



Global Energy Transition: implications for the Gas Sector

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 **GAZPROM**
JOINT-STOCK COMPANY



 university of
 groningen

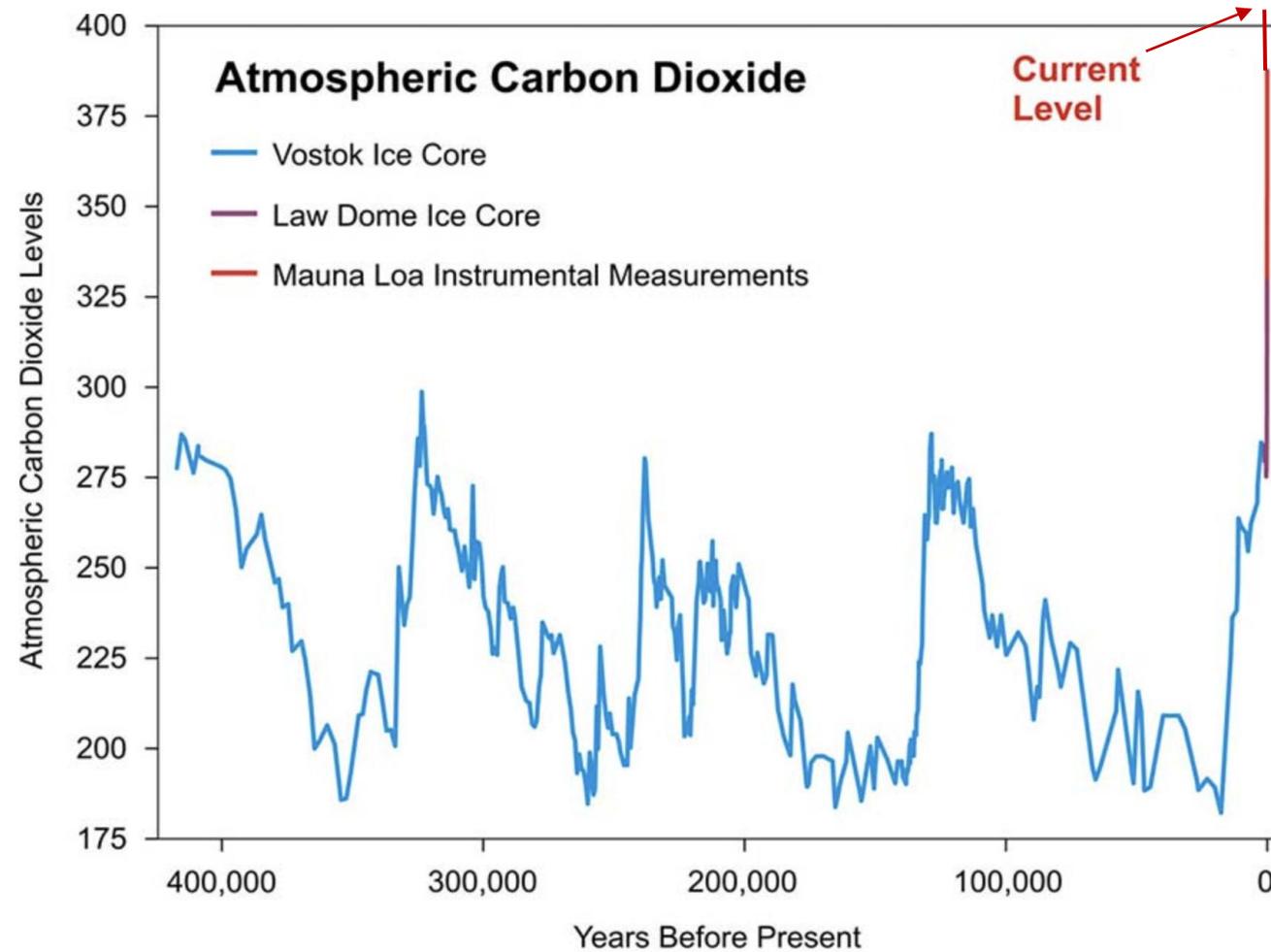


Agenda

- Major global trends impacting the energy sector
- A vision on the future of the gas sector in a hybrid world
- Implications for the Gas Sector, a healthy future?



Atmospheric CO₂ concentration

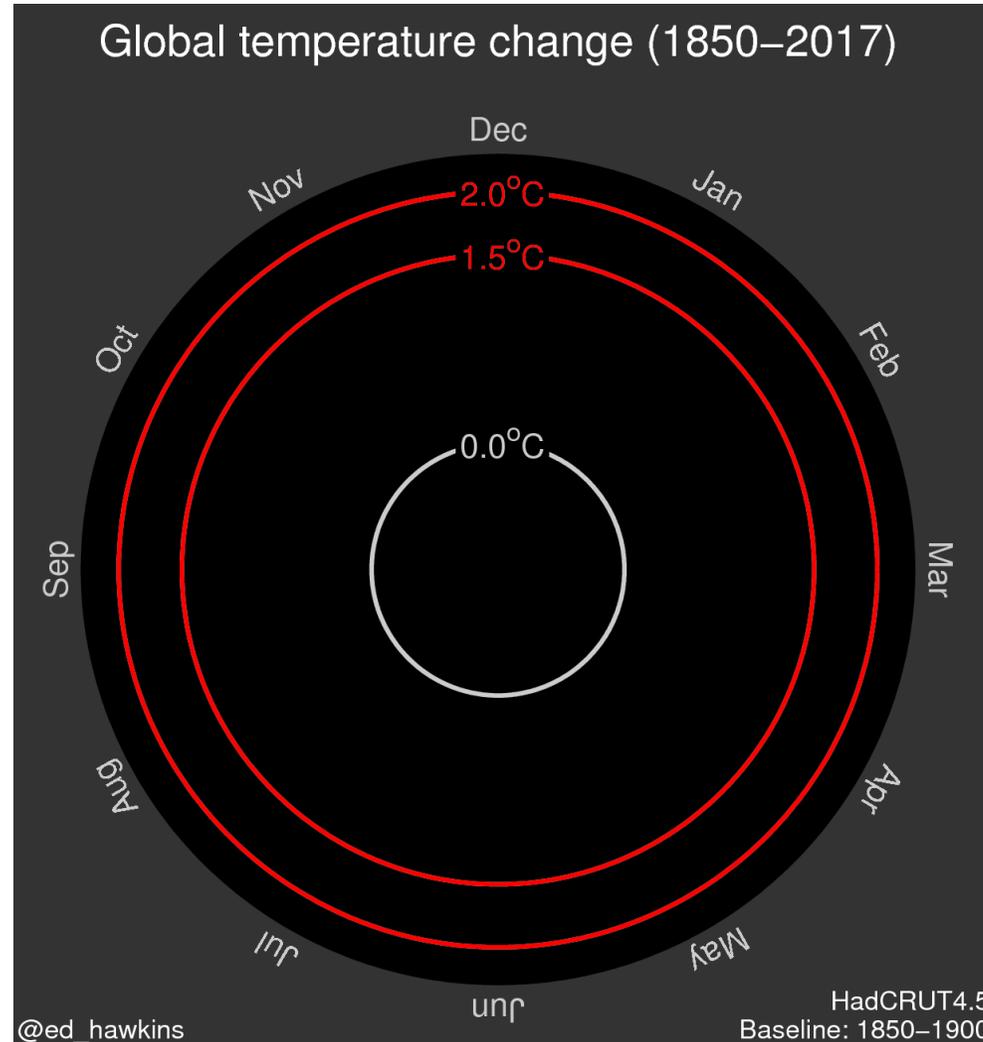


Atmospheric CO₂ History | 400,000 Years Before Present

https://www.co2_earth/co2-ice-core-data



Temperature spiral



<http://www.climate-lab-book.ac.uk/spirals/>

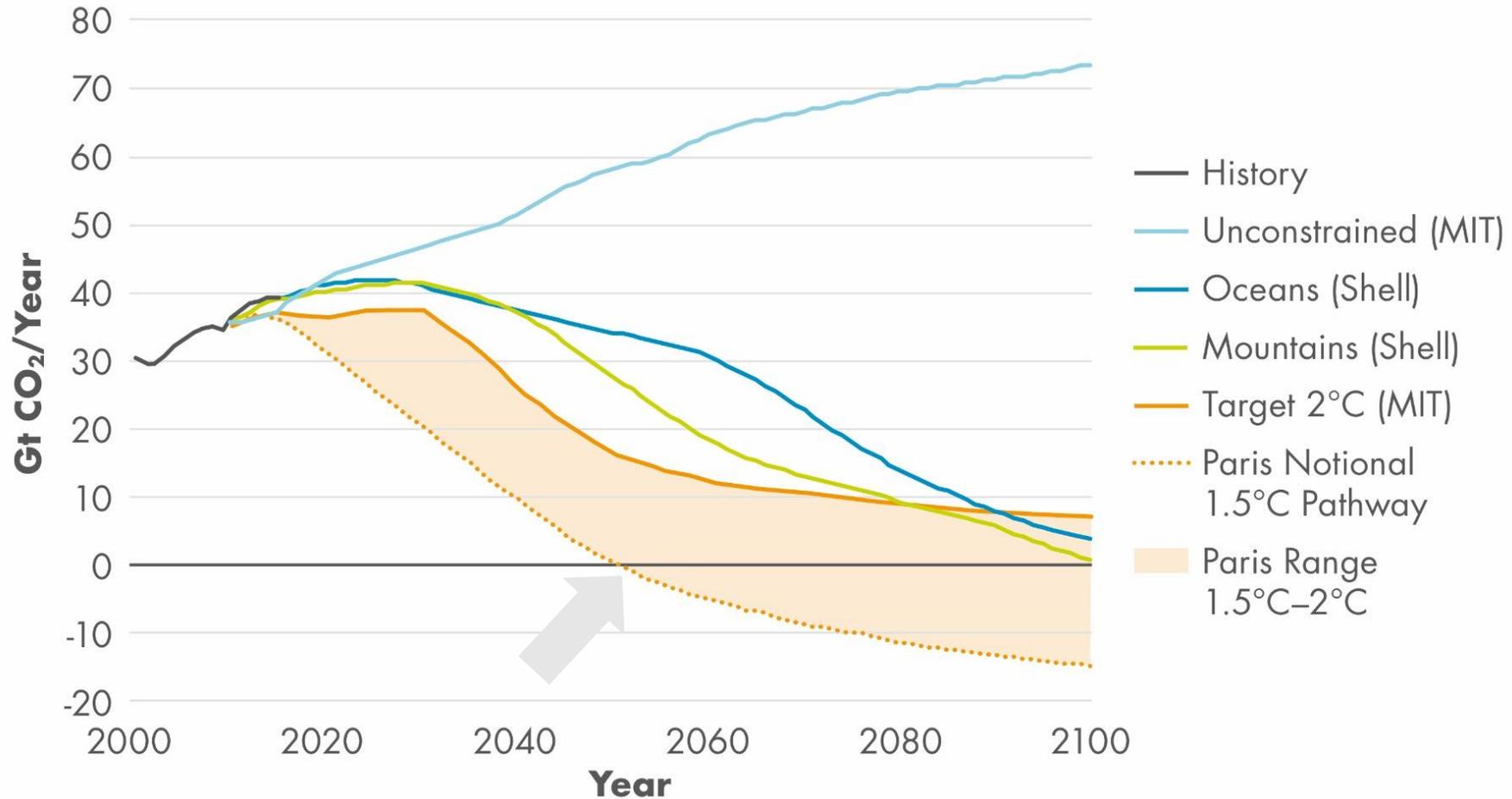


Paris Agreement – Global minus USA





Negative GHG emissions needed by 2050 for achieving limiting 1.5 deg C pathway



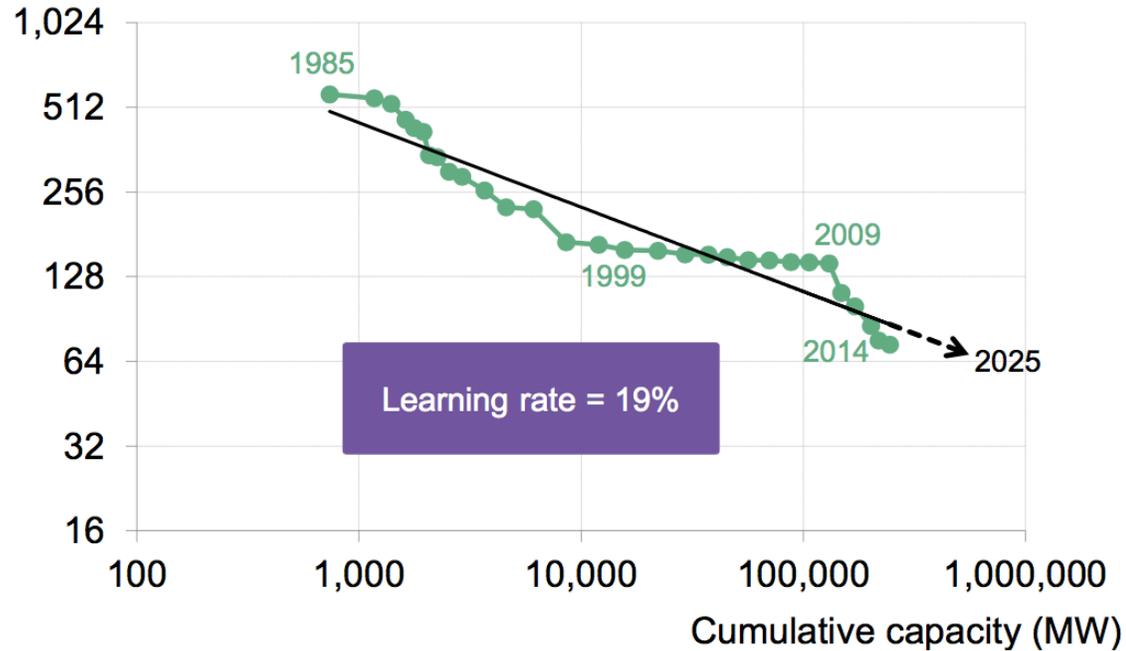
Source: Shell: "A better life with a healthy planet – pathways to net-zero emissions"



Wind and solar cost reduction

Wind

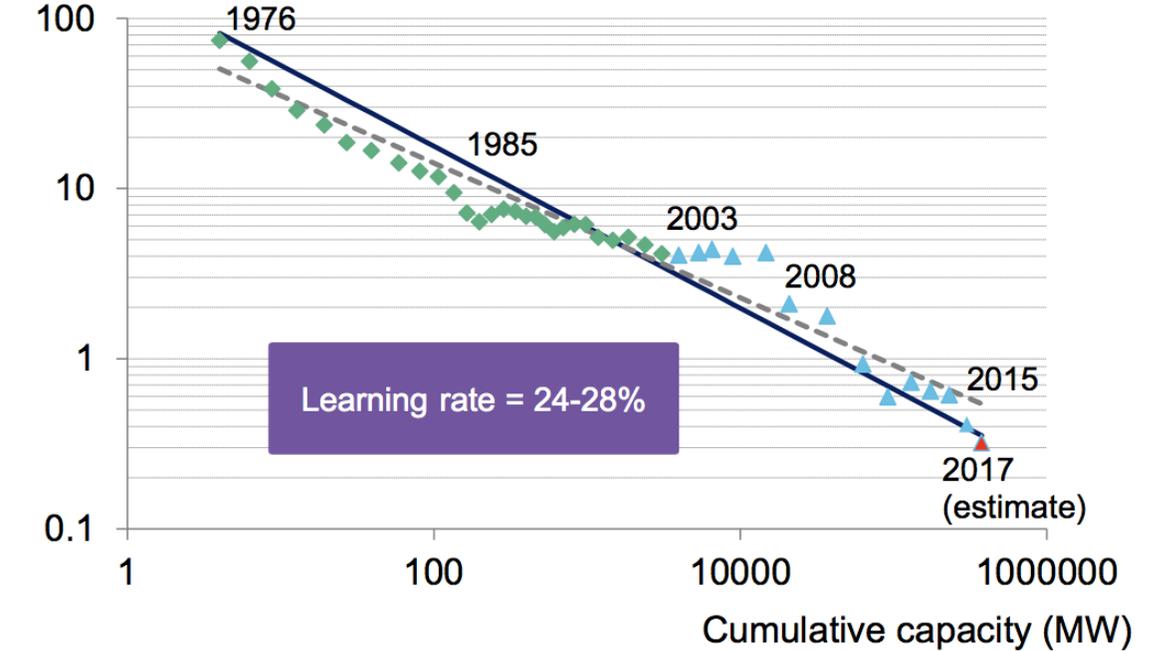
eur/MWh



Source: Bloomberg New Energy Finance

Solar

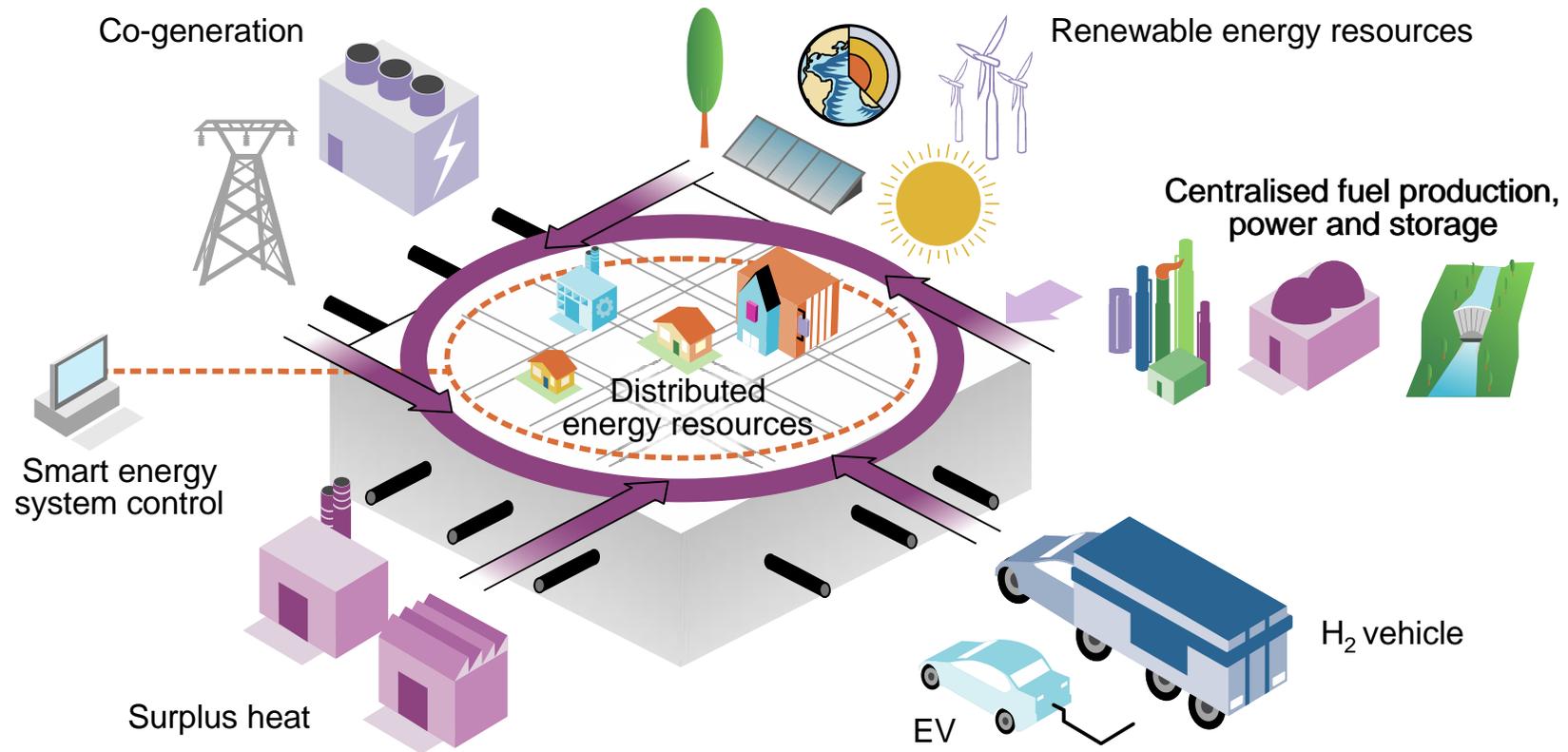
\$/W



Source: Bloomberg New Energy Finance



From centralised to hybrid energy systems



A sustainable energy system is a smarter, more unified and integrated energy system, fed by 'prosumers'



Interim Conclusion – Major global trends affecting the energy sector

- Responding to climate change:
 - climate change is a big problem
 - Paris Agreement: global agreement minus USA
- Technology development is accelerating:
 - Cost reduction renewable energy is reducing rapidly
 - Cost competitiveness of renewable energy is nearing
- From centralised to hybrid energy systems

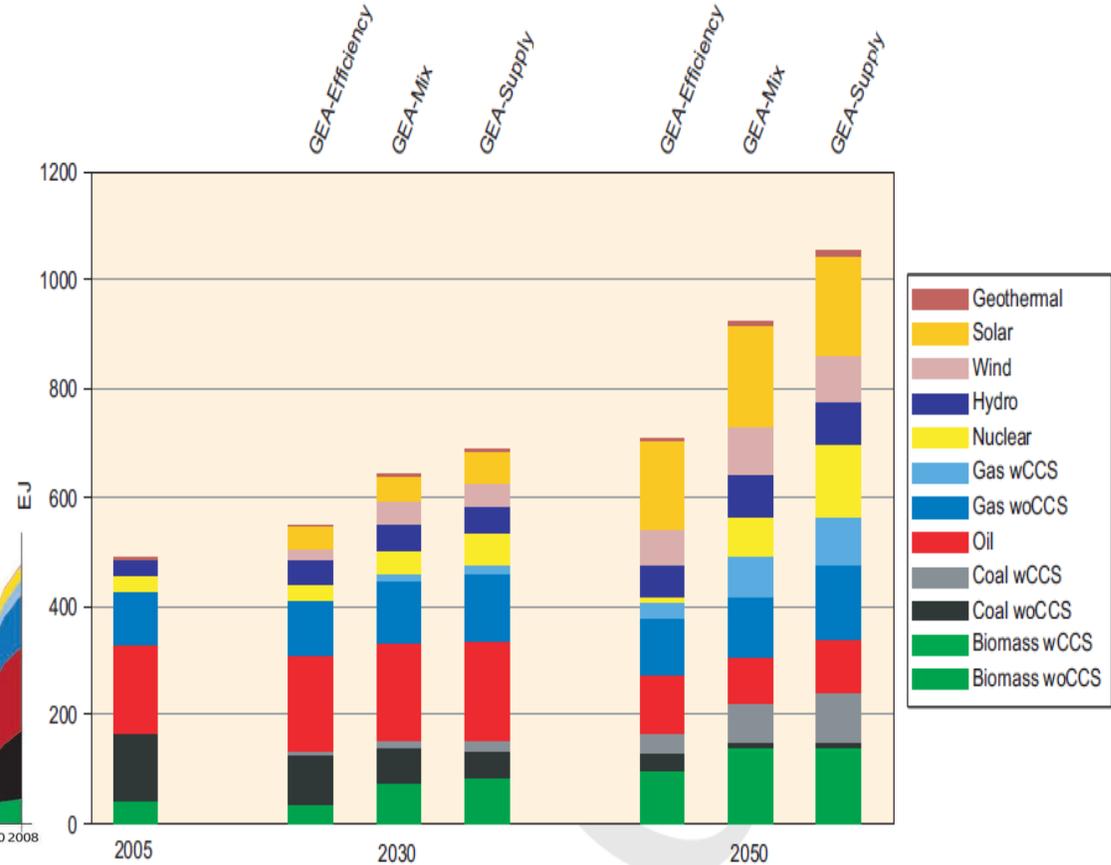
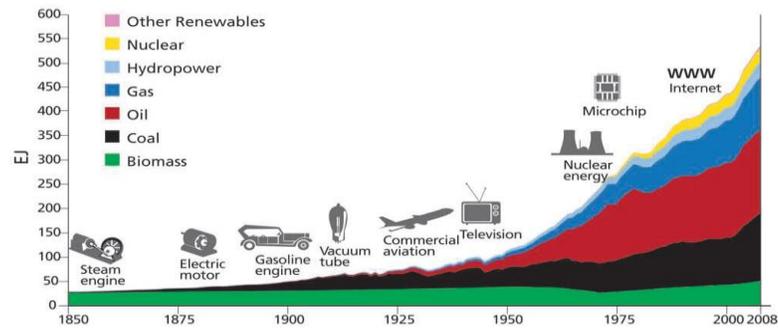
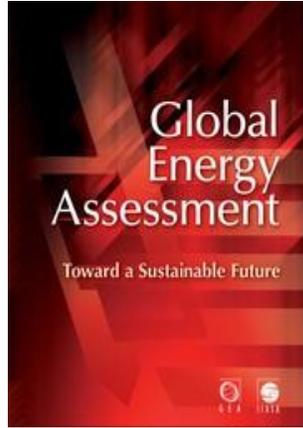


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Or something completely different as per GEA?



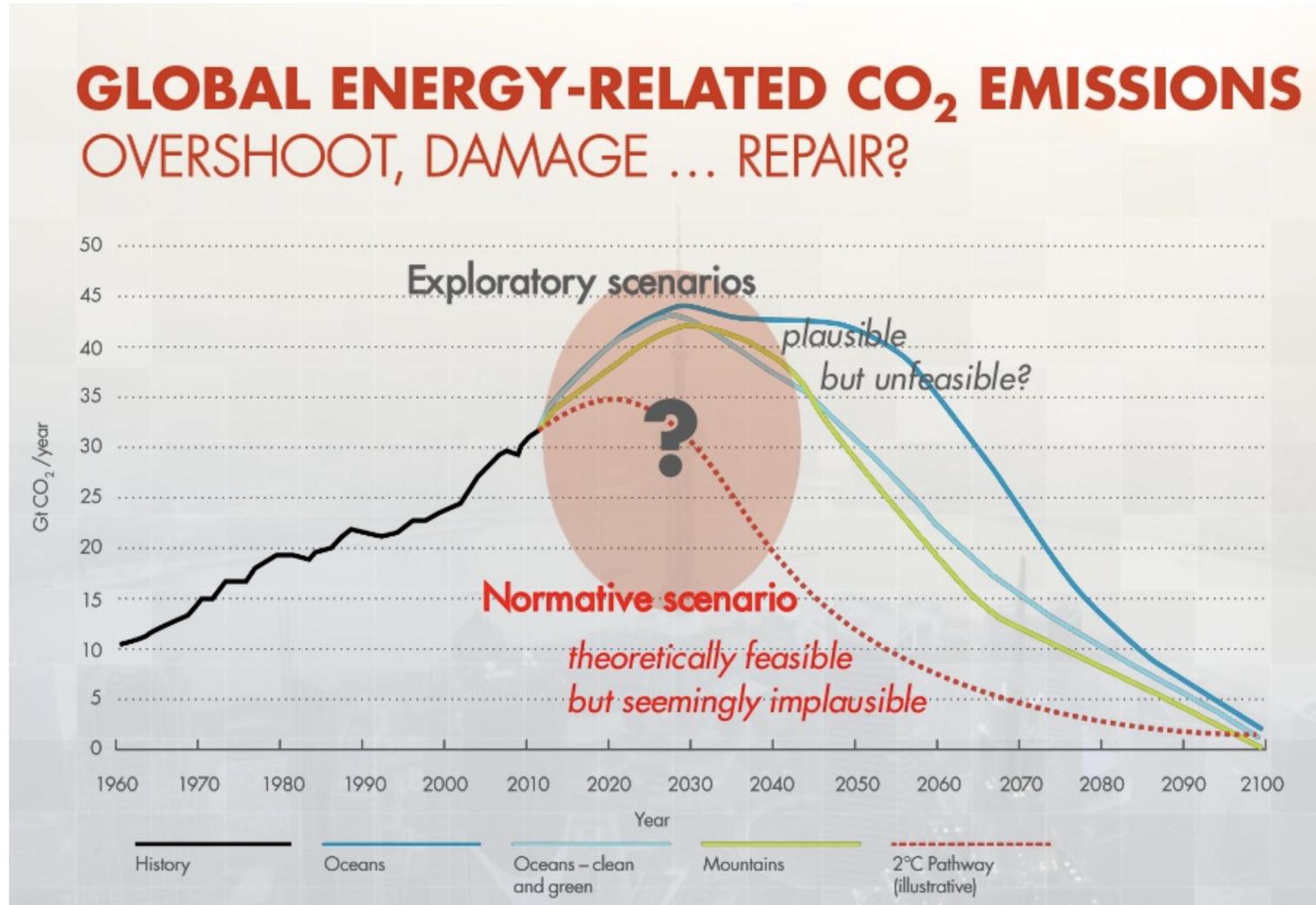


Key Findings of GEA

1. Energy systems can be transformed to support a sustainable future
2. An effective transformation requires immediate action
3. Energy efficiency is an immediate and effective option
4. Renewable energies are abundant, widely available and increasingly cost effective
5. Major changes in fossil energy systems are essential and feasible
6. Universal access to modern energy carriers and cleaner cooking by 2030 is possible
7. An integrated energy system strategy is essential
8. Energy options for a sustainable future bring substantial multiple benefits for society
9. Socio-cultural changes as well as stable rules and regulations will be required
10. Policy, regulations and stable investment regimes will be essential



Shell scenarios: Sharp reduction in CO₂: hybrid world



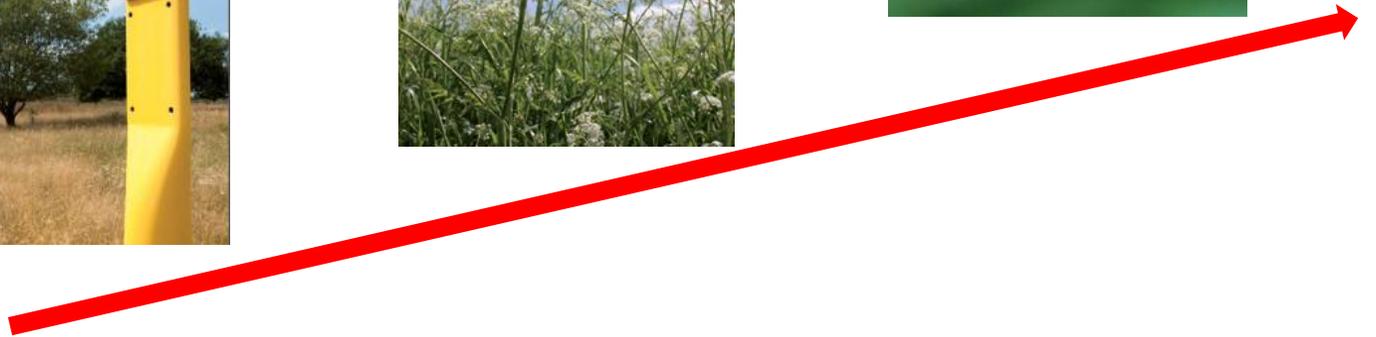
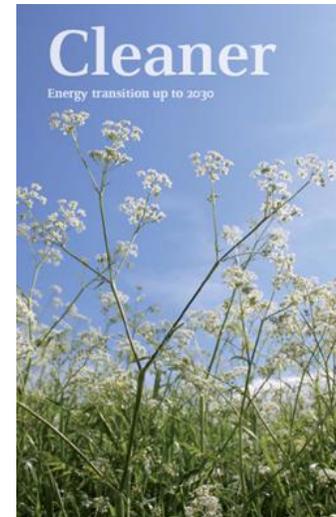
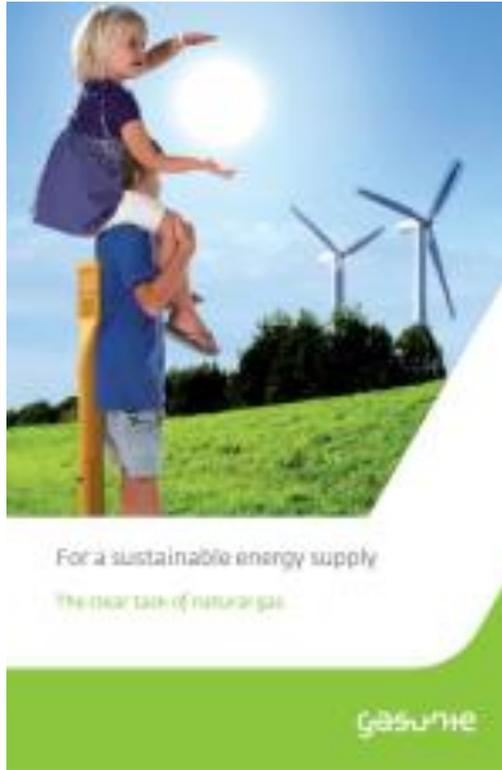


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 - Gas has a major role to play in the short term, but it's longer term is less clear
 - Include global trends into your business strategy
 - Innovate!

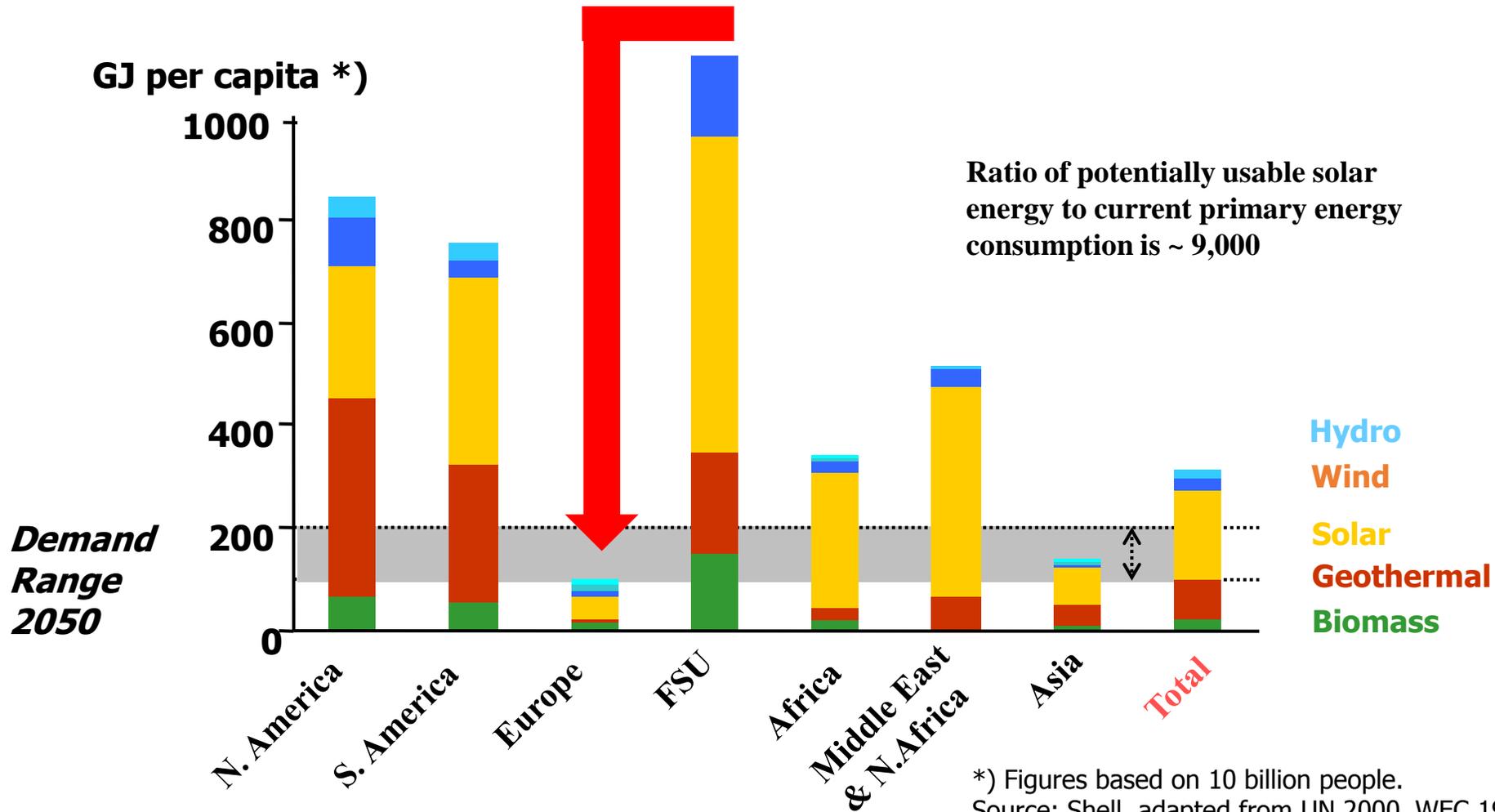


“For a sustainable energy supply – the clear task of natural gas”





Russia has an enormous renewable energy resource base, which it could export to Europe





Conclusion

- Climate change is being addressed through the Paris Agreement
 - Technology development is accelerating and renewable energy technologies are becoming competitive to fossil fuels
 - We are moving from centralised to hybrid energy systems
 - Russia renewable energy resource base is enormous
 - Russia can become an important supplier of renewable energy
- => Look at climate change as a business opportunity!**