



WHEN TRUST MATTERS

Energy Transition Outlook World Energy Systems by 2050

13 May 2021

Power Supply & Use

Graham Slack, Country Manager Australia, Energy Systems at DNV



Highlights

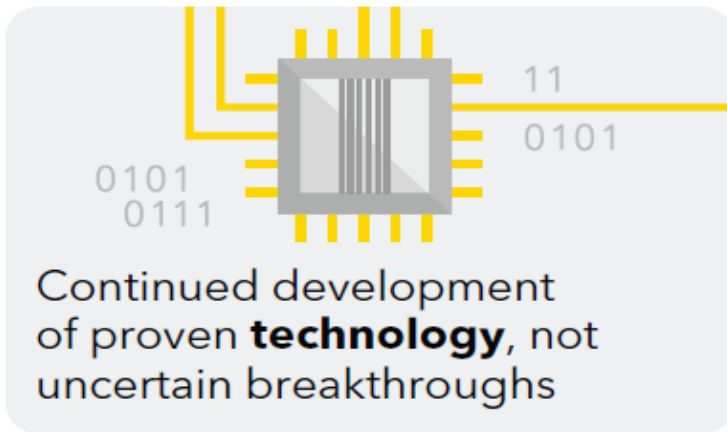
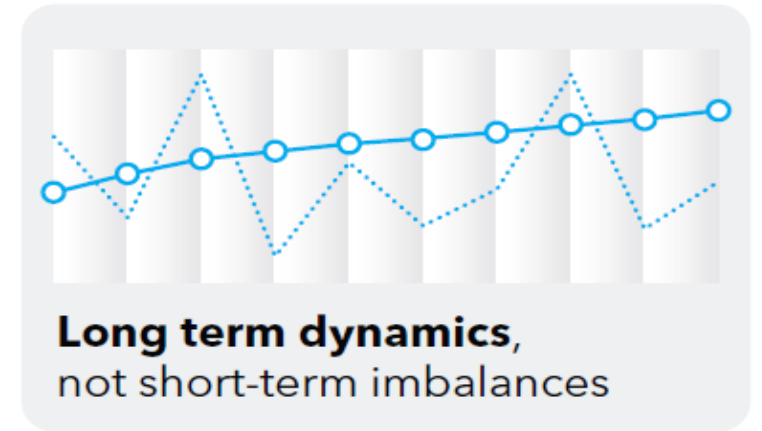
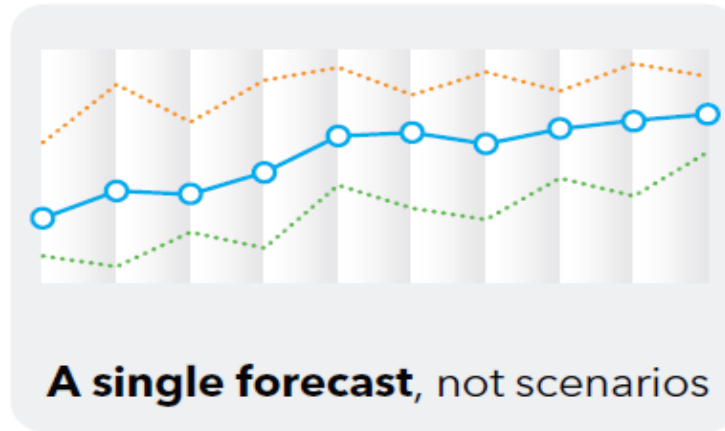
COVID-19 reduces energy demand by 8% and places peak emissions behind us

Rapid electrification, dominated by solar PV and wind, transforms the energy mix

Decarbonization of hard-to-abate sectors remain too slow; we are not on track to meet the Paris Agreement targets

Existing technologies can deliver the 1.5°C ambition, but stronger policies are needed to scale uptake

Our approach



Our model of the world's energy system



Dedicated research unit
focusing on the energy
transition

100+ internal experts
across oil and gas,
renewables and
transport infrastructure

**~30 external
collaboration partners**
in business and academia

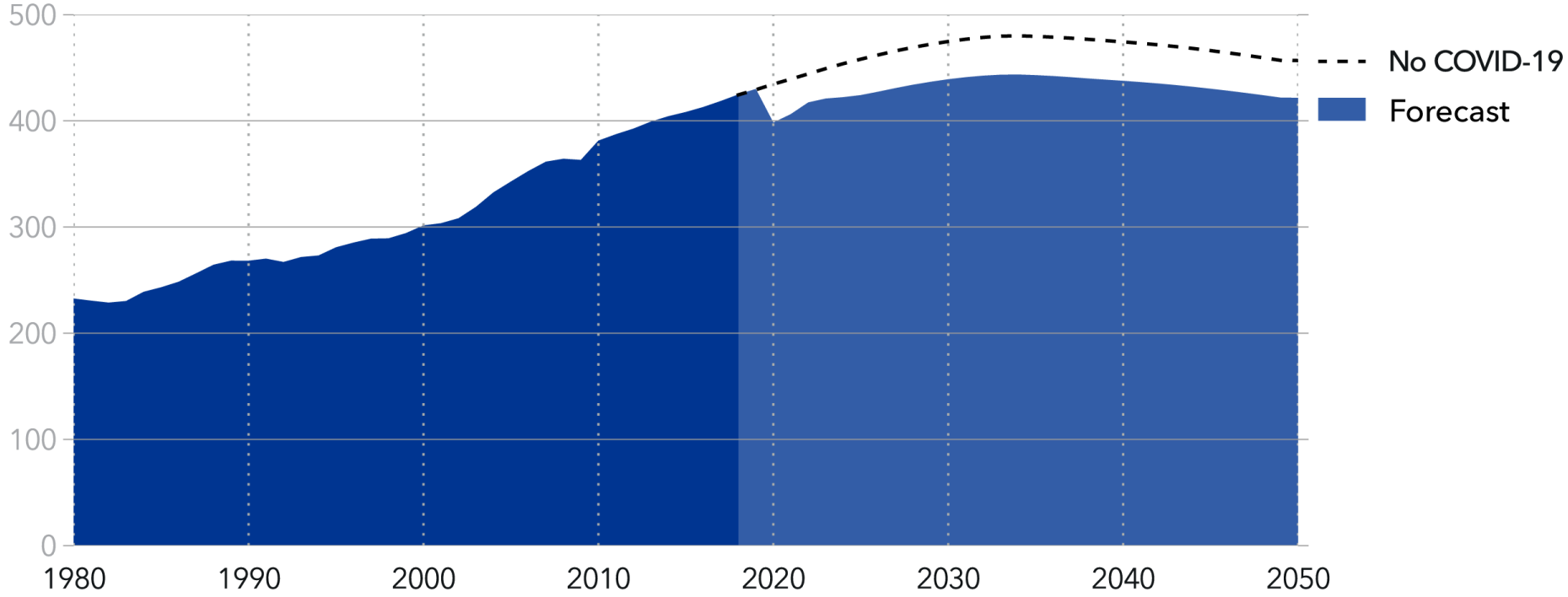
A global and regional forecast



COVID-19 reduces global energy demand by 8%

World final energy demand - with and without COVID-19

Units: EJ/yr

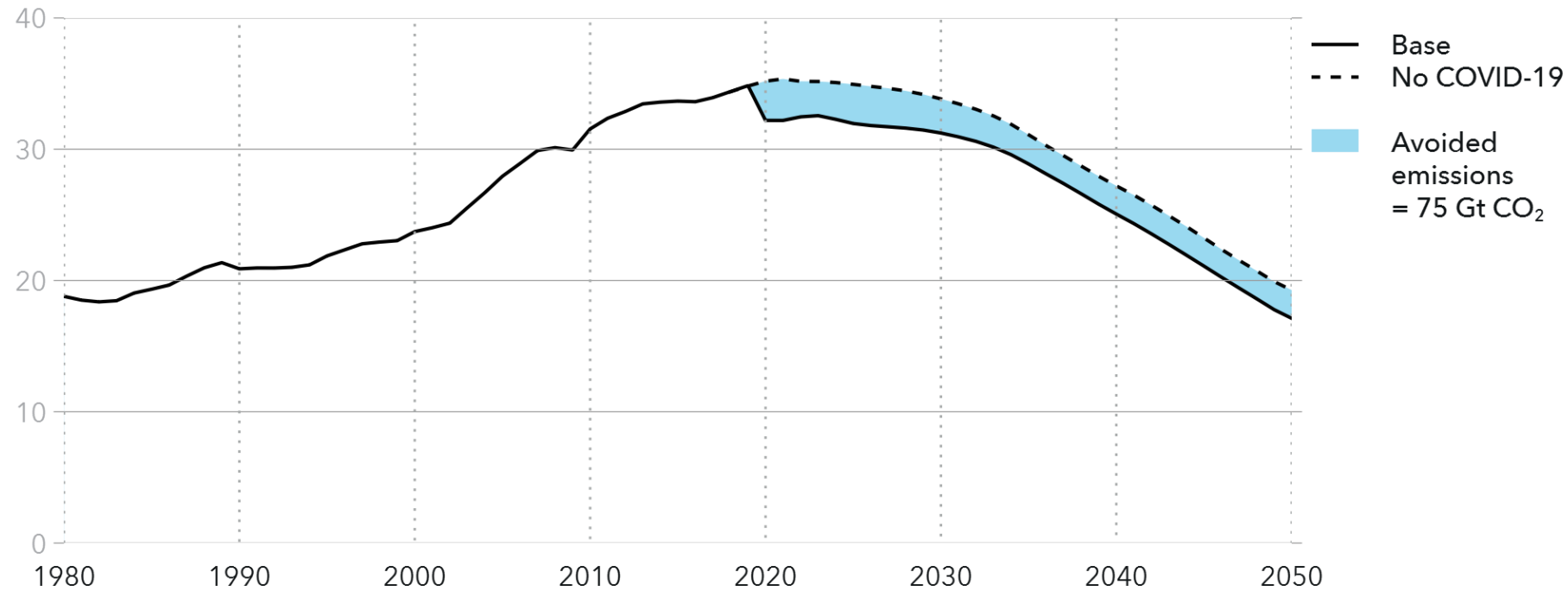


Historical data source: IEA WEB (2019)

Emissions have peaked, but COVID-19 has limited long-term effects on the climate

World energy-related CO₂ emissions - with and without COVID-19

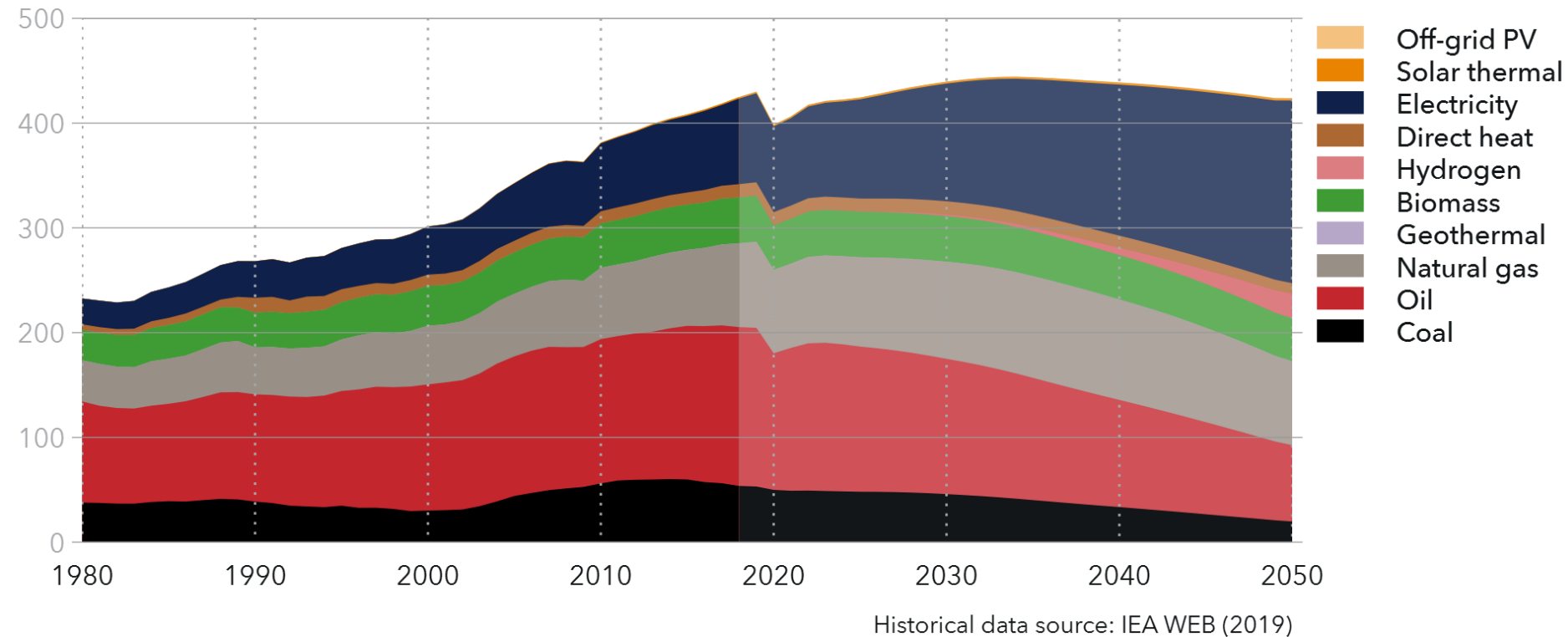
Units: GtCO₂/yr



The share of electricity in the final energy demand mix will more than double

World final energy demand by carrier

Units: EJ/yr



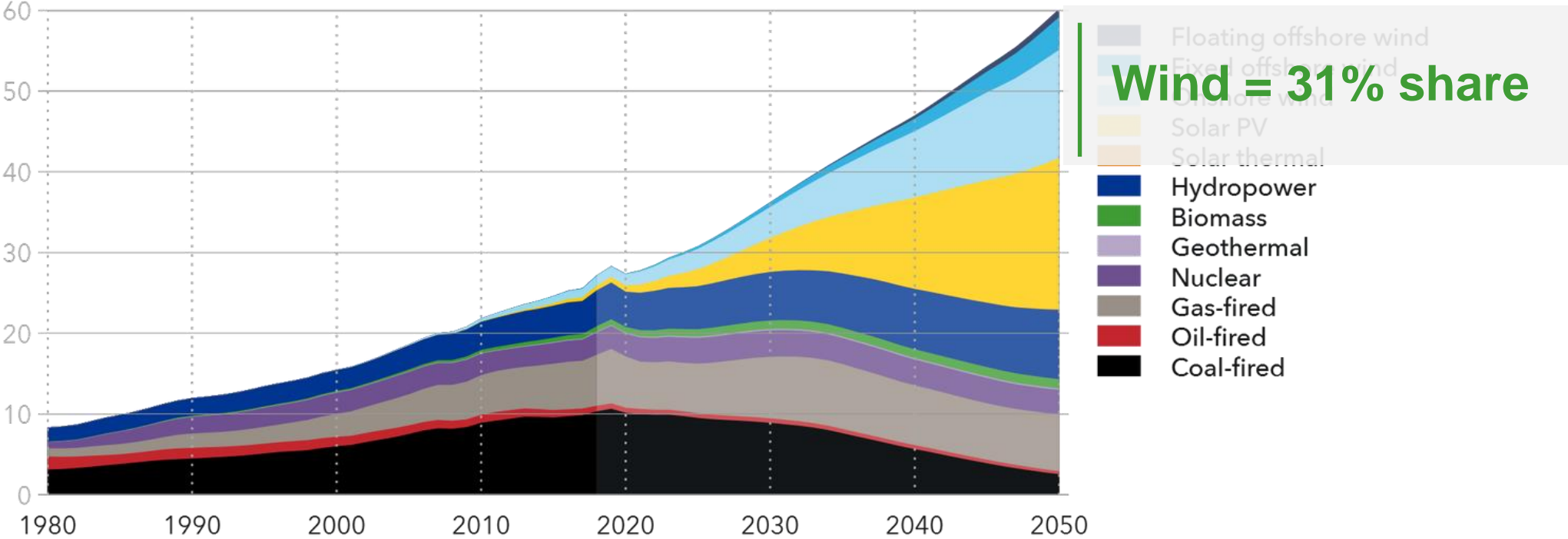
WIND



Wind grows to 31% of electricity generation by 2050

World electricity generation by power station type

Units: PWh/yr

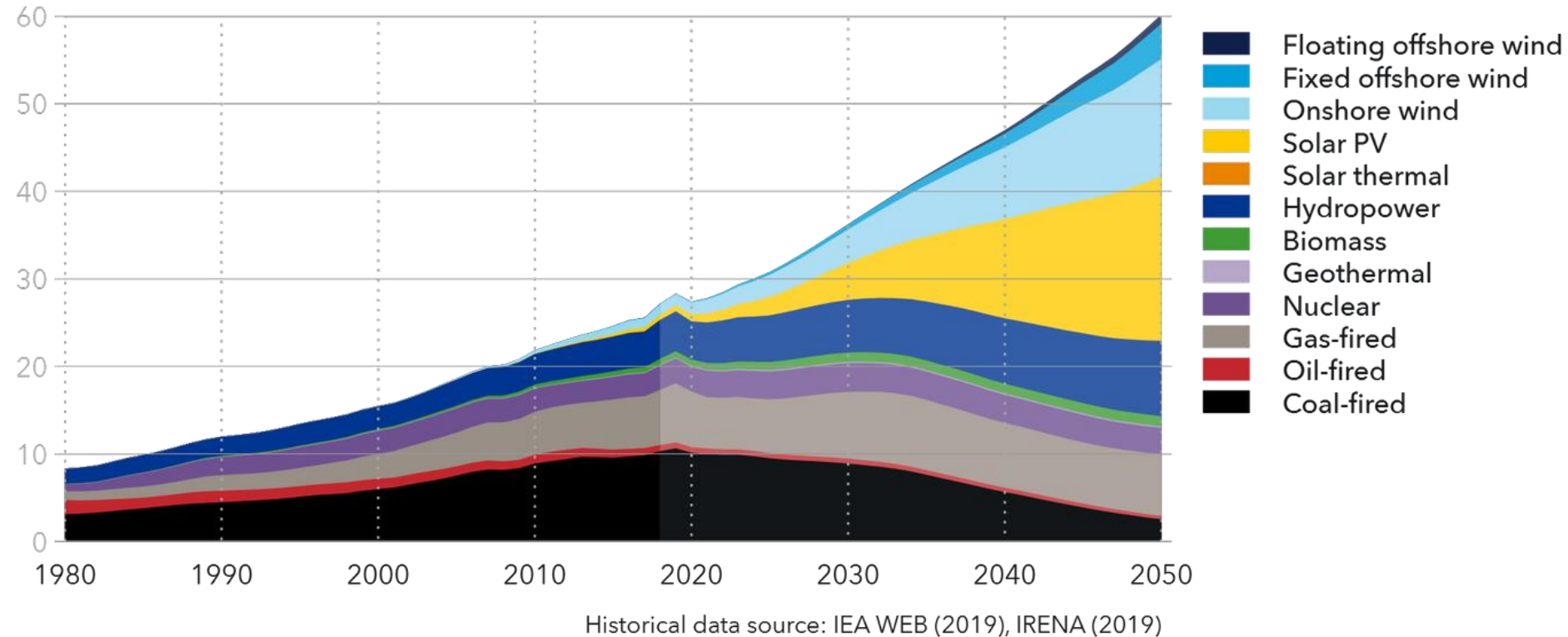


Historical data source: IEA WEB (2019), IRENA (2019)

Wind grows to 31% of electricity generation by 2050

World electricity generation by power station type

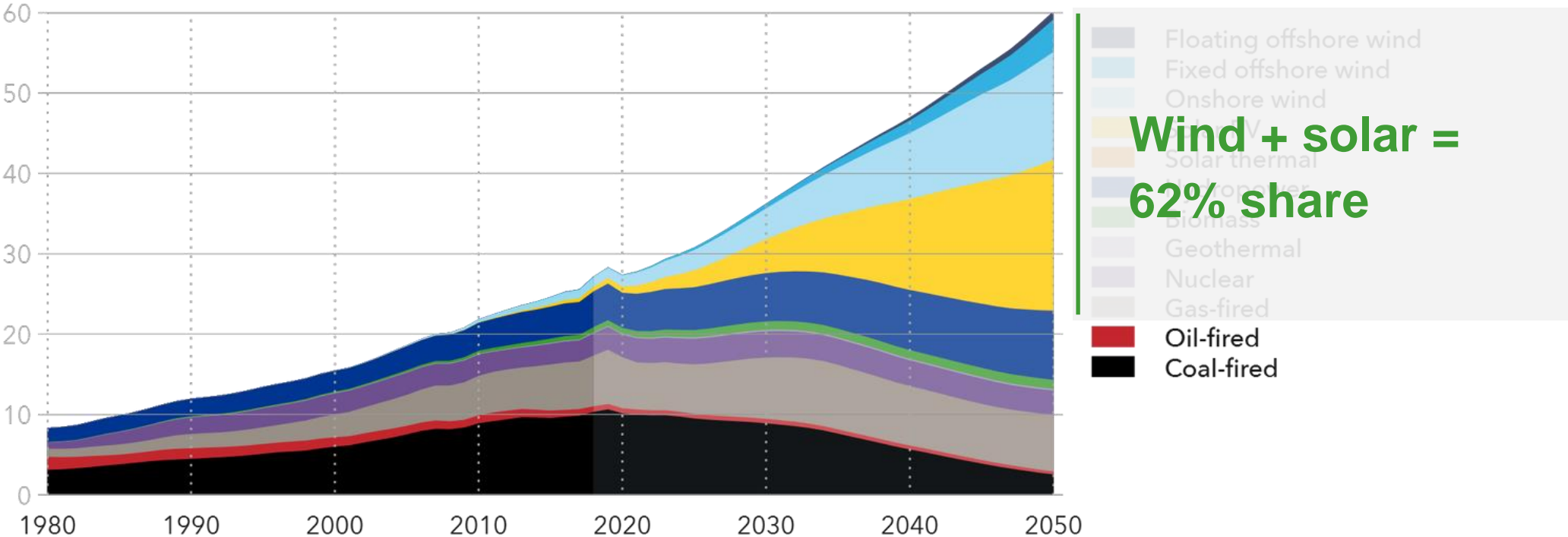
Units: PWh/yr



We predict a huge shift in the electricity system

World electricity generation by power station type

Units: PWh/yr

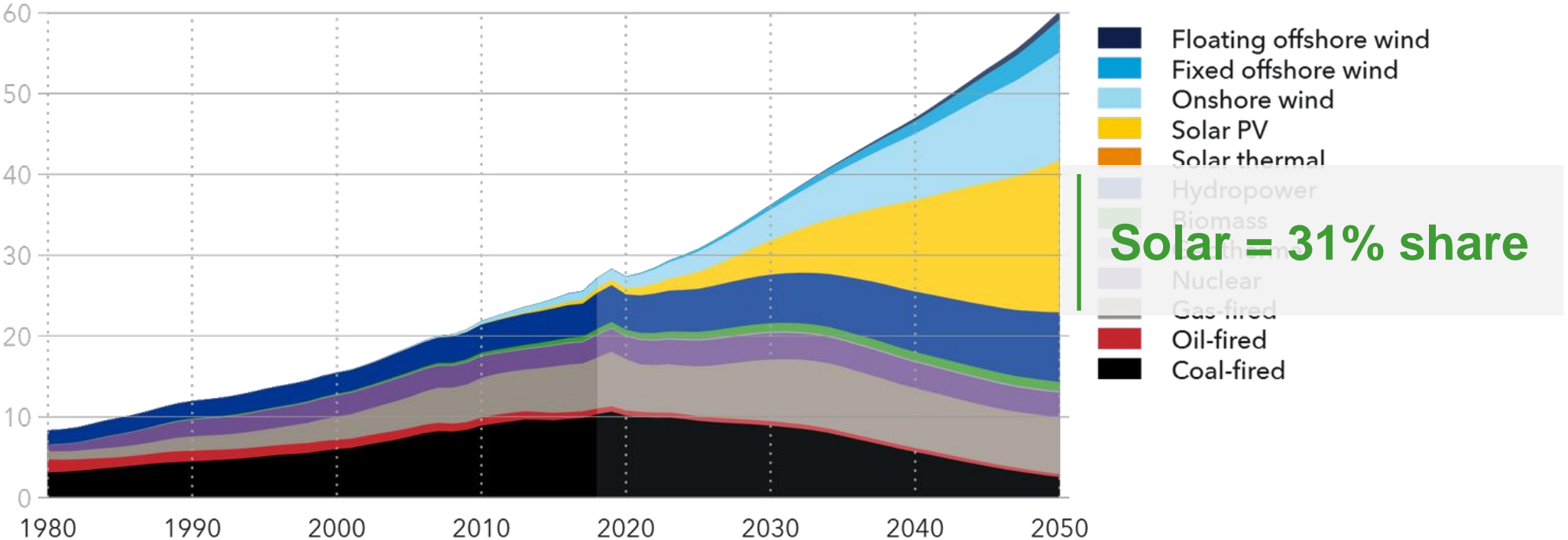


Historical data source: IEA WEB (2019), IRENA (2019)

Solar and wind will dominate electrical generation

World electricity generation by power station type

Units: PWh/yr



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

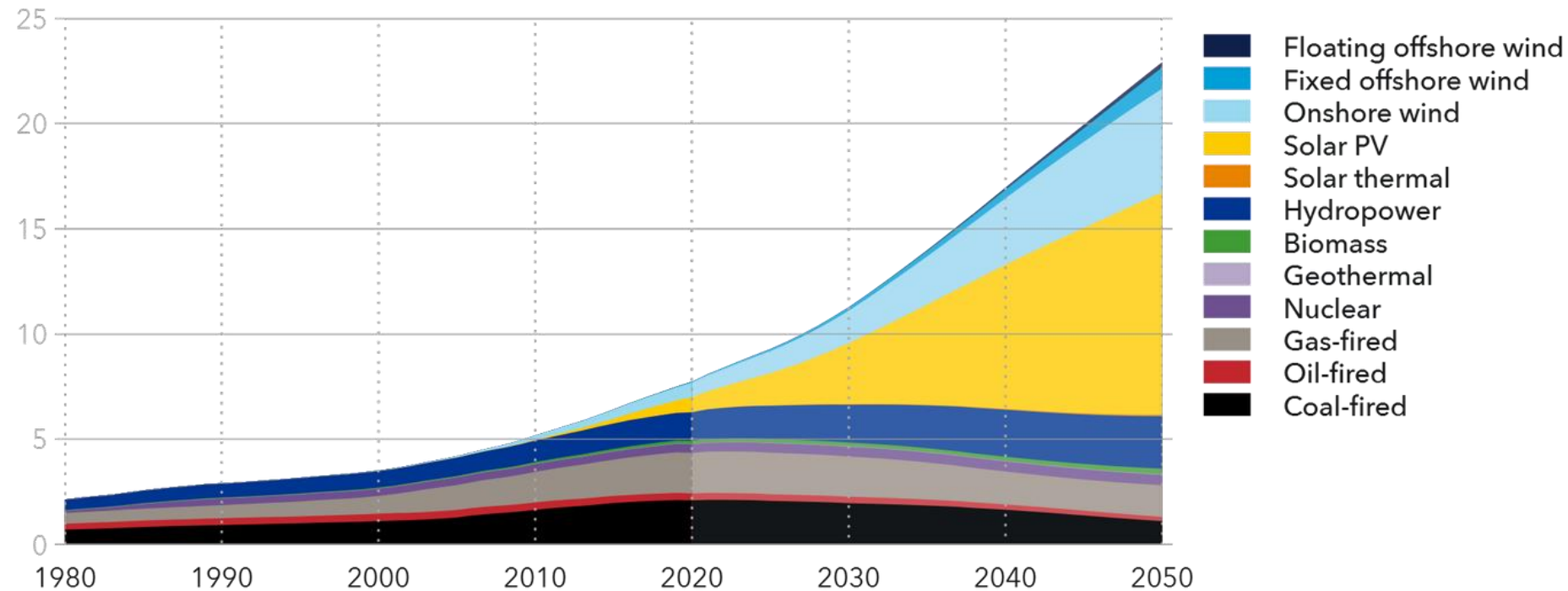
SOLAR



Solar PV generation grows to be 46% of the total installed capacity by 2050

World power station installed capacity

Units: TW



Historical data source: GlobalData (2020), Platts WEPP (2018), IRENA (2020), WNA (2020)

Regulatory and policy implications

Growth in subsidy-free renewables will be less policy driven and more market driven

Shorter term commitment still needed for post-pandemic economic stimulus packages and new focused policies and regulation

Preparing for a large volume of renewables

Electricity market regulators should give greater consideration to how power markets should be designed

Dynamic, closer to real-time market operation should remunerate resources for providing network services

For other sectors, such as Evs, the right balance of 'pull' and 'push' factors will be key to reducing emissions

The investment required for a successful transition is huge

Substantial opportunities for investment in:

- New generation
- New and upgraded grid infrastructure
- New applications in energy use

Thank you

Graham Slack, Country Manager Australia, Energy Systems at DNV

graham.slack@dnv.com

www.dnv.com