



New (Energy) Business Paradigms

Seven shifts

Bert Stuij

Energy Delta Institute
Vice President Innovation



Founding partners

gasunie

GasTerra

GAZPROM
JOINT-STOCK COMPANY



university of
 groningen



New Energy Business Paradigms

- The Hockey stick World
 - The Age of Abundance
 - The Price Collapse of Renewables
 - Power to Power
 - Decentralized, Connected, Smart
 - Global shifts
-
- A Russian Revolution?





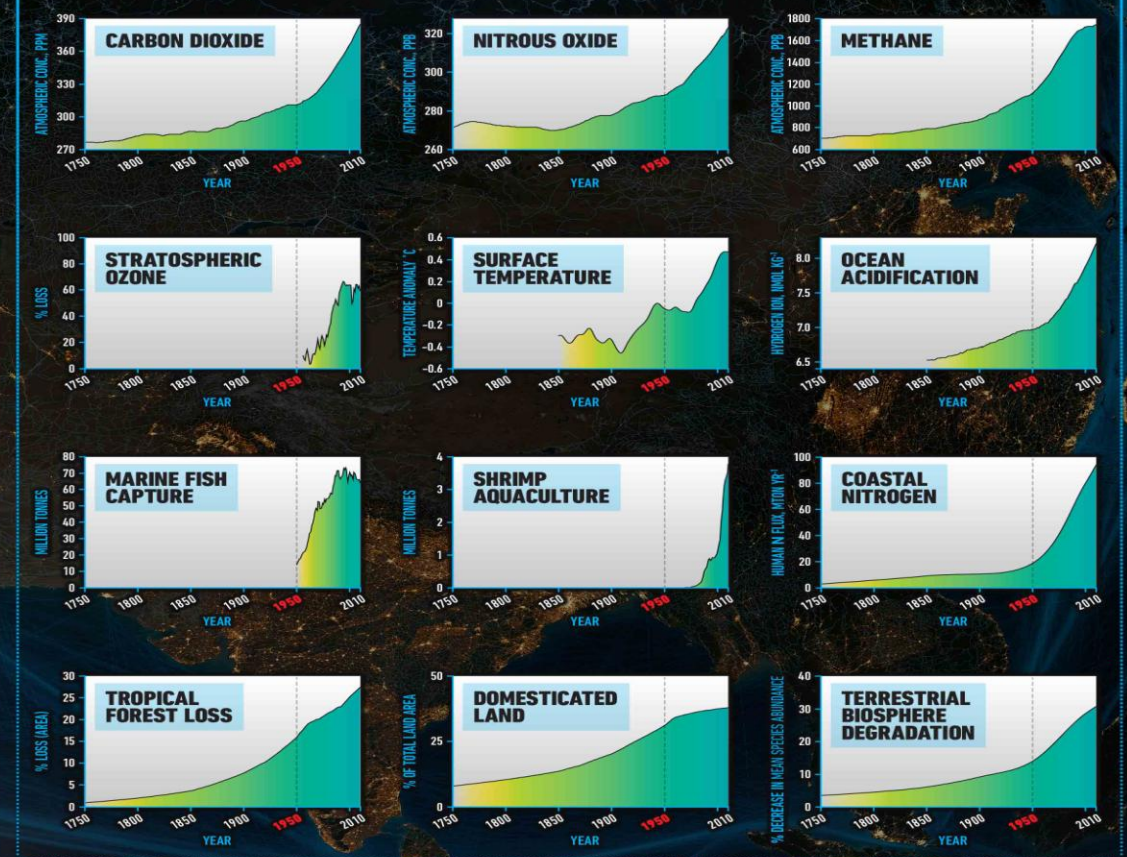
The Hockey stick World

THE GREAT ACCELERATION

SOCIO-ECONOMIC TRENDS



EARTH SYSTEM TRENDS





The Hockey stick World

UNITED NATIONS FOUNDATION  Climasphere

The Paris Agreement: 101

On April 22nd – Earth Day – leaders representing more than 100 countries will gather at the United Nations in New York to sign the Paris Agreement on climate change.

The event is expected to be the largest single-day signing in the history of international accords.

But what does it all mean?

THE AGREEMENT: IN 3 STEPS



✓ **Adoption by negotiators at COP21**
December 2015



○ **Signing ceremony at UN headquarters**
April 22, 2016



○ **Ratification at the national level by 55 countries representing 55% of the world's emissions**
Date TBD

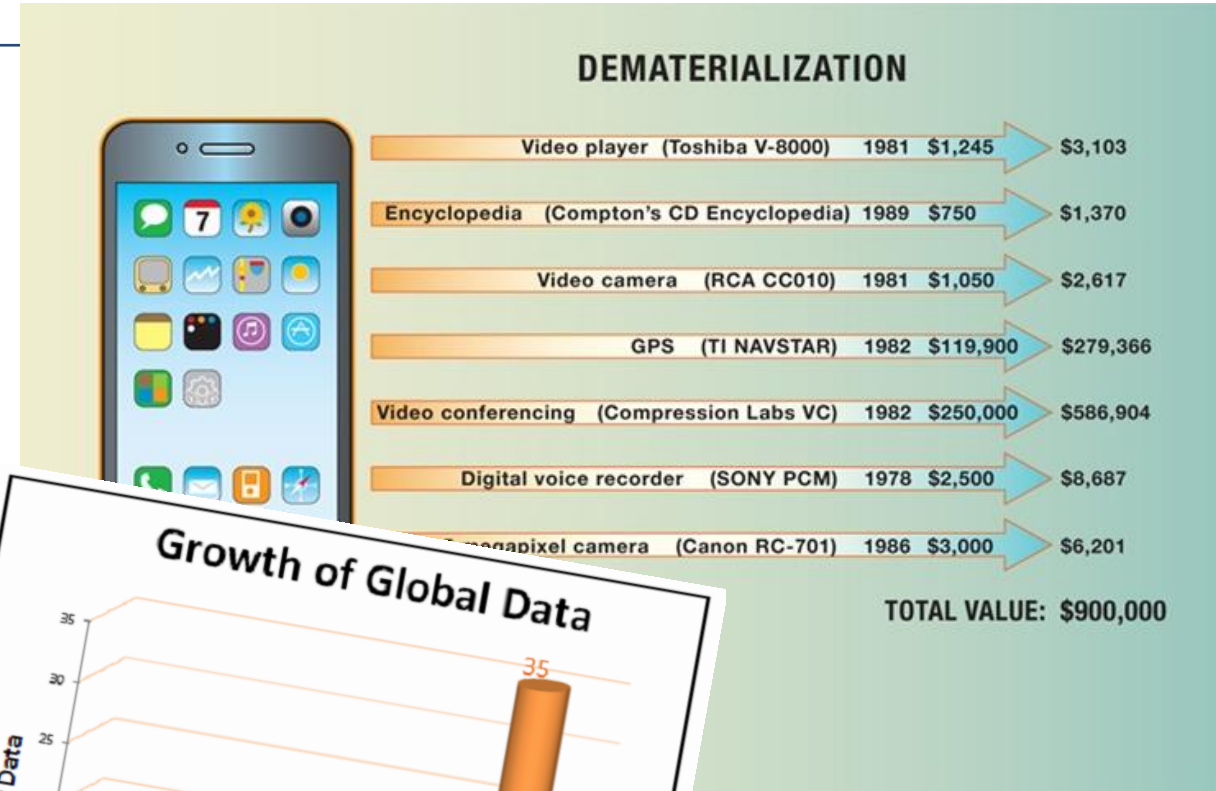
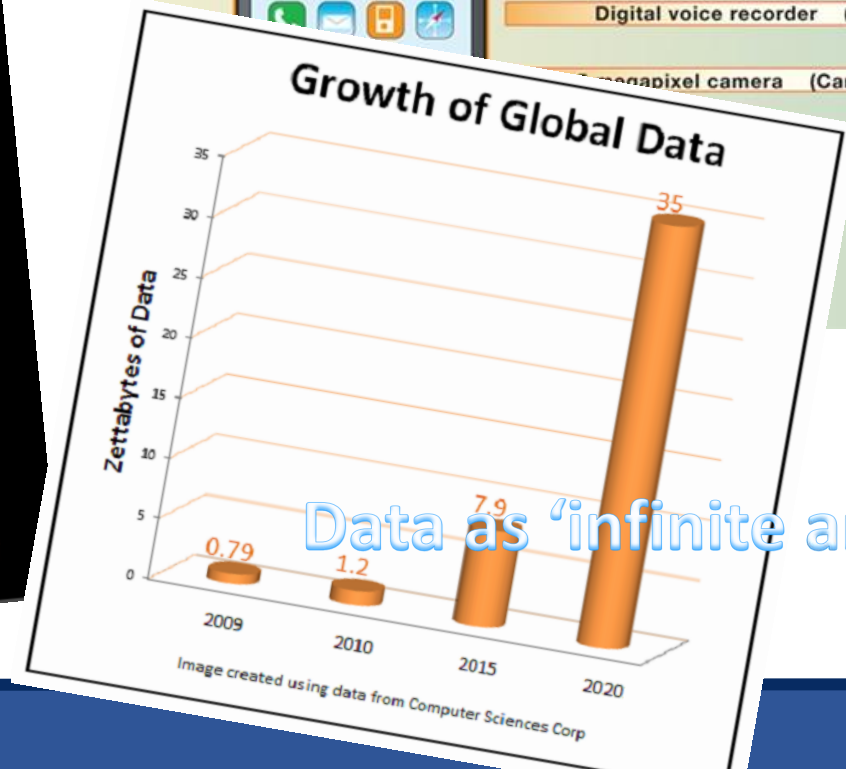
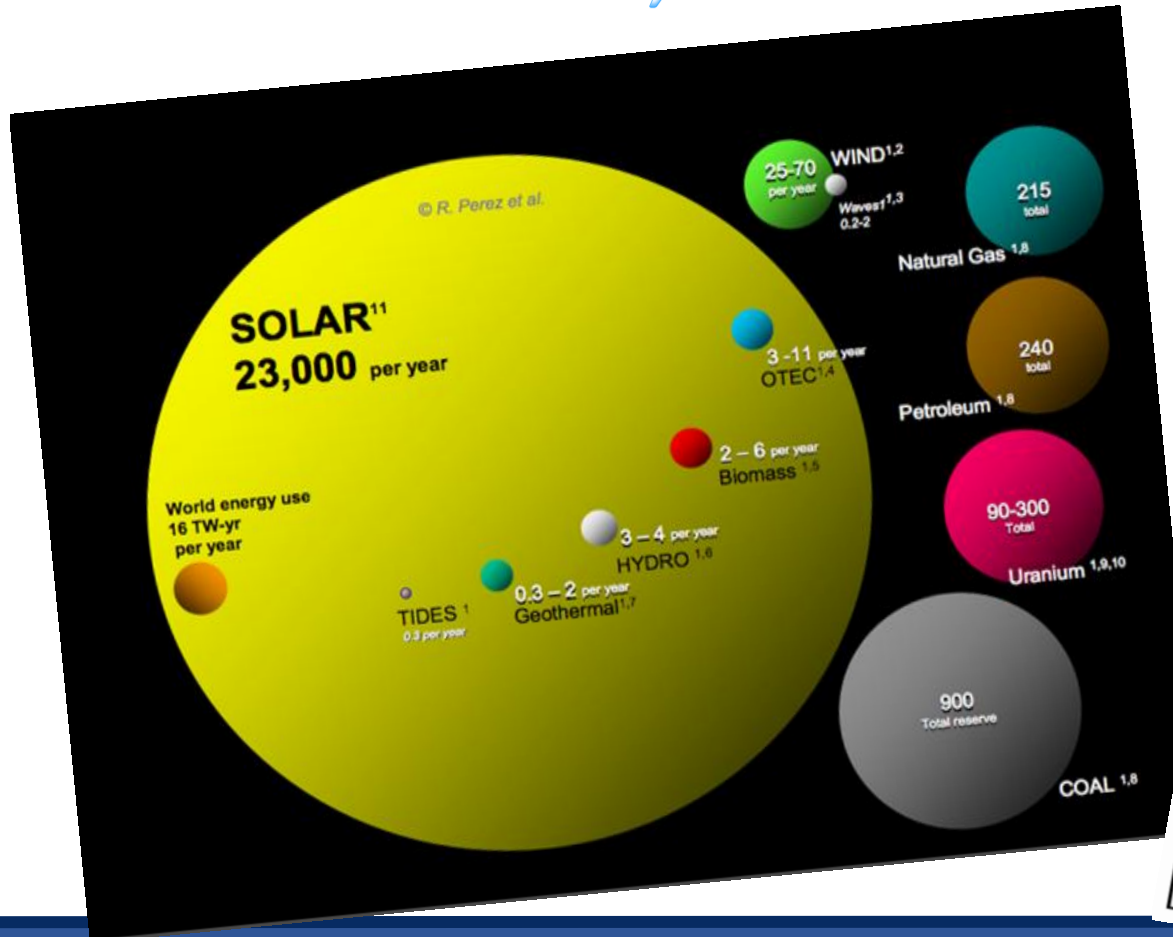




The Age of Abundance

Zero price economics

Renewable resources, circular use

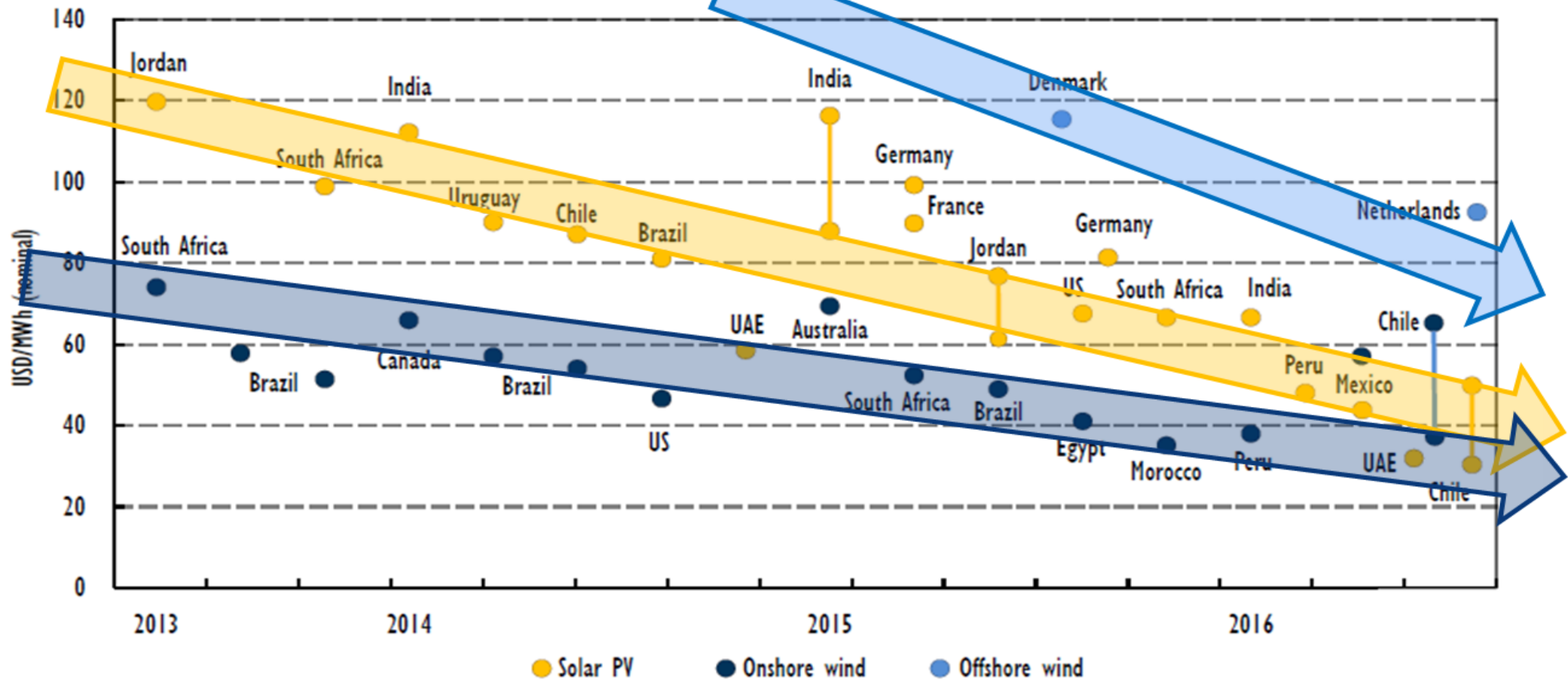


Data as 'infinite and free' resource



The Price Collapse of Renewables

Figure 2.5 Recent announced long-term remuneration contract prices for renewable power by date of announcement and to be commissioned over 2016-21



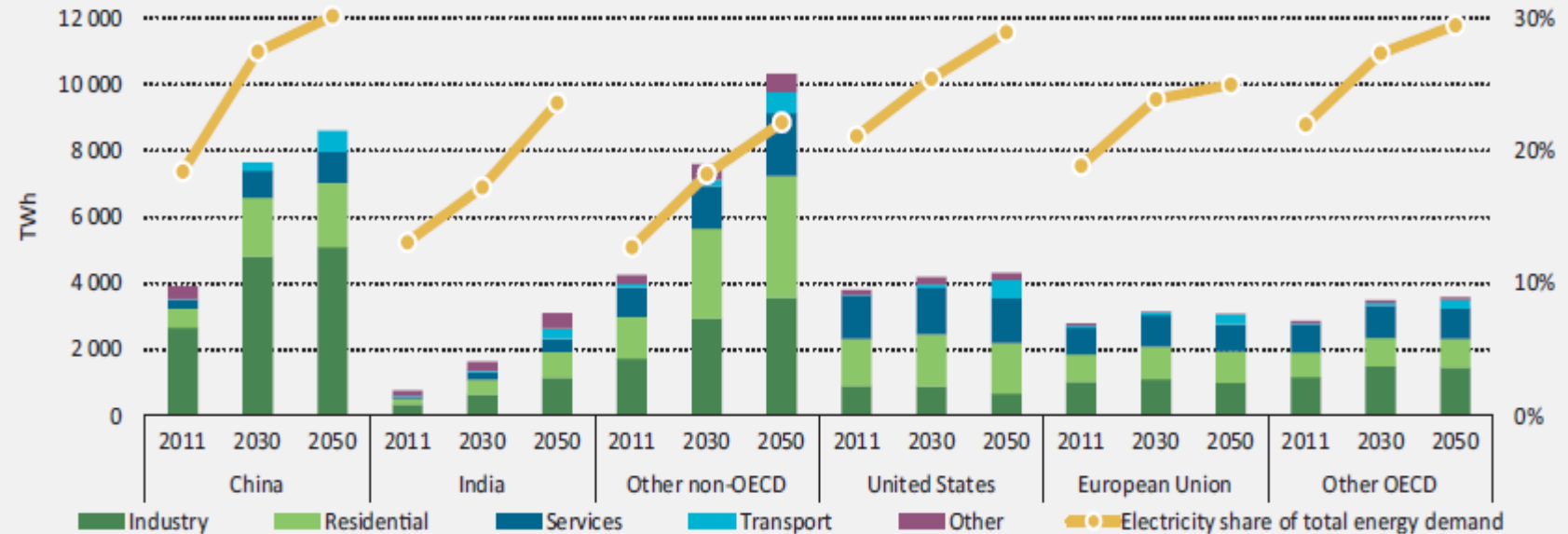


Power to Power

The era of fire is ending ...

- Mobility: combustion engines to electric drives
- Industry: power (to hydrogen) to 'X'
- Heating: demand reduction, heat pumps

Sectoral electricity demand and share of electricity in total energy demand in the 2DS



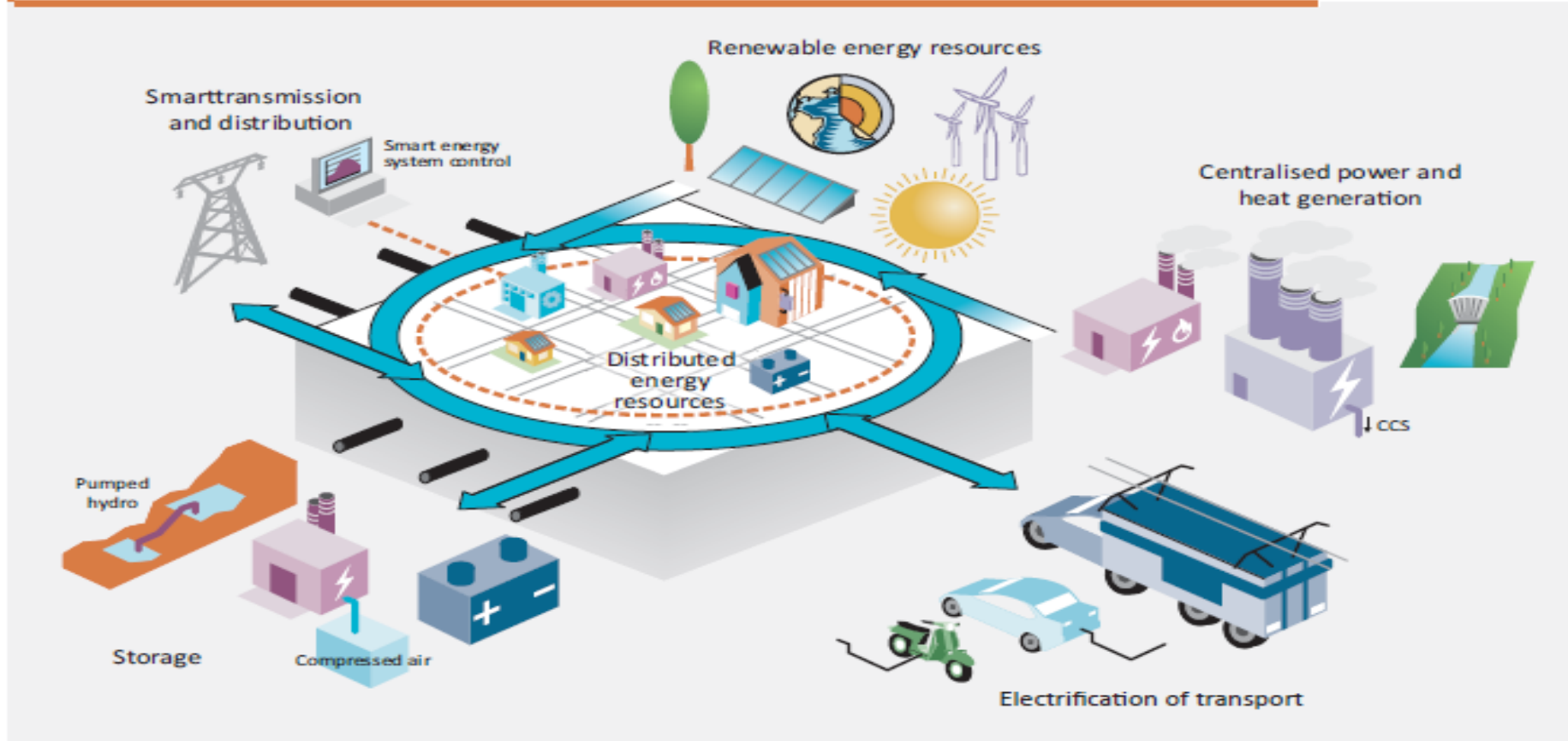
Key point

Electricity demand growth differs between industrialised and industrialising countries, but an increasing share of electricity in the overall energy mix follows similar trends.



Decentralized, connected, smart

The integrated and intelligent electricity system of the future



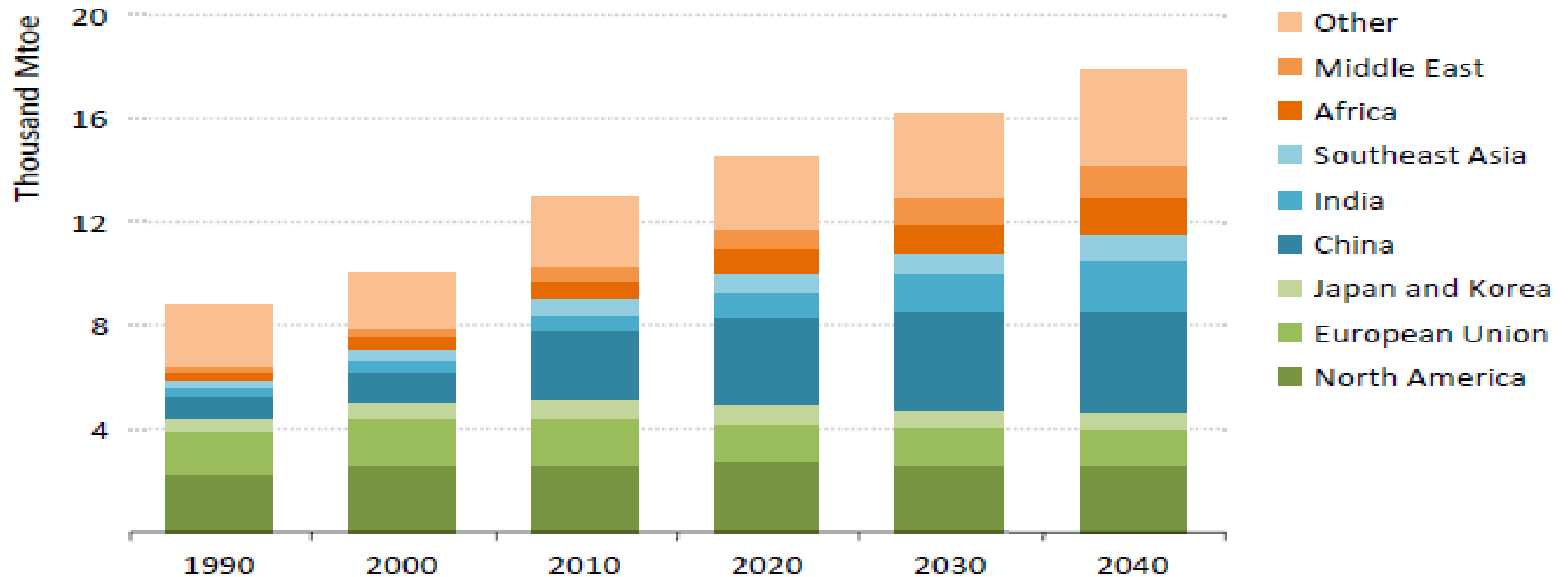
Key point

The aim for the future is to better integrate all elements of electricity systems to optimise investment and operation; this will increase complexity, but also improve efficiency and resilience while optimising use of energy resources.



Global Energy Shift

Energy demand by region in the New Policies Scenario



The geography of global energy demand continues to shift



From Energy Super Power...

Fossils: *maturity/dominance*

- 20% of global gas production
- 12,5% of global oil production
- 35% of oil & gas supply of European Union
- Largest gas reserves, 8th largest oil reserves, 2nd largest coal reserves

Oil and natural gas production in Russia (2013)

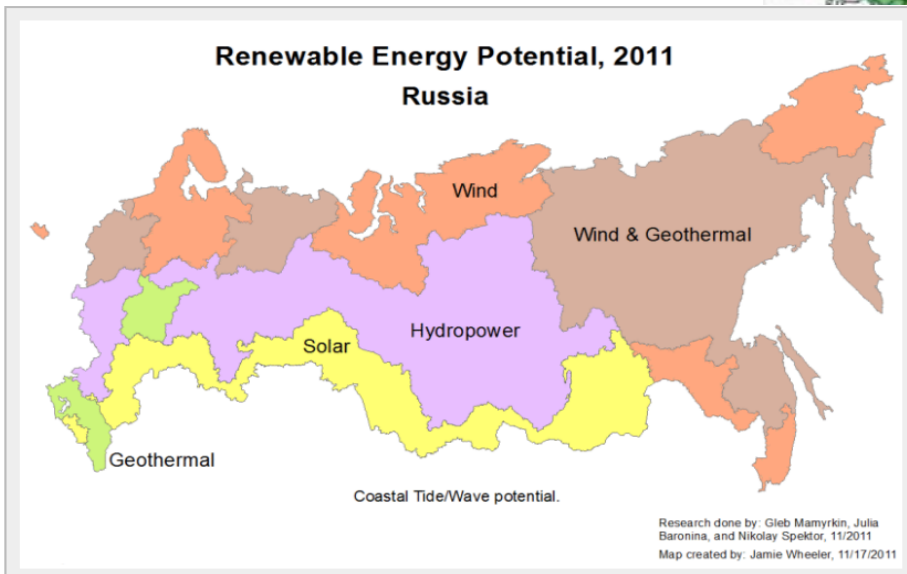
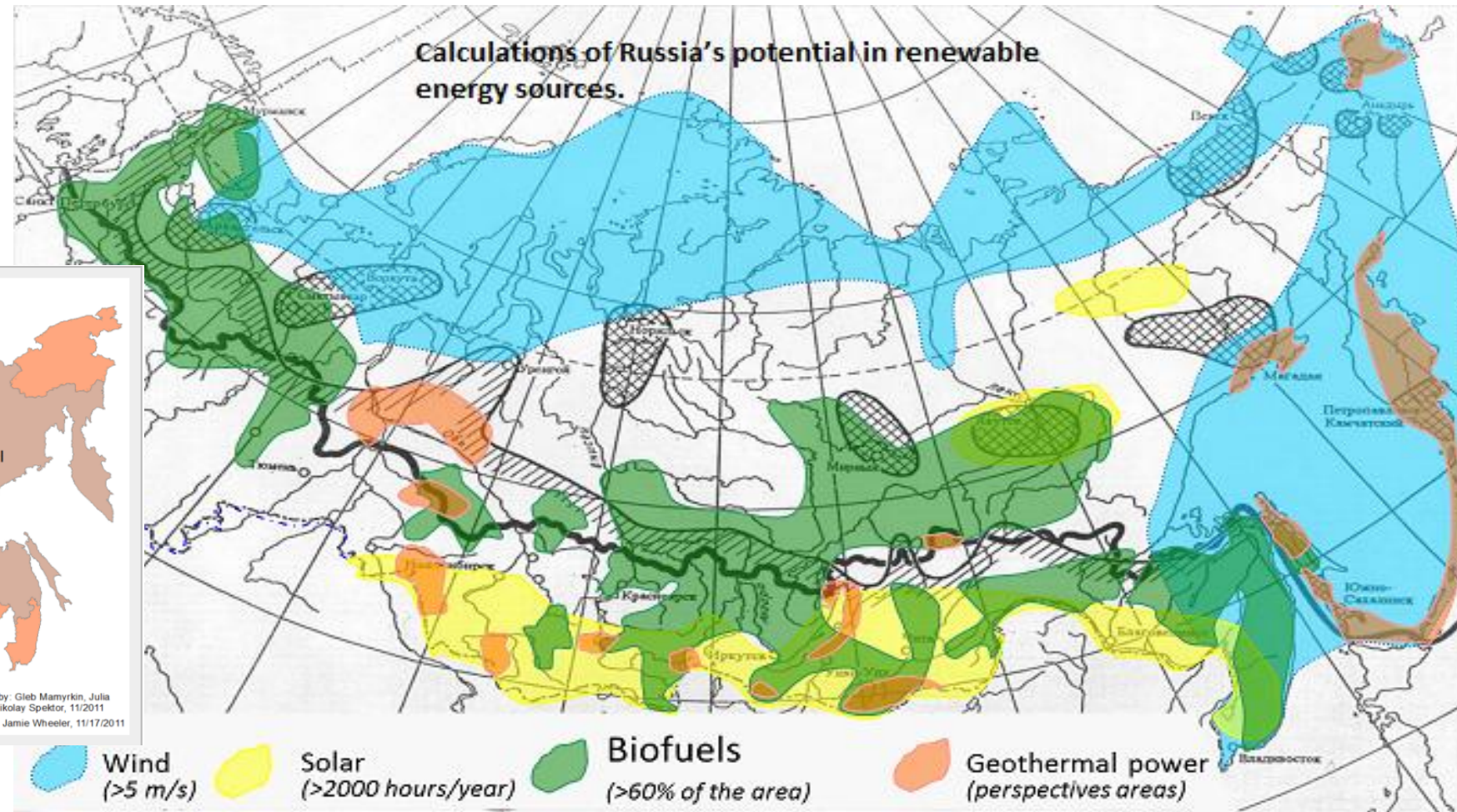




To Renewable Energy Super Power?

Renewables: *infancy/promise*

- Wind/solar: 0,075% (150 MW of 2000 GW)
- Exception: hydro – 4 % of global capacity (45 GW of 1000 GW)





The New Paradigm

The tables are turning, so come on board.



Thank you.