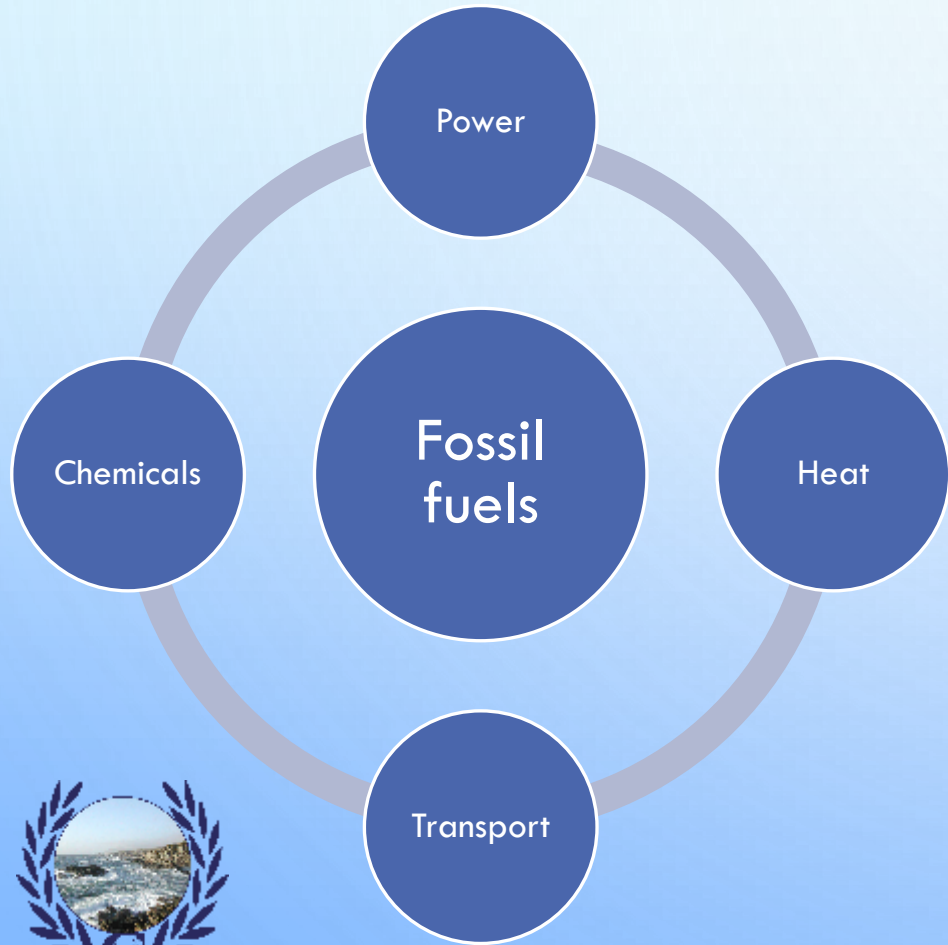


SESSION 9:

THE FUTURE – ELECTRONS AND MOLECULES

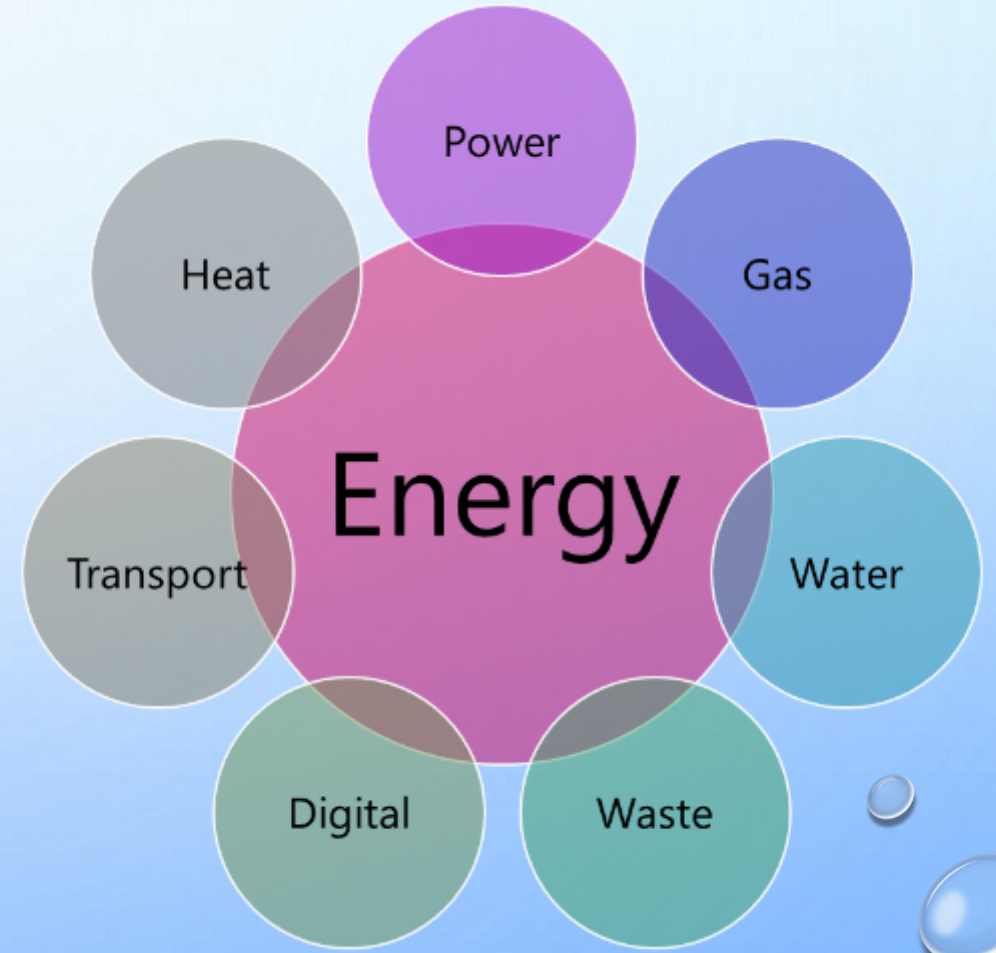


THE EVOLVING ENERGY SYSTEM – THE RISE OF THE ELECTRON



IMPACTS

- Integration
- Networks
- Technology
- Emissions
- Circularity
- Infrastructure
- Efficiency
- Socialisation
- Economy
- Finance



Collaboration and collaborative approaches are critical

THE FUTURE ENERGY SYSTEM

- WIND AND SOLAR
- ELECTRIFICATION
- POWER TO X
- DISTRIBUTED ENERGY SYSTEMS
- ENERGY STORAGE



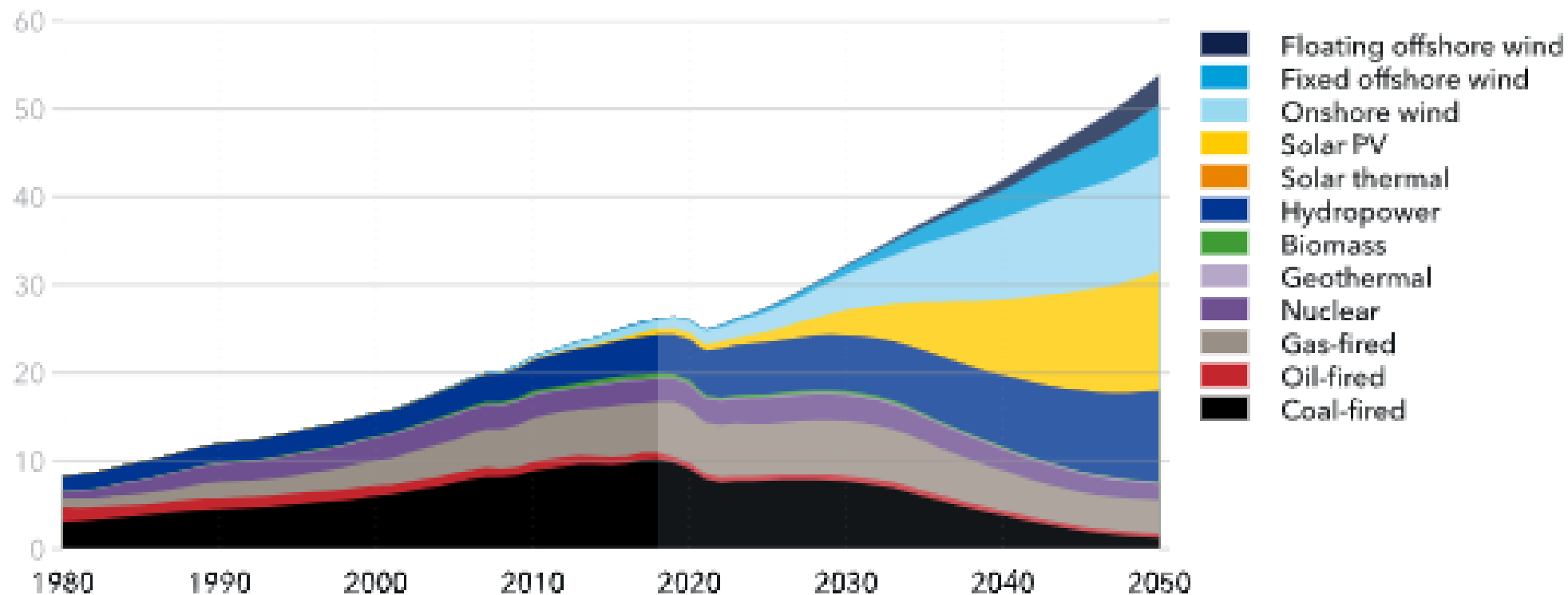
New Zealand bans future offshore oil and gas exploration

Article by Amanda Doyle



World electricity generation by power station type

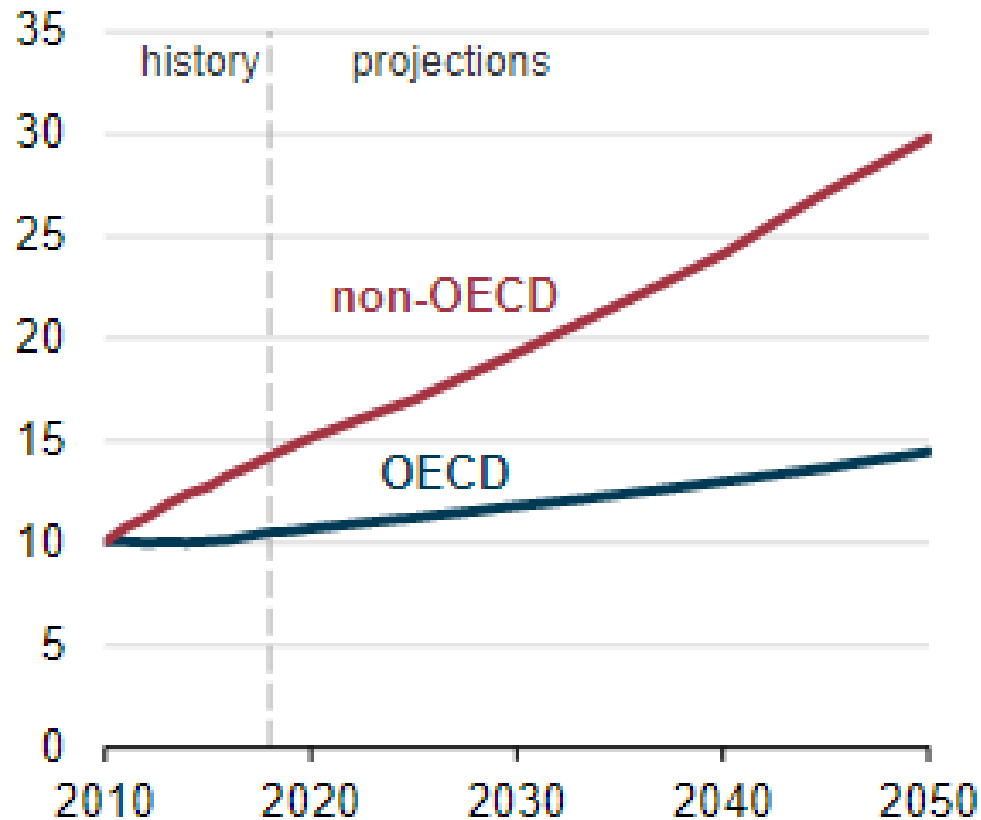
Units: PWh/yr



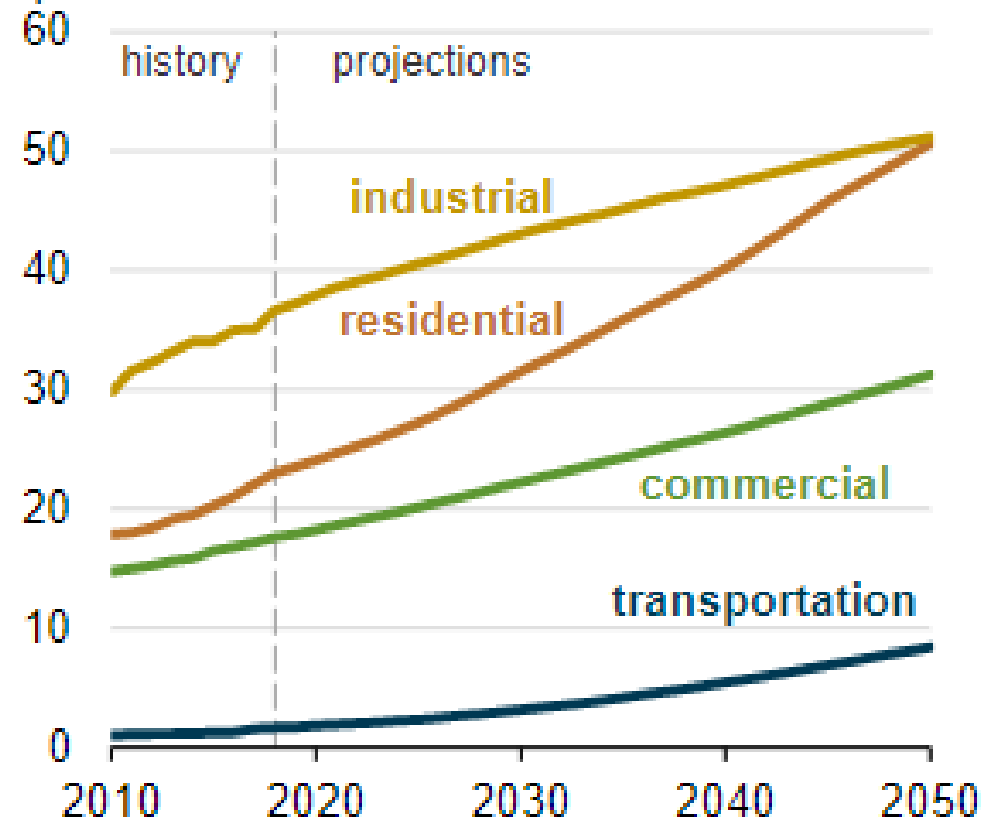
Historical data source: IEA WEB (2018), IRENA (2019)



Global net electricity generation trillion kilowatthours



Global electricity use by sector quadrillion British thermal units

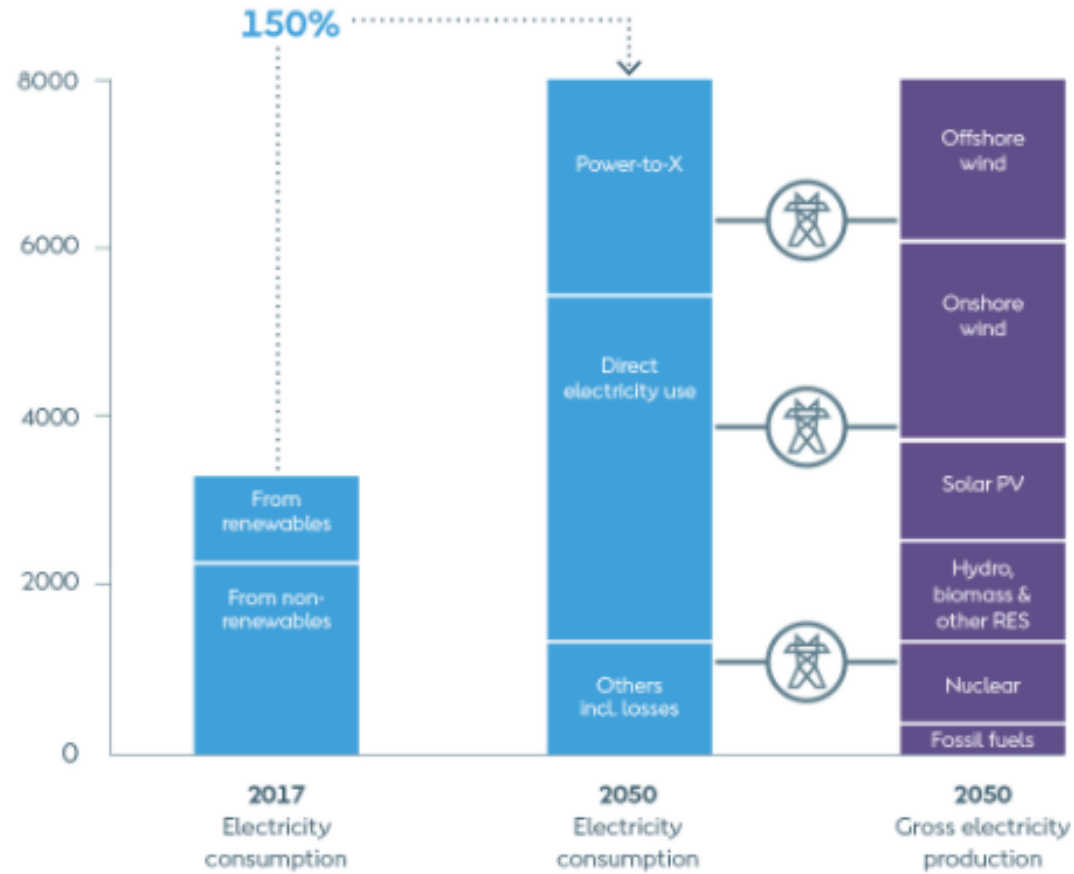


Source: U.S. Energy Information Administration, *International Energy Outlook 2019* Reference case



By 2050, power consumption is set to rise by 150% to fuel Europe's green transformation

TWh







Source: European Commission 2018, 1.5TECH Scenario

DES Definition

Distributed Energy Systems (DES) is a term which encompasses a diverse array of generation, storage and energy monitoring and control solutions. DES can be tailored to very specific requirements and users' applications including cost reductions, energy efficiency, security of supply and carbon reduction.

DES categories include: power generation, combined heat and power, energy storage (including electric vehicles) and distributed energy management systems. DES covers energy in the forms of electricity, heating and cooling.

-  Electricity
-  Heating
-  Cooling
-  Energy reduction

DES

Energy storage



Power generation



External network



User applications



Electric vehicles



Distributed energy management



“

DEVELOPMENTS AND ACTIONS IN ONE PART OF THE ENERGY SYSTEM TRIGGER CHANGES IN ITS OTHER ELEMENTS, UNVEILING NEW, AND SOMETIMES EVEN UNEXPECTED, INTERLINKAGES.

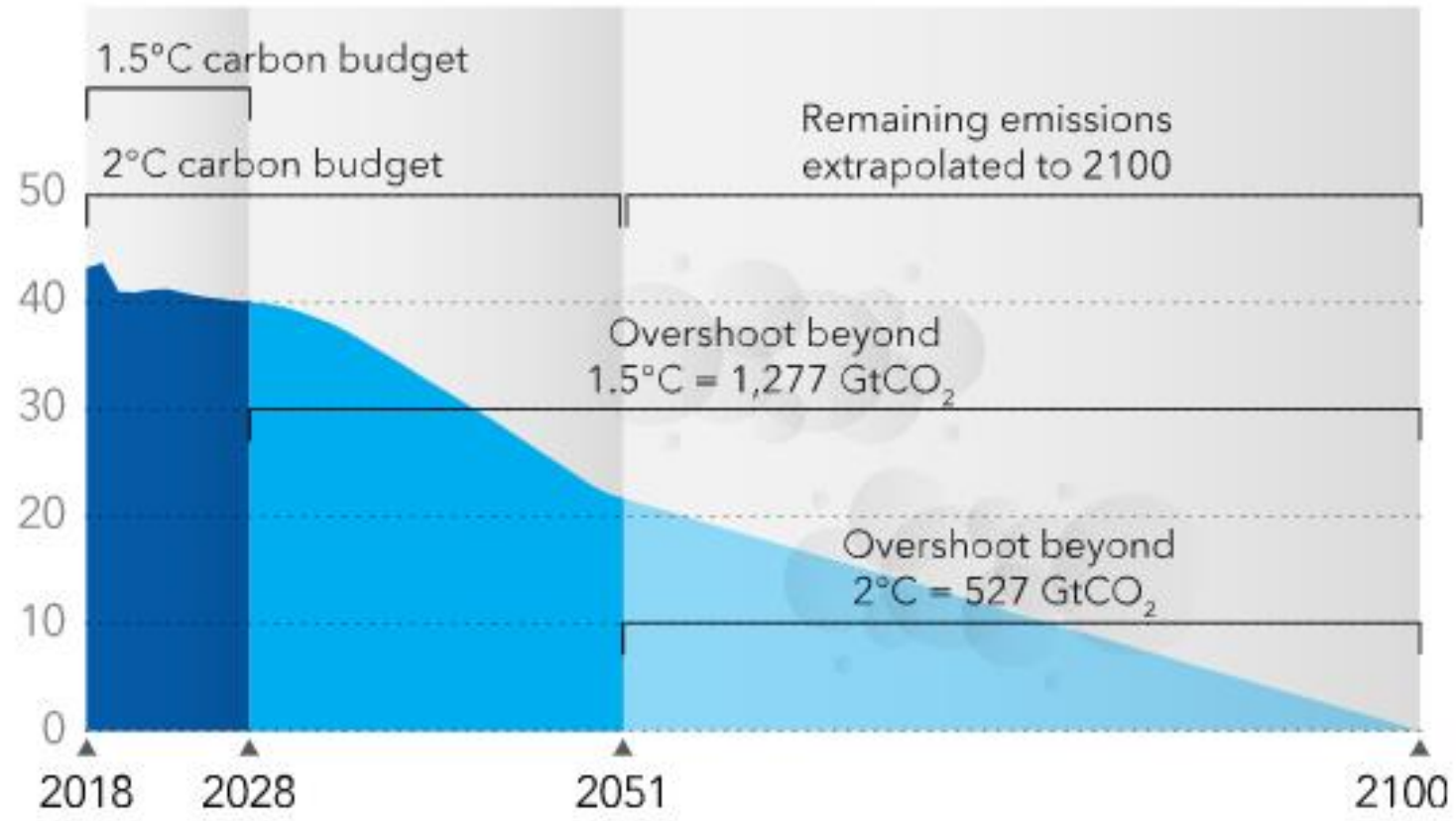
”

“THE FUTURE OF THE EUROPEAN ENERGY SYSTEM: UNVEILING THE BLUEPRINT TOWARDS A CLIMATE-NEUTRAL ECONOMY” WORKSHOP SYNTHESIS REPORT, MARCH 2021



Carbon emissions and carbon budgets

Units: GtCO₂/yr



SOURCE: DNV-GL

“ IN ORDER TO ACHIEVE A FUTURE WHERE GLOBAL WARMING IS LIMITED TO SAFE LEVELS, WE NEED TO FURTHER REDUCE ENERGY USE, ELECTRIFY ALL SECTORS POSSIBLE VIA RENEWABLE ELECTRICITY, DECARBONIZE HARDER-TO-ABATE SECTORS THROUGH E.G. DECARBONIZED GAS, AND SUCCEED WITH CARBON CAPTURE AND STORAGE ON AN INDUSTRIAL SCALE. ”

DNV-GL, ENERGY OUTLOOK 2020



“

NO MATTER WHICH COUNTRY YOU'RE IN, THE COST OF CLEAN ENERGY NOW IS CHEAPER THAN THE COST OF CLIMATE CHANGE LATER. THOSE BETTING ON RENEWABLE ENERGY WILL WIN BIG.

”

JOHN KERRY, US CLIMATE ENVOY



RESOURCES

[HTTPS://WWW.BAYWA-RE.COM/EN/RETHINK-ENERGY/EXPLORE-THE-DECADE-THAT-MATTERS/HOME/](https://www.baywa-re.com/en/rethink-energy/explore-the-decade-that-matters/home/)

[HTTPS://WWW.ARUP.COM/-/MEDIA/ARUP/FILES/PUBLICATIONS/D/DES_FULL-REPORT.PDF](https://www.arup.com/-/media/arup/files/publications/d/des_full-report.pdf)

[HTTPS://WWW.IRENA.ORG/PUBLICATIONS/2020/APR/GLOBAL-RENEWABLES-OUTLOOK-2020](https://www.irena.org/publications/2020/apr/global-renewables-outlook-2020)

[HTTPS://EASE-STORAGE.EU/PUBLICATION/DECARBONISED-EUROPE-2050/](https://ease-storage.eu/publication/decarbonised-europe-2050/)



Q & A

