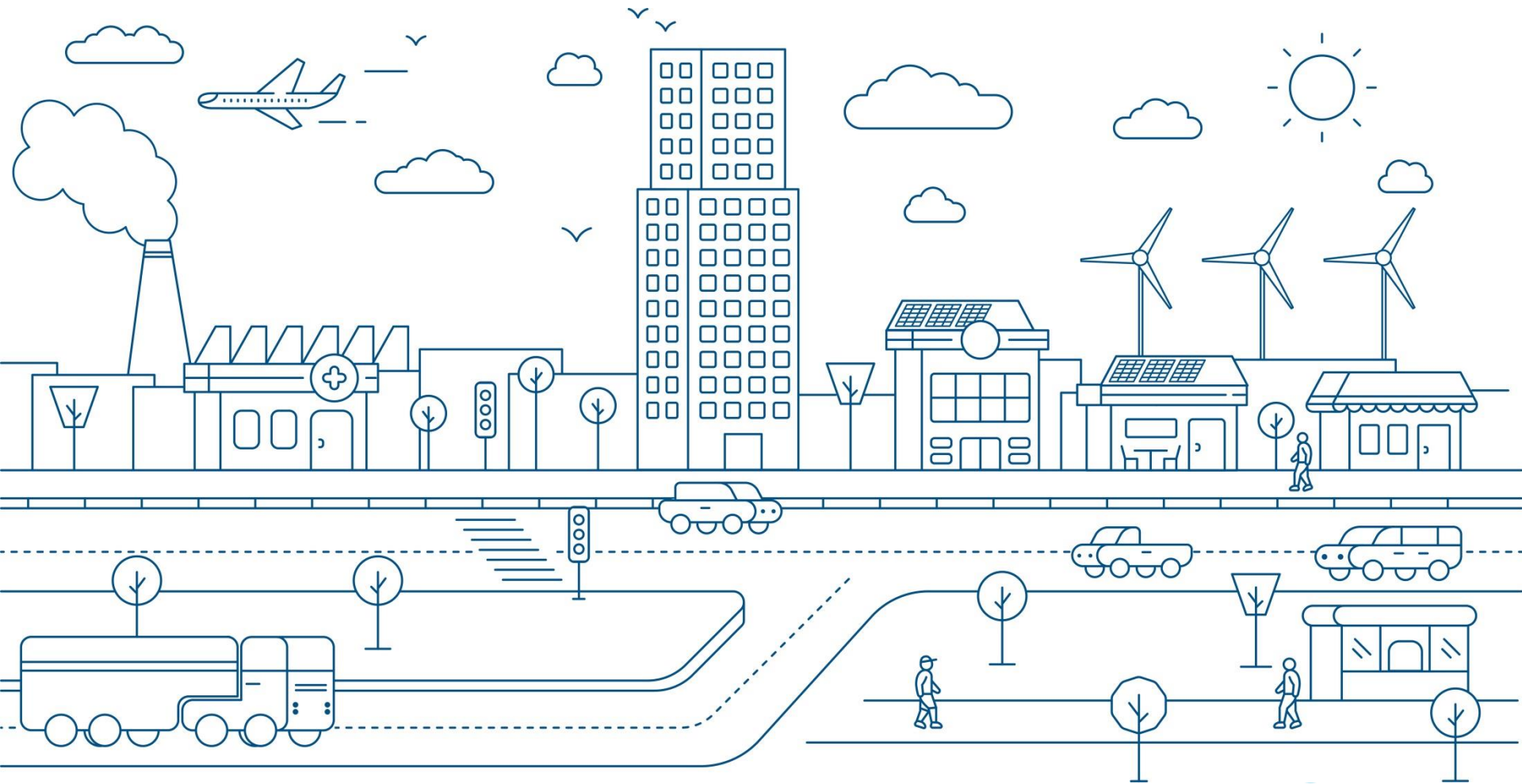
# Intermittency increases flexibility need



# Increasing needs for shorter term flexibility

	Change in need	Demand side response	Storage (batteries)	Grid and cables	Gas/Coal	Hydropower
Balancing (0 - 1 hours)	 2x-4x					
Intra day (1 – 24 hours)	 2x-10x					
Intra week (1 – 7 days)	 1-5x					
Base load (> 1 week)	 -10% – -80%					

# Energy revolution in Europe





# Statkraft – Europe's largest producer of renewable energy

OWN CAPACITY

**19 300 MW**

62 TWh → 98% renewable

.....

THIRD PARTY CAPACITY

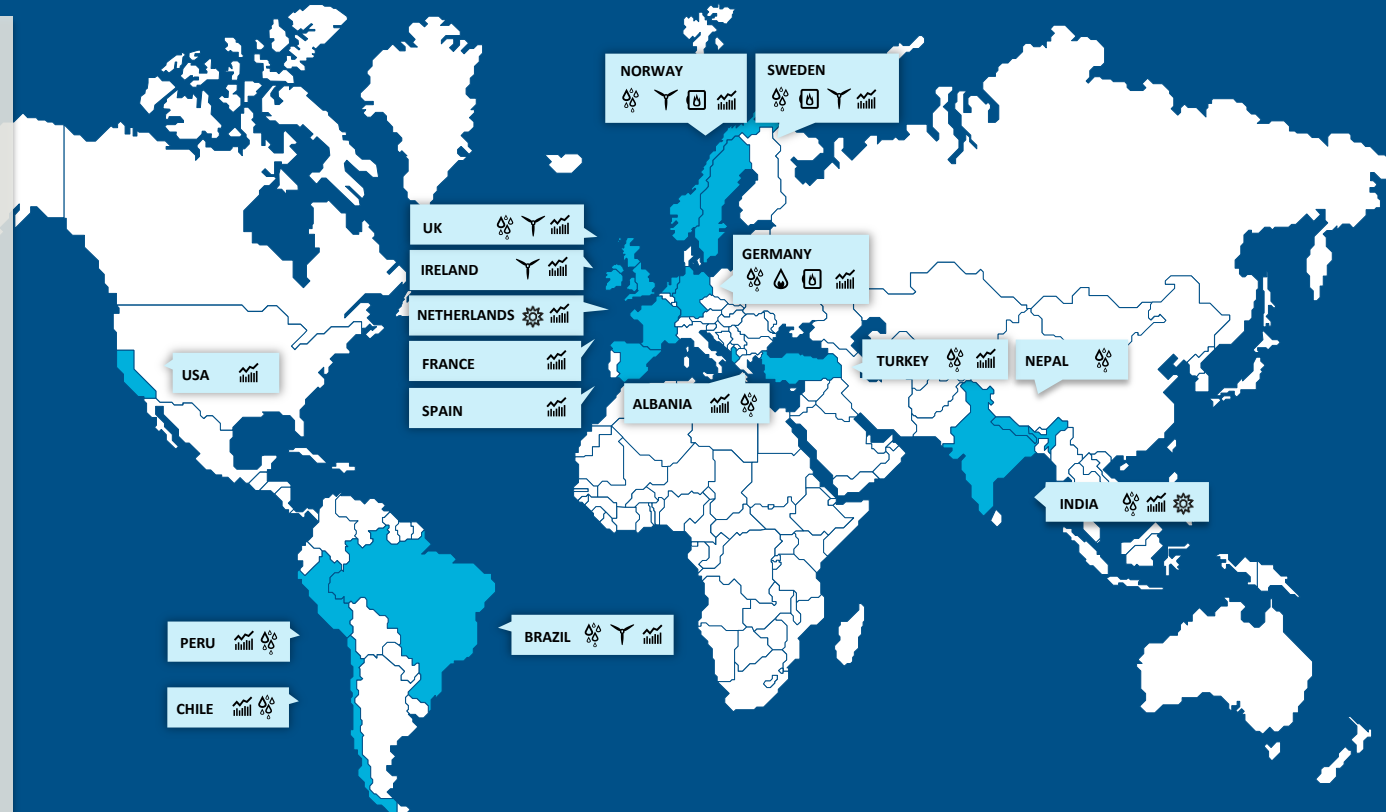
**22 000 MW**

100% renewable

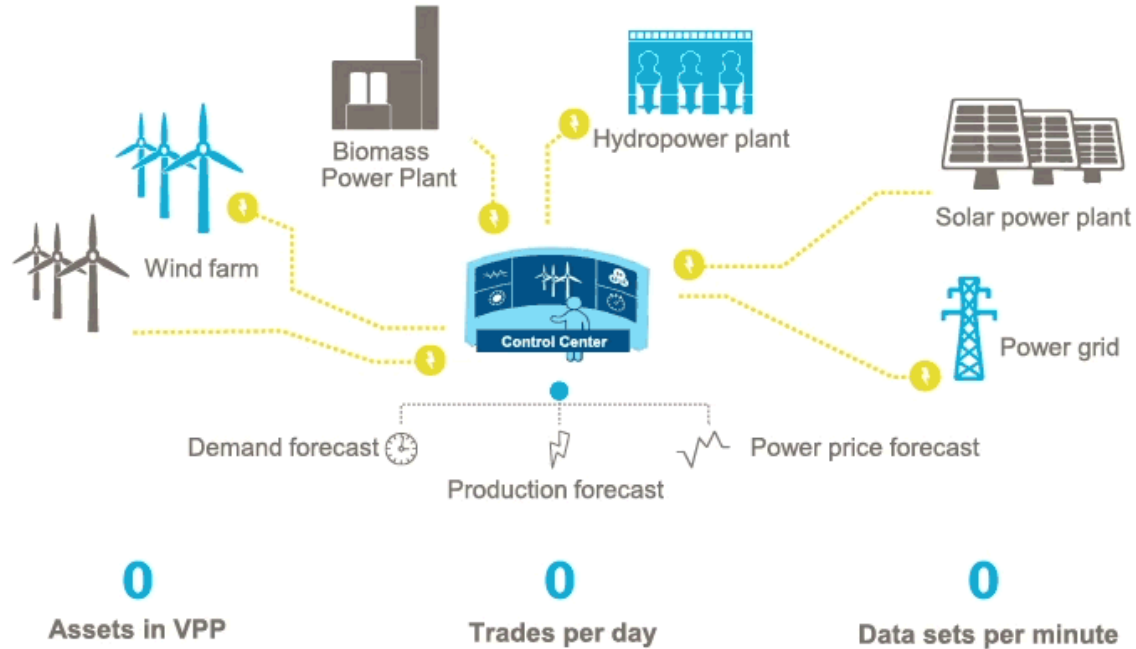
.....

EMPLOYEES

**3 600**



# Statkraft's heritage meets new technology



# France is one of the focus markets for Statkraft's growth in Europe

## HYDROPOWER



## WIND & SOLAR



## MARKET ACCESS





**Thank you!**

**For more information, please visit [www.statkraft.fr](http://www.statkraft.fr)**