



THE EVOLVING ENERGY TRANSITION

Joe Slater

CIGRE Pre-Conference Panel Presentation

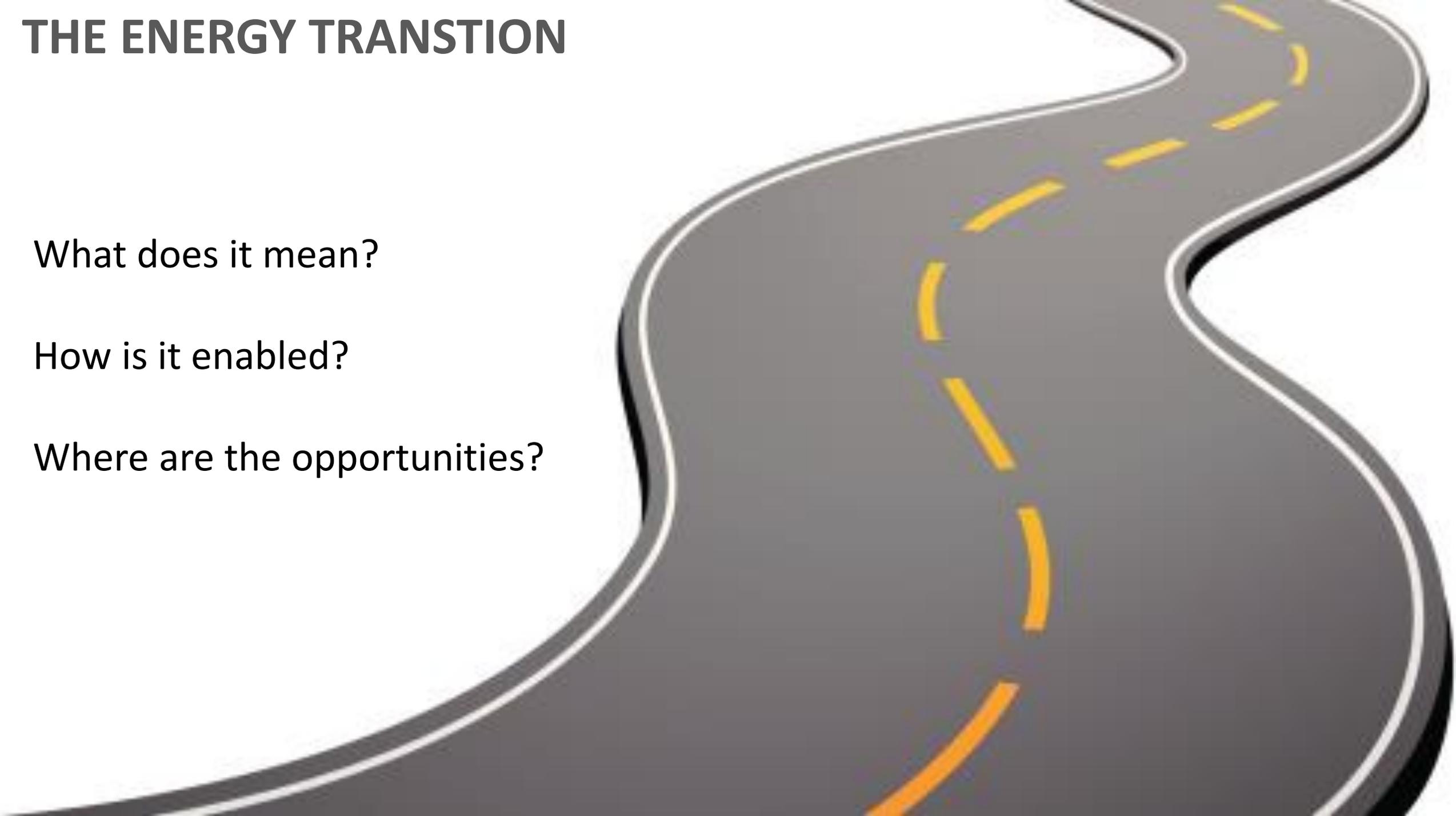
Oct 31, 2022

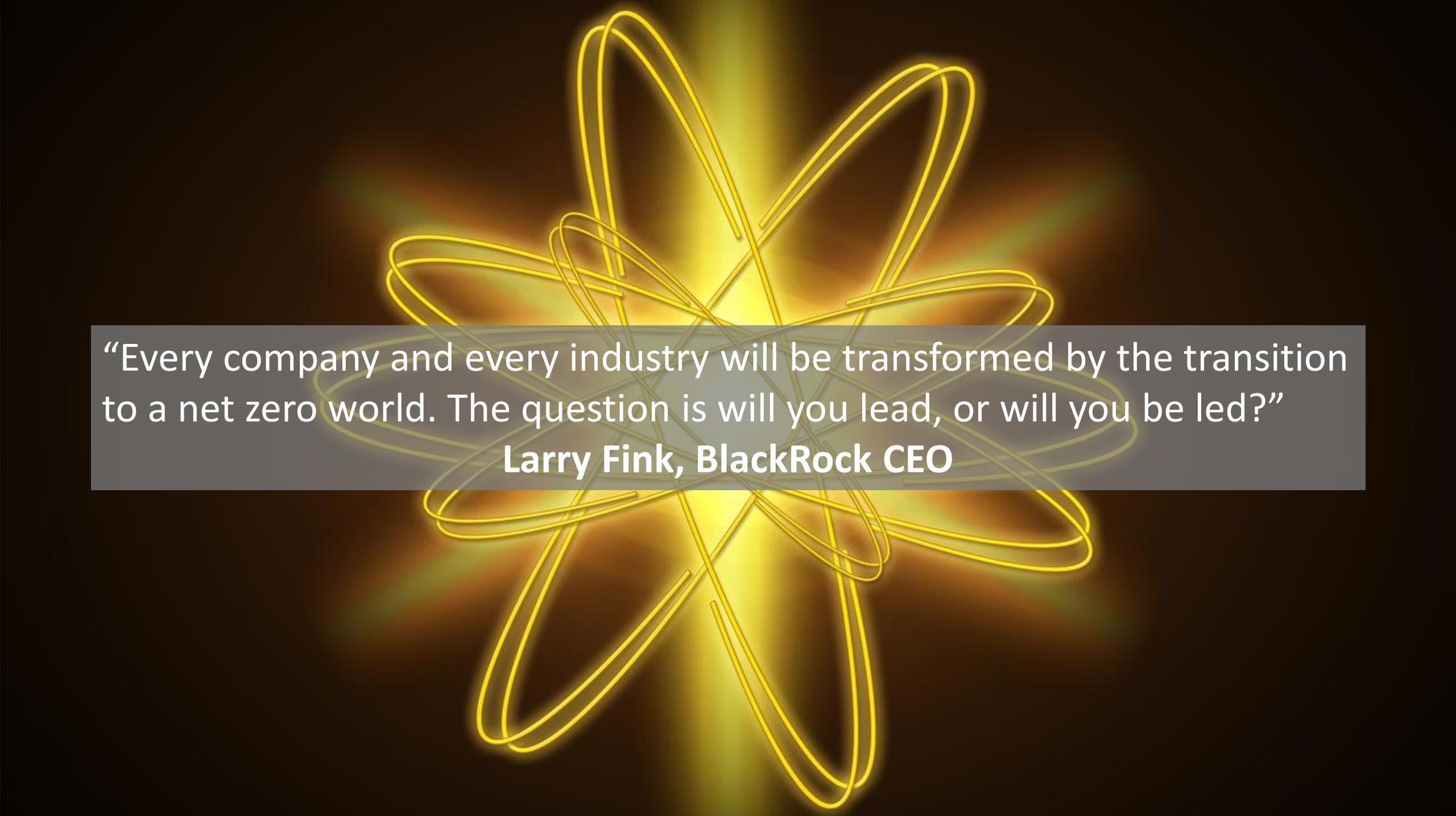
THE ENERGY TRANSITION

What does it mean?

How is it enabled?

Where are the opportunities?



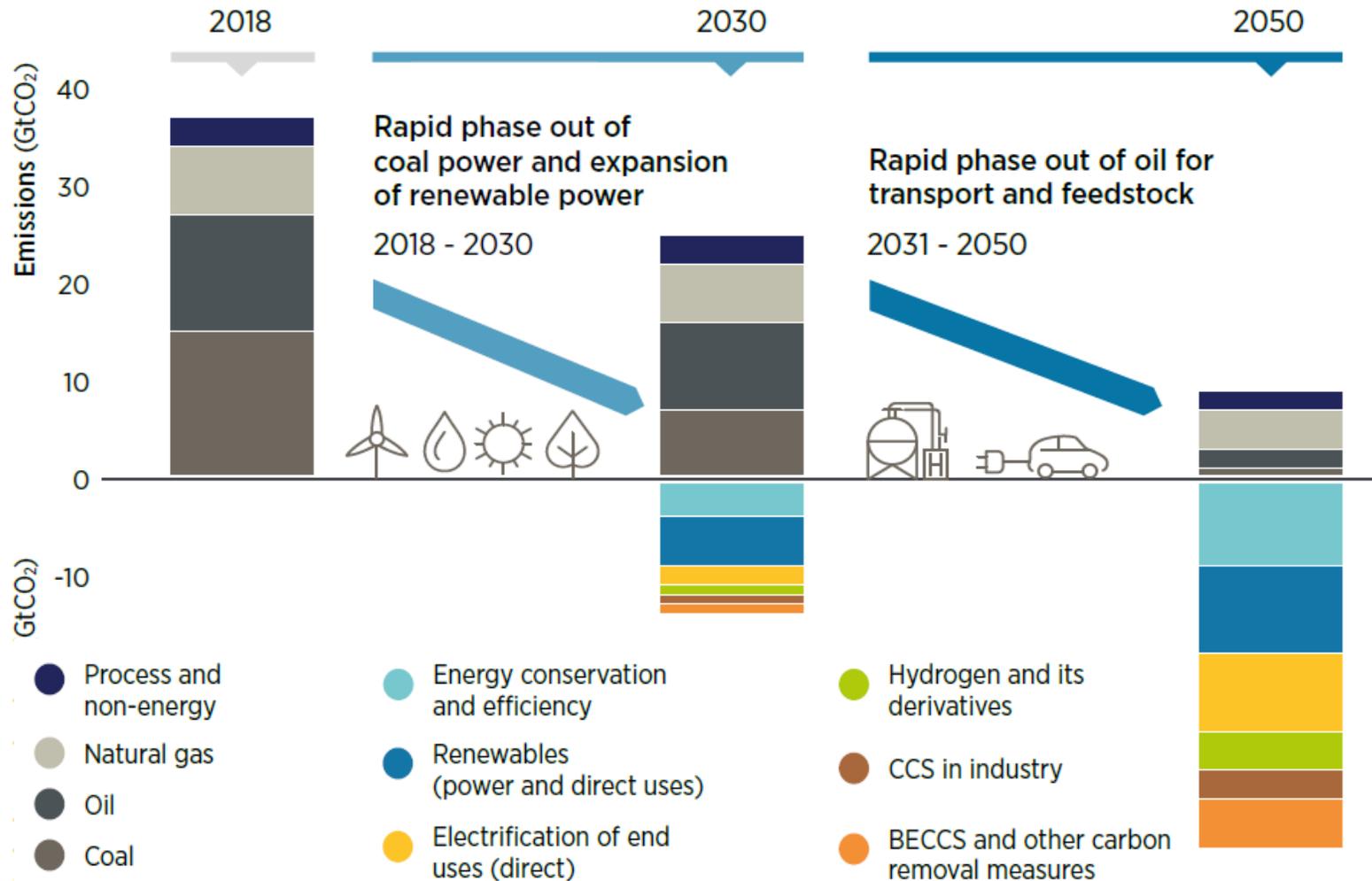


“Every company and every industry will be transformed by the transition to a net zero world. The question is will you lead, or will you be led?”

Larry Fink, BlackRock CEO

WHAT NEEDS TO HAPPEN?

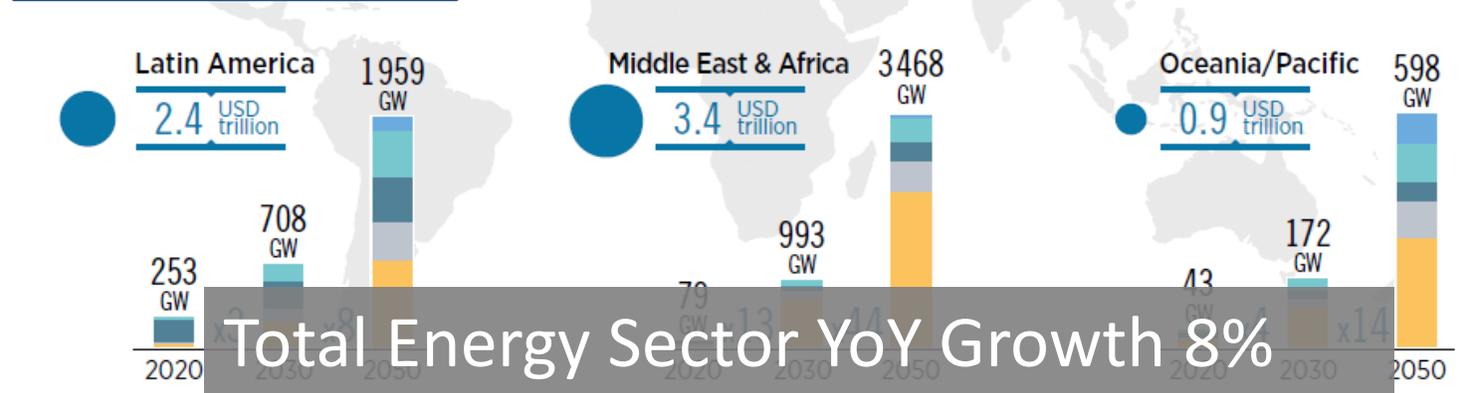
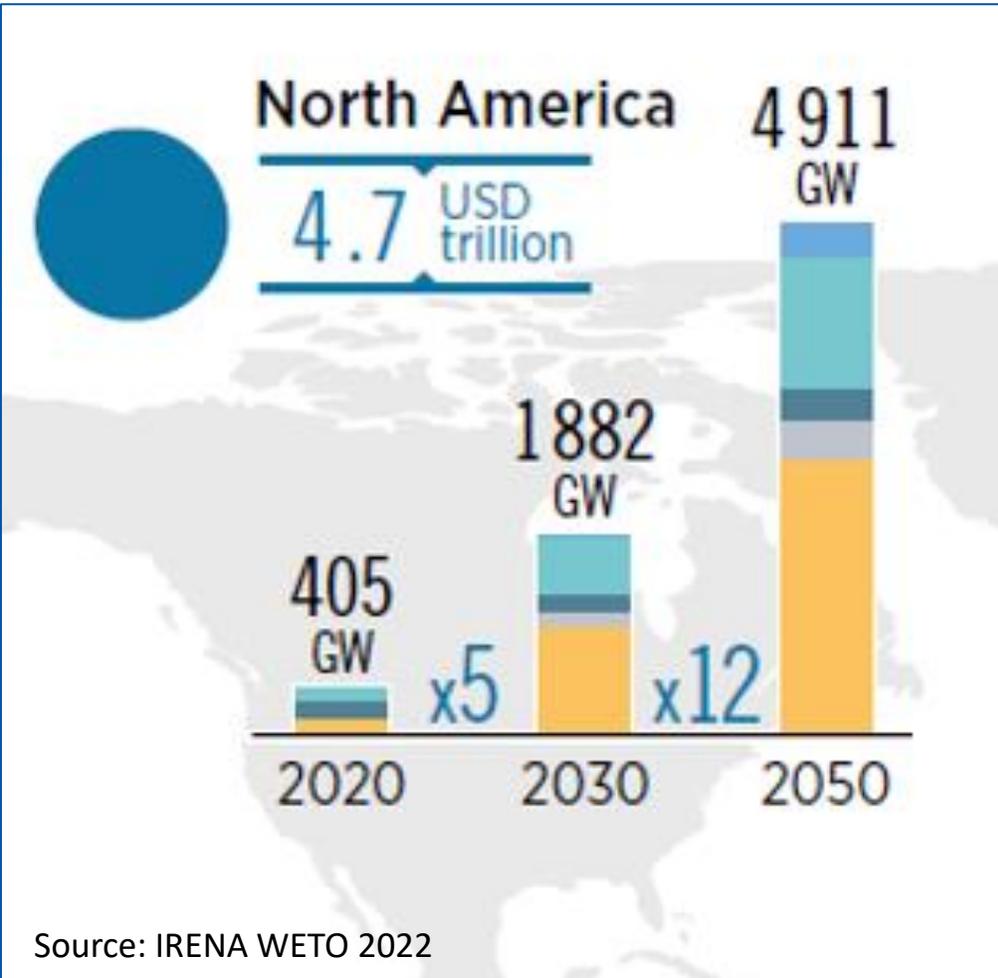
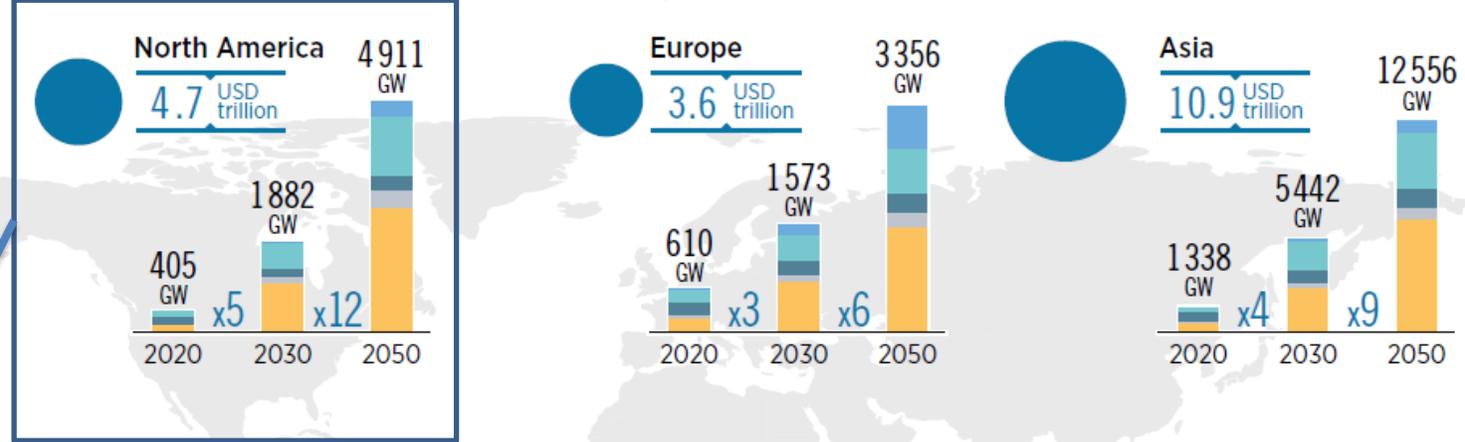
FIGURE 1.3 Evolution of emissions in accordance with the deployment of technological avenues, 2018–2050



Source: IRENA WETO 2022

HOW IT HAPPENS?

INCREASED INVESTMENT



Total Energy Sector YoY Growth 8%

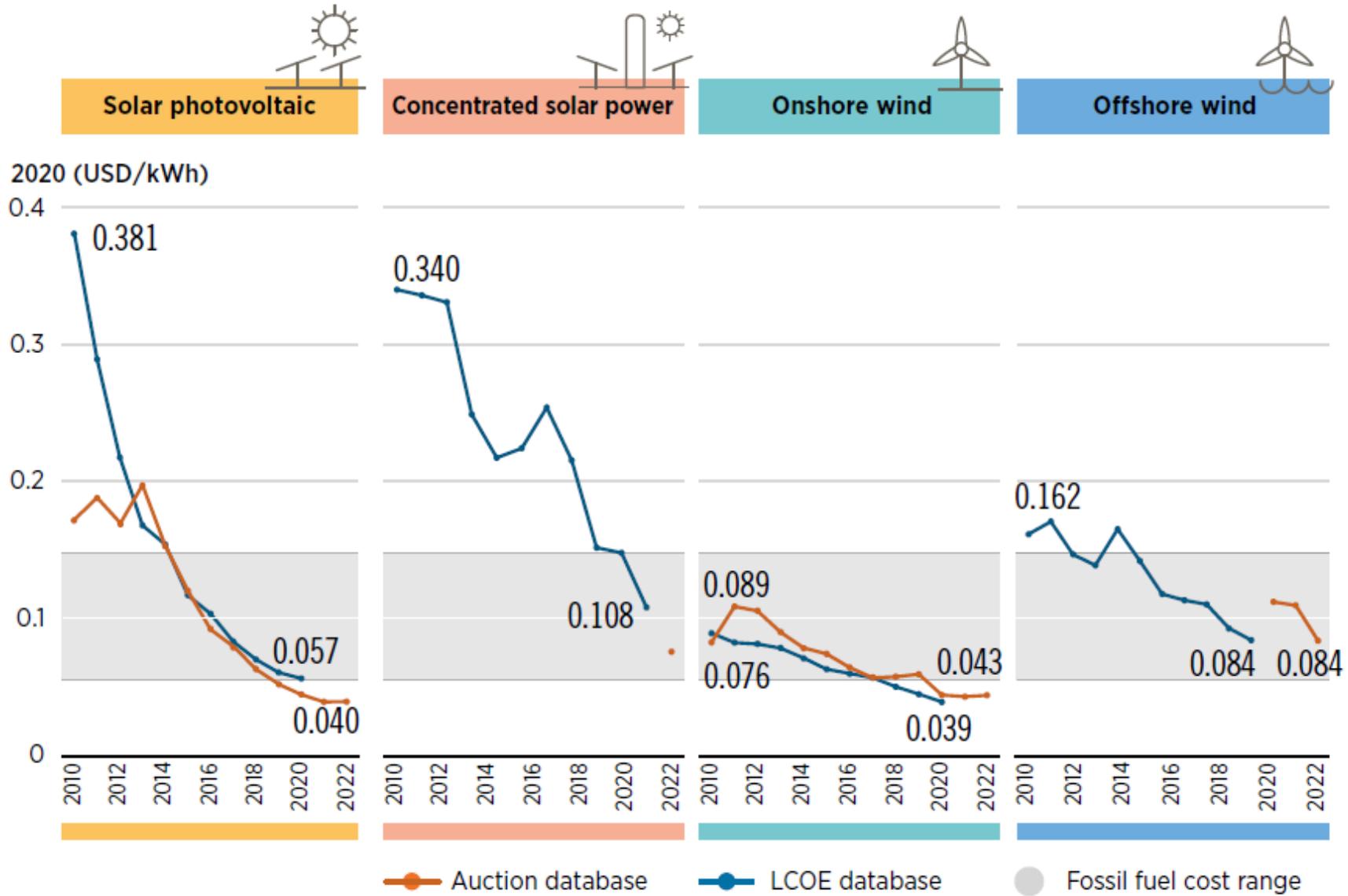
Renewable Sector YoY Growth 12%

Improved efficiency
Electrification of mobility
Wind/Solar Generation

- Circles** = Investment costs, 2021-2050
- Stacked columns** = Installed capacity
- x-Value** = Upscaling in 2030 and 2050 from 2020 level
- Offshore Wind
- Onshore Wind
- Hydro
- Others
- Solar PV

Source: IRENA WETO 2022

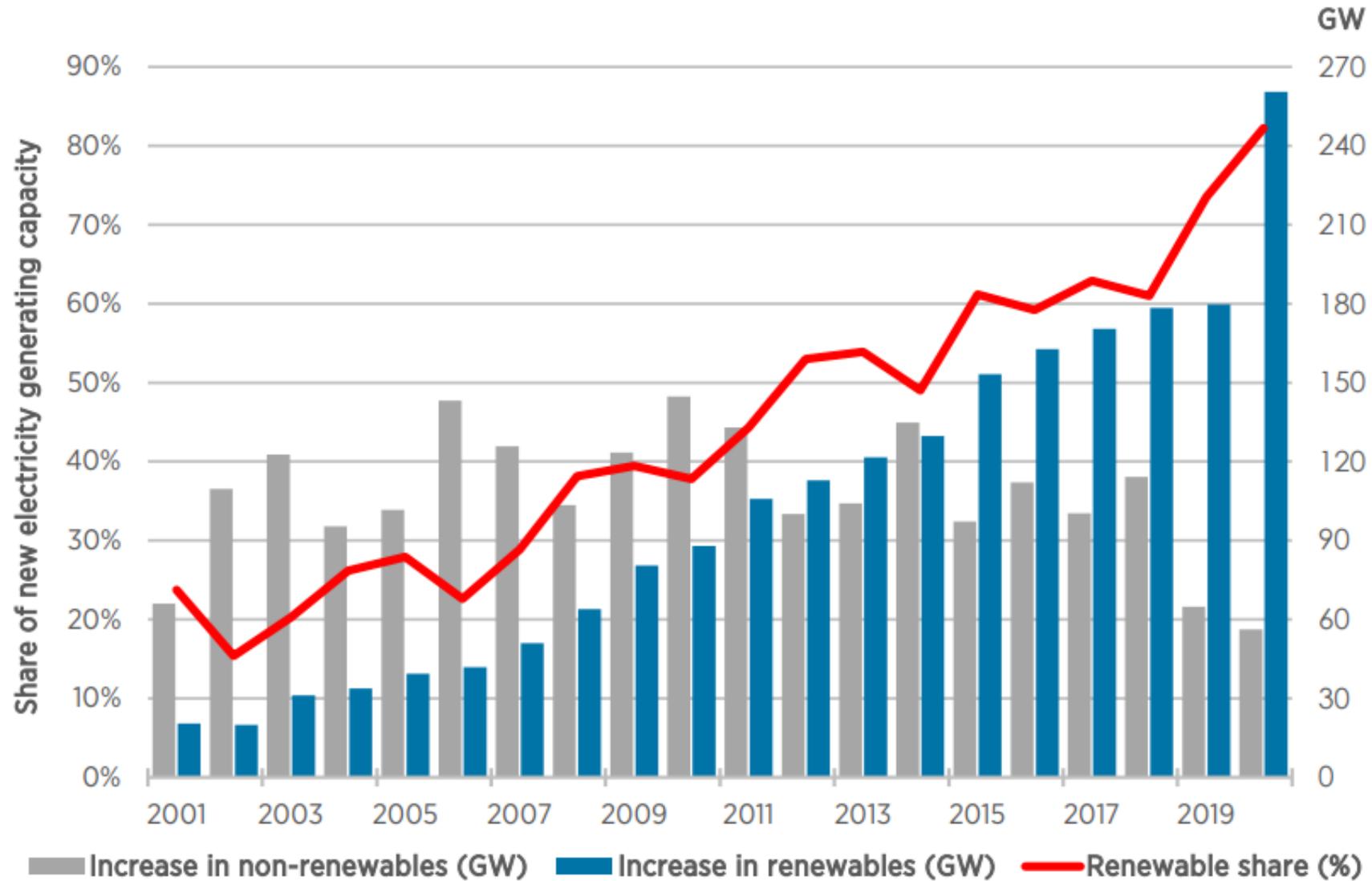
WHY ITS HAPPENING



Source: IRENA WETO 2022

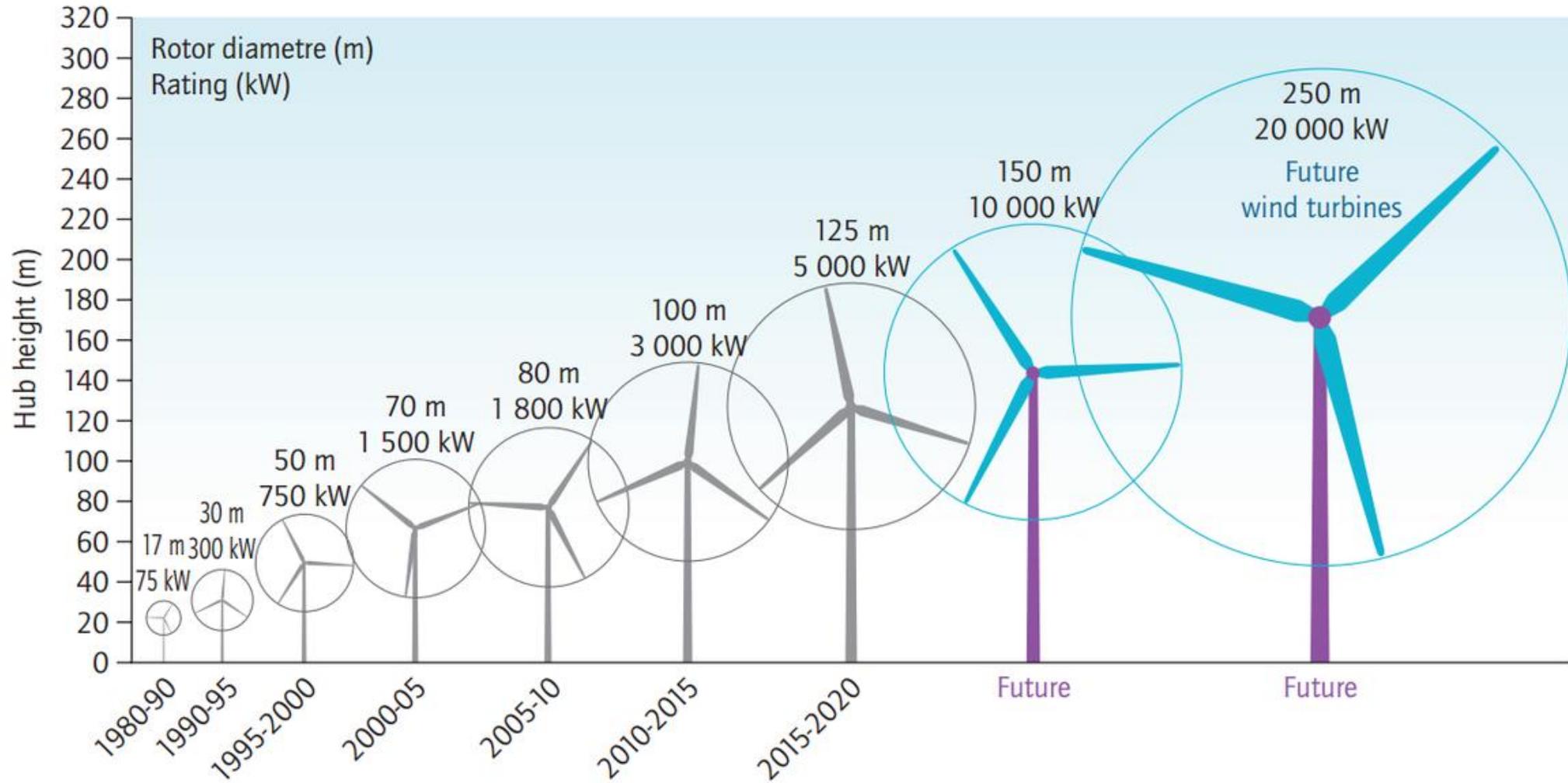
WHAT HAS HAPPENED?

Renewable share of annual power capacity expansion

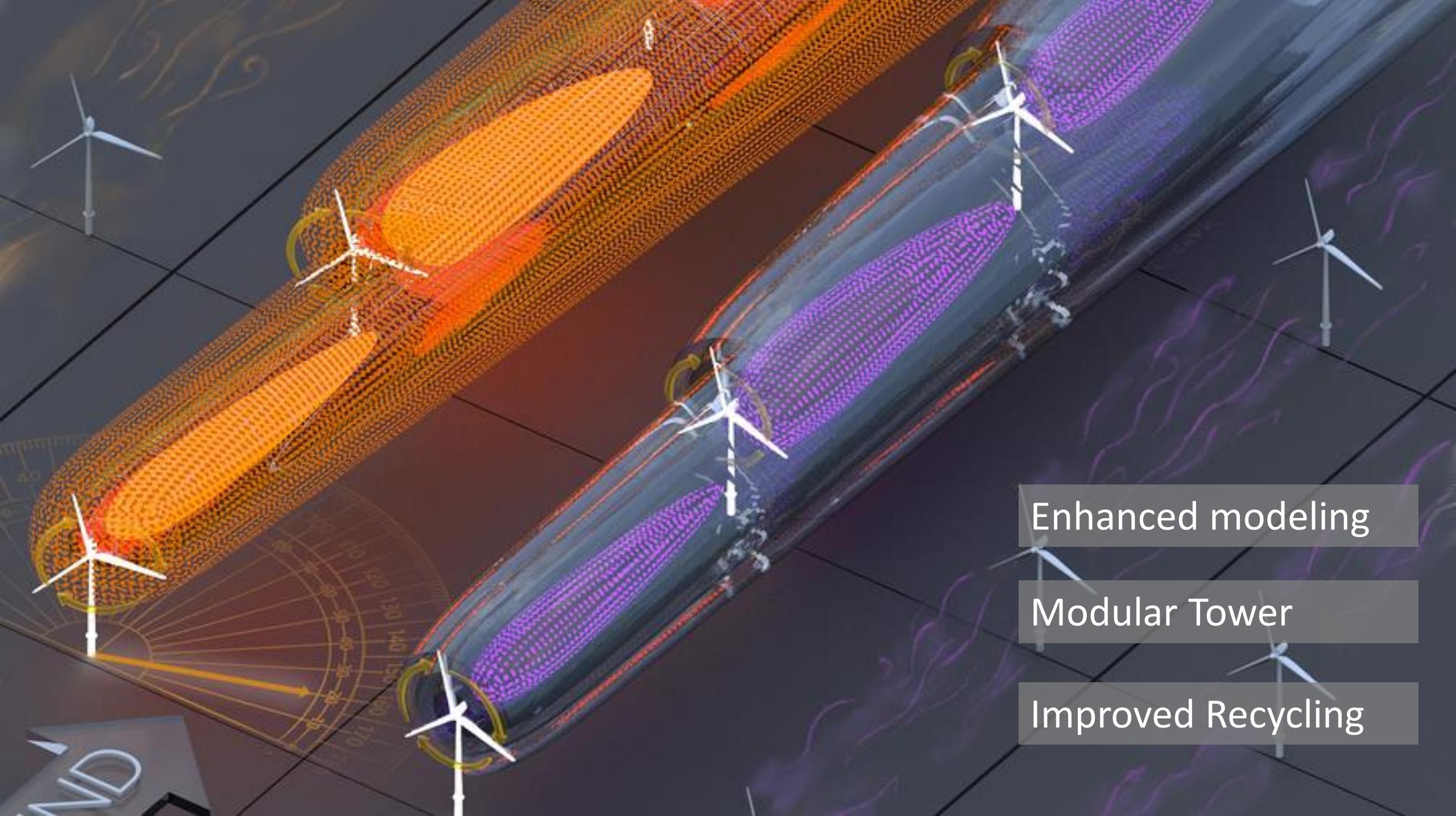


Source: IRENA 2021 Renewable Capacity Highlights

EVOLUTION OF WIND POWER



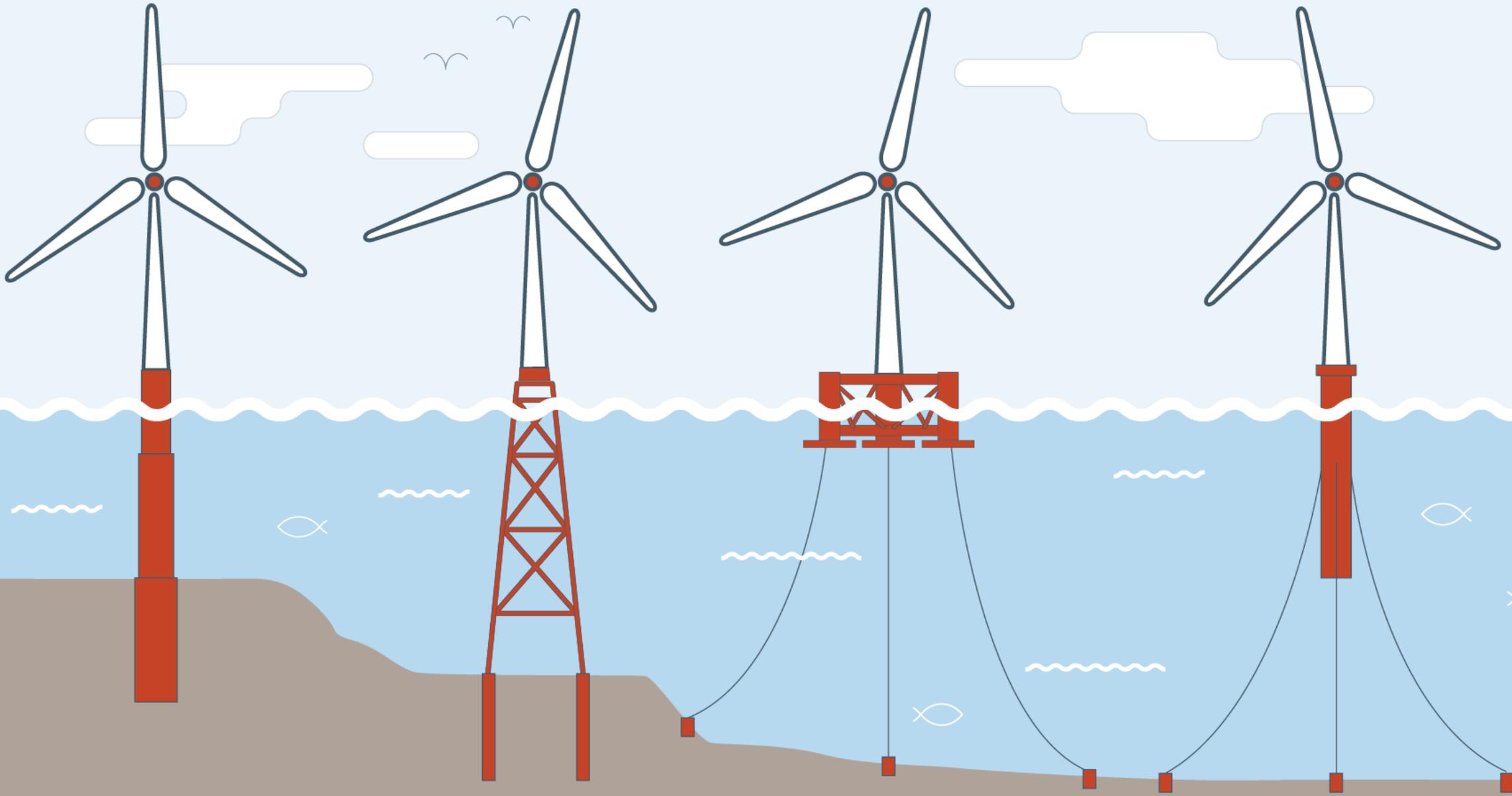
Source: adapted from EWEA, 2009.



Enhanced modeling

Modular Tower

Improved Recycling



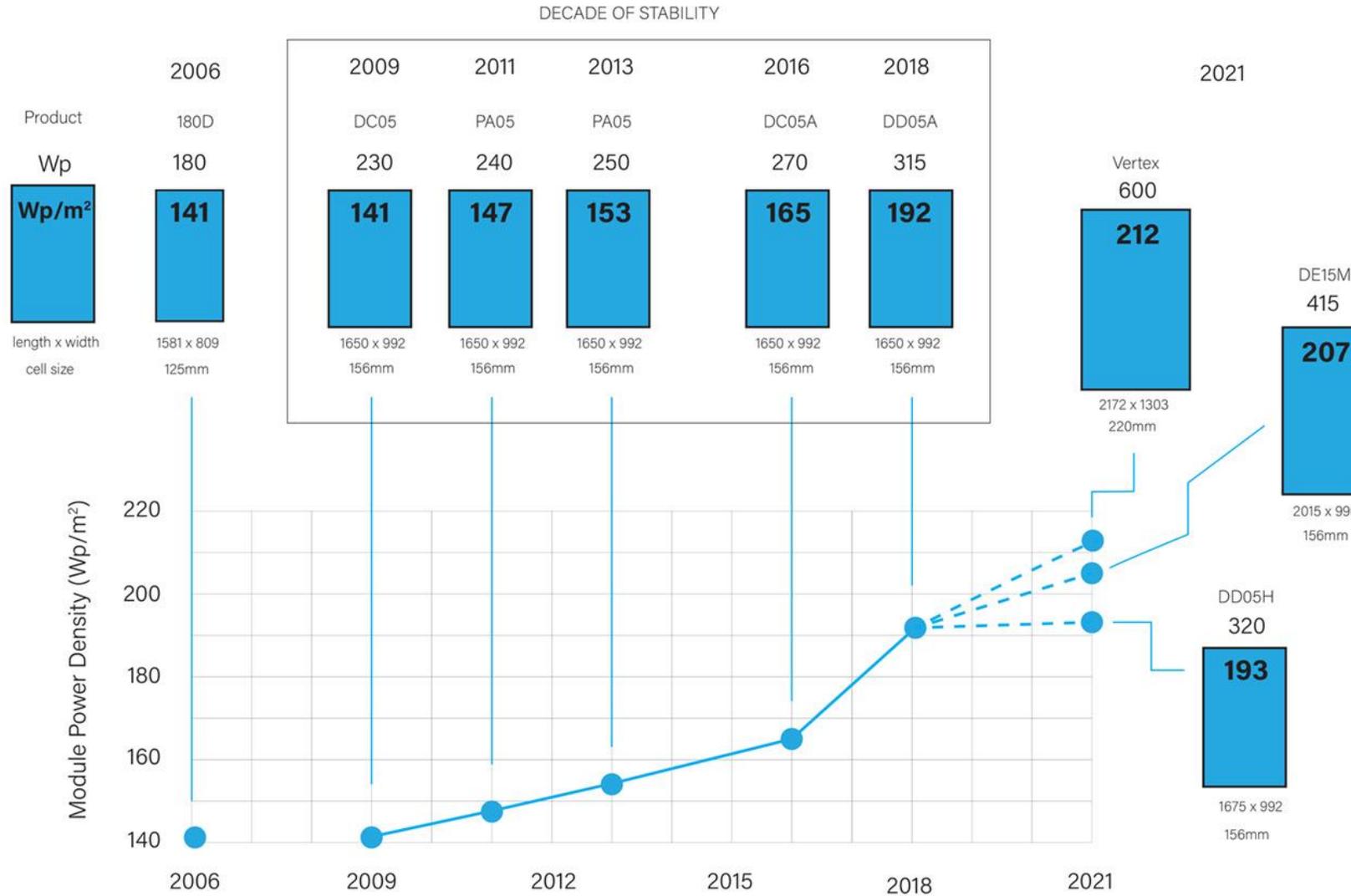
MONOPILE

JACKET / TRIPOD

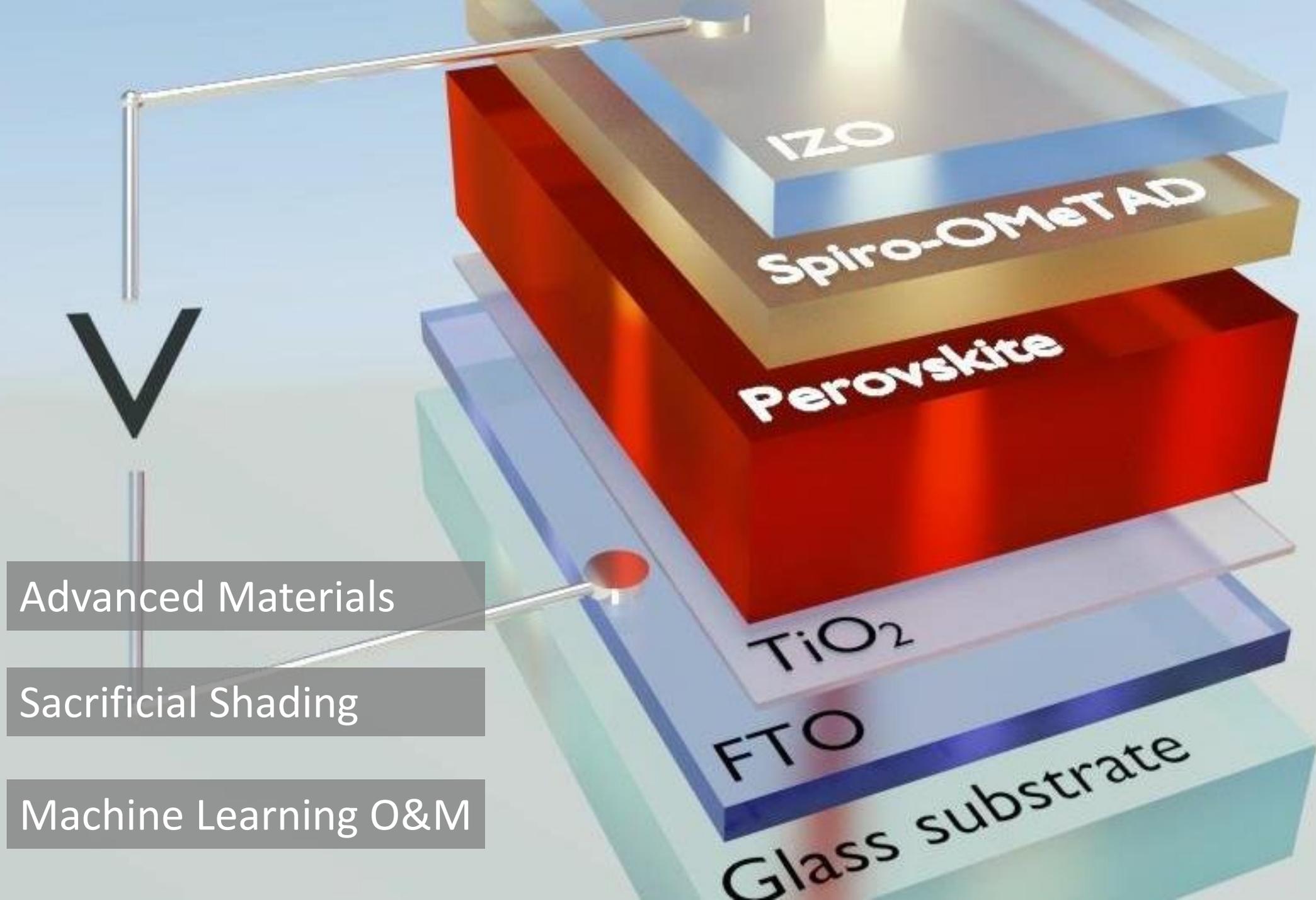
SEMI-SUBMERSIBLE

FLOATING SPAR

EVOLUTION OF SOLAR PV



Source: www.trinasolar.com (and as archived at Wayback Machine)



Advanced Materials

Sacrificial Shading

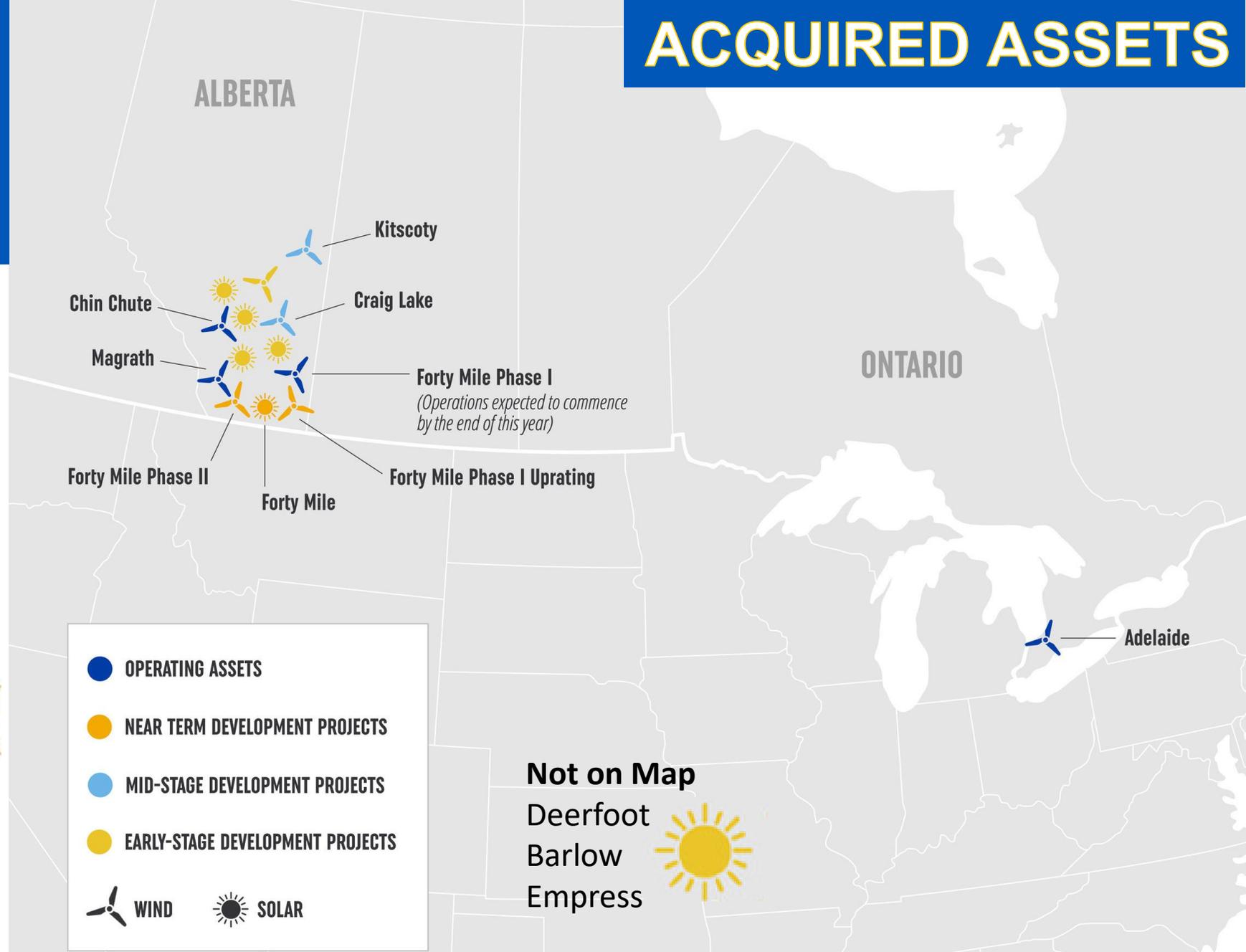
Machine Learning O&M



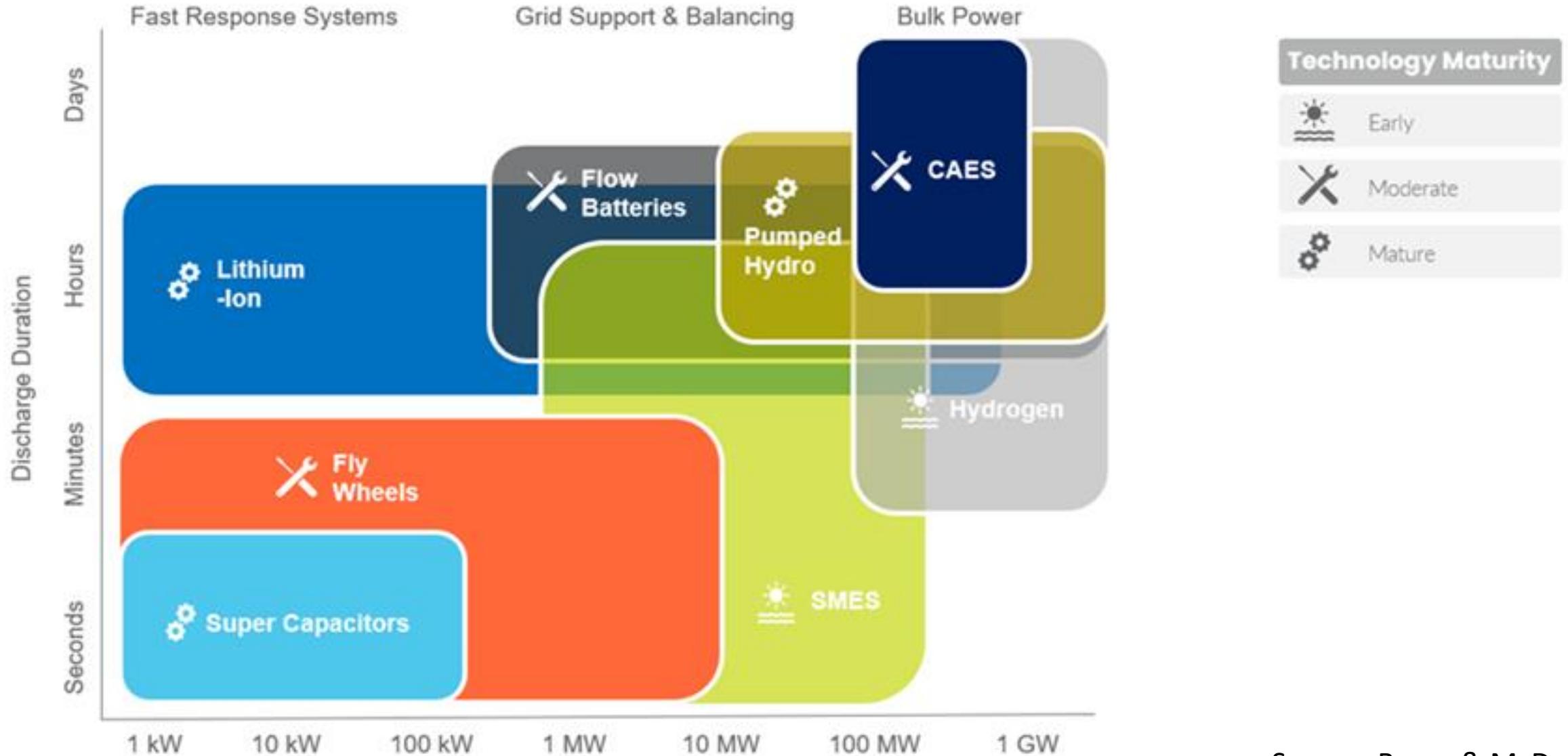


ATCO



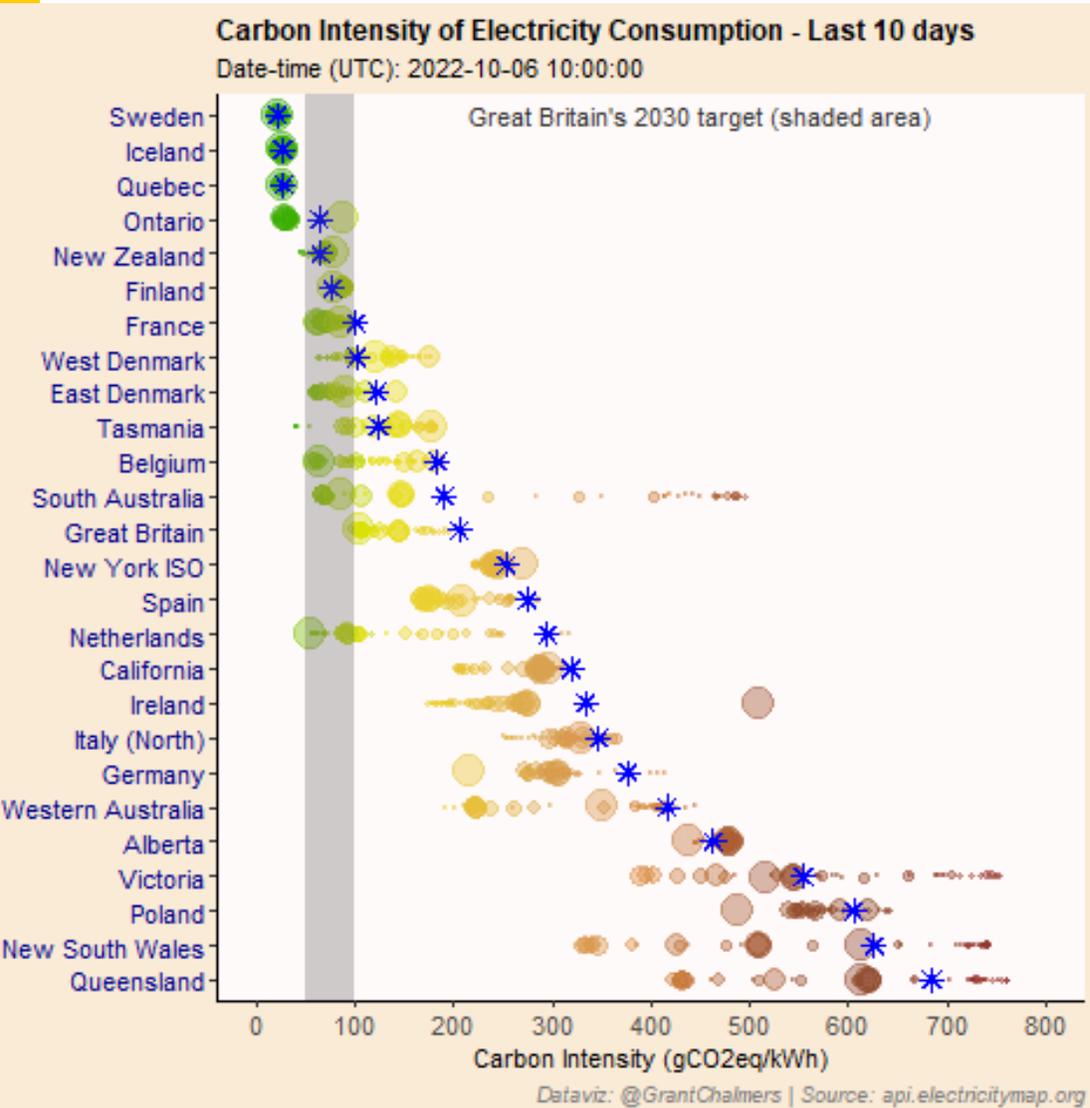


ENERGY STORAGE OPTIONALITY

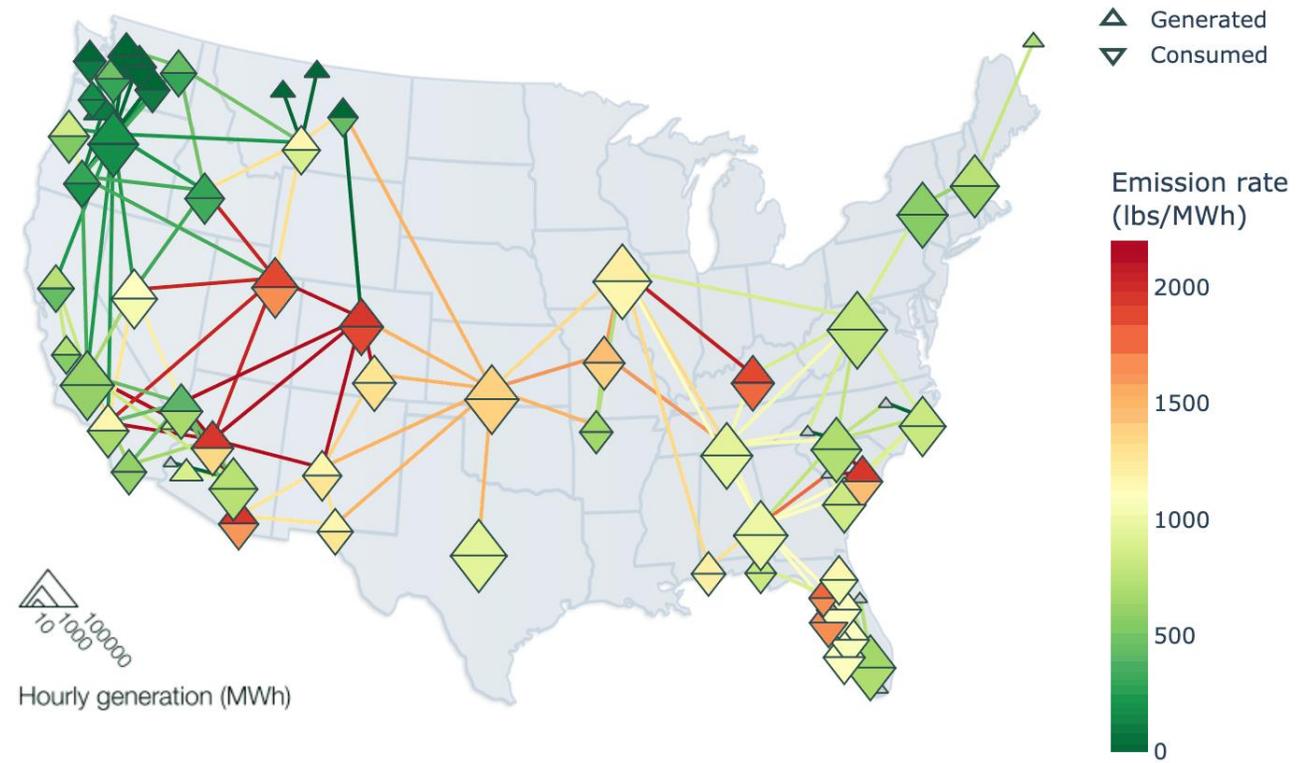


Source: Burns & McDonnell

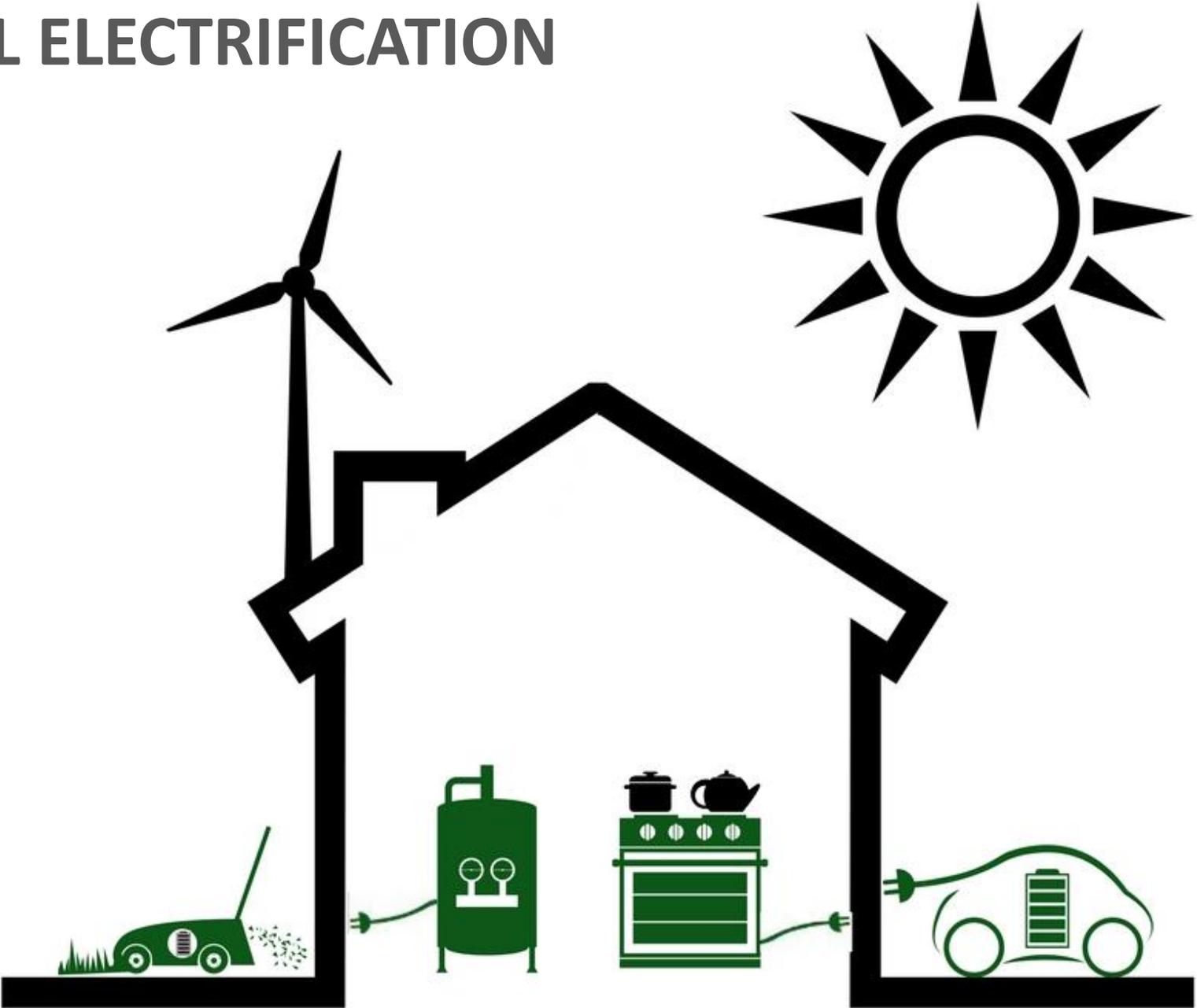
AT TIMES...



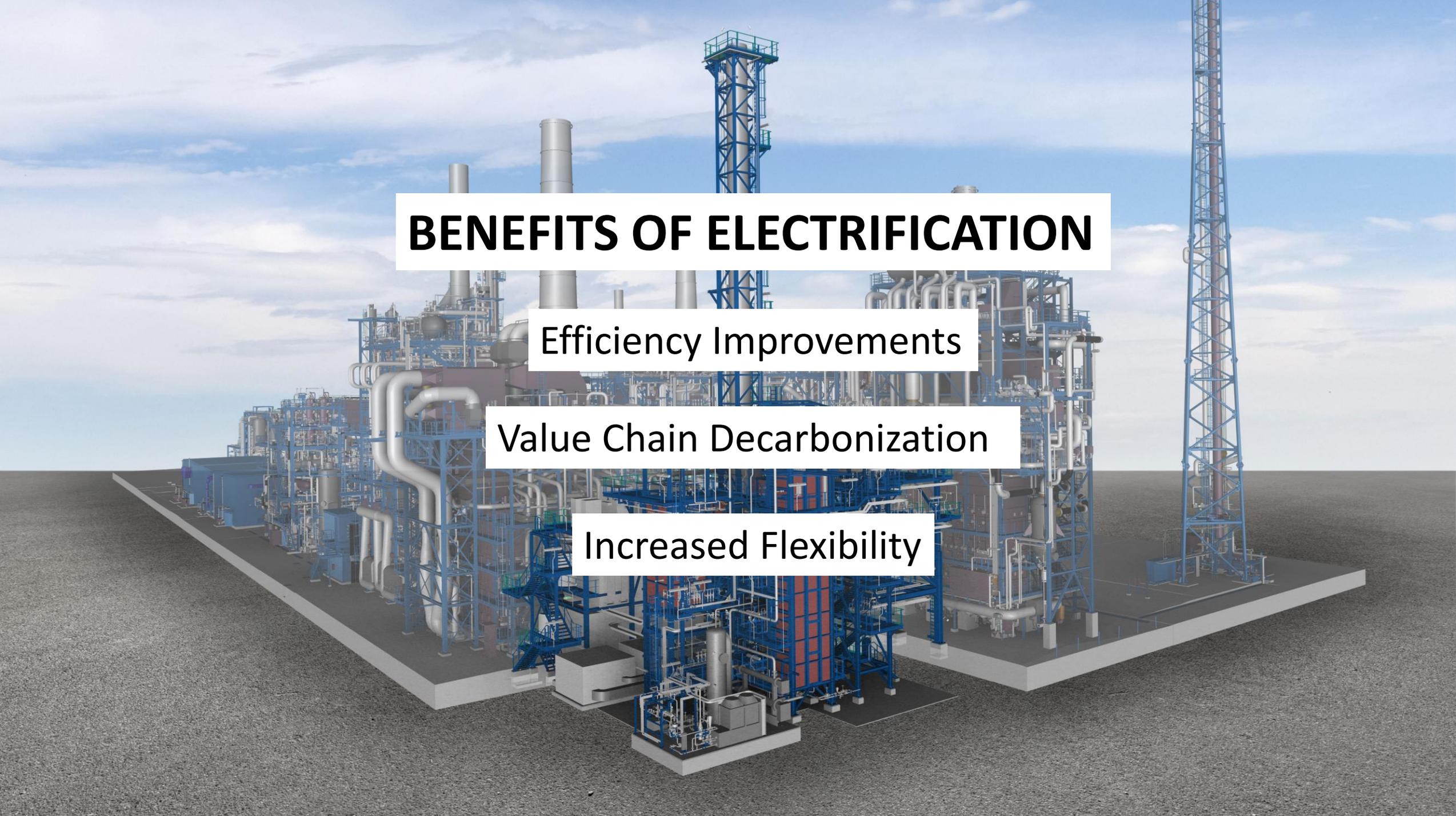
August 1, 2020 - 1:00 AM ET



BENEFICIAL ELECTRIFICATION



Source: [EESI](#)



BENEFITS OF ELECTRIFICATION

Efficiency Improvements

Value Chain Decarbonization

Increased Flexibility

PARTNERSHIPS & COLLABORATION



Oil Sands
Pathways to Net Zero

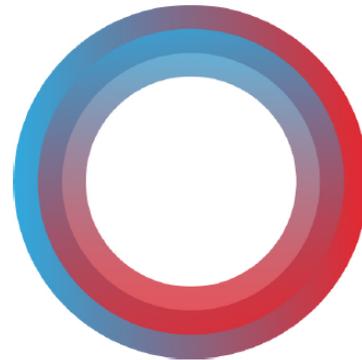


cenovus
ENERGY



RE100

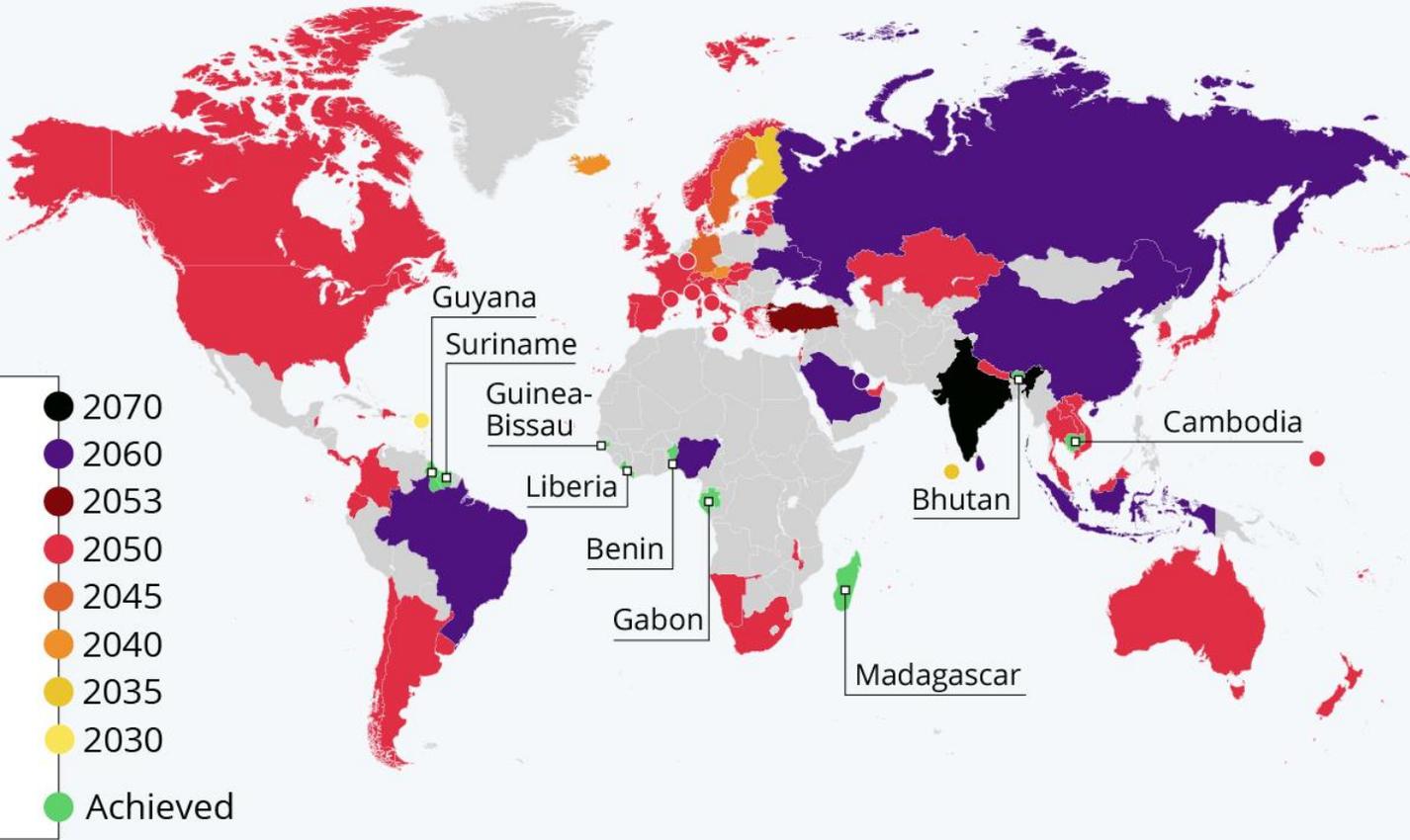
CLIMATE
GROUP



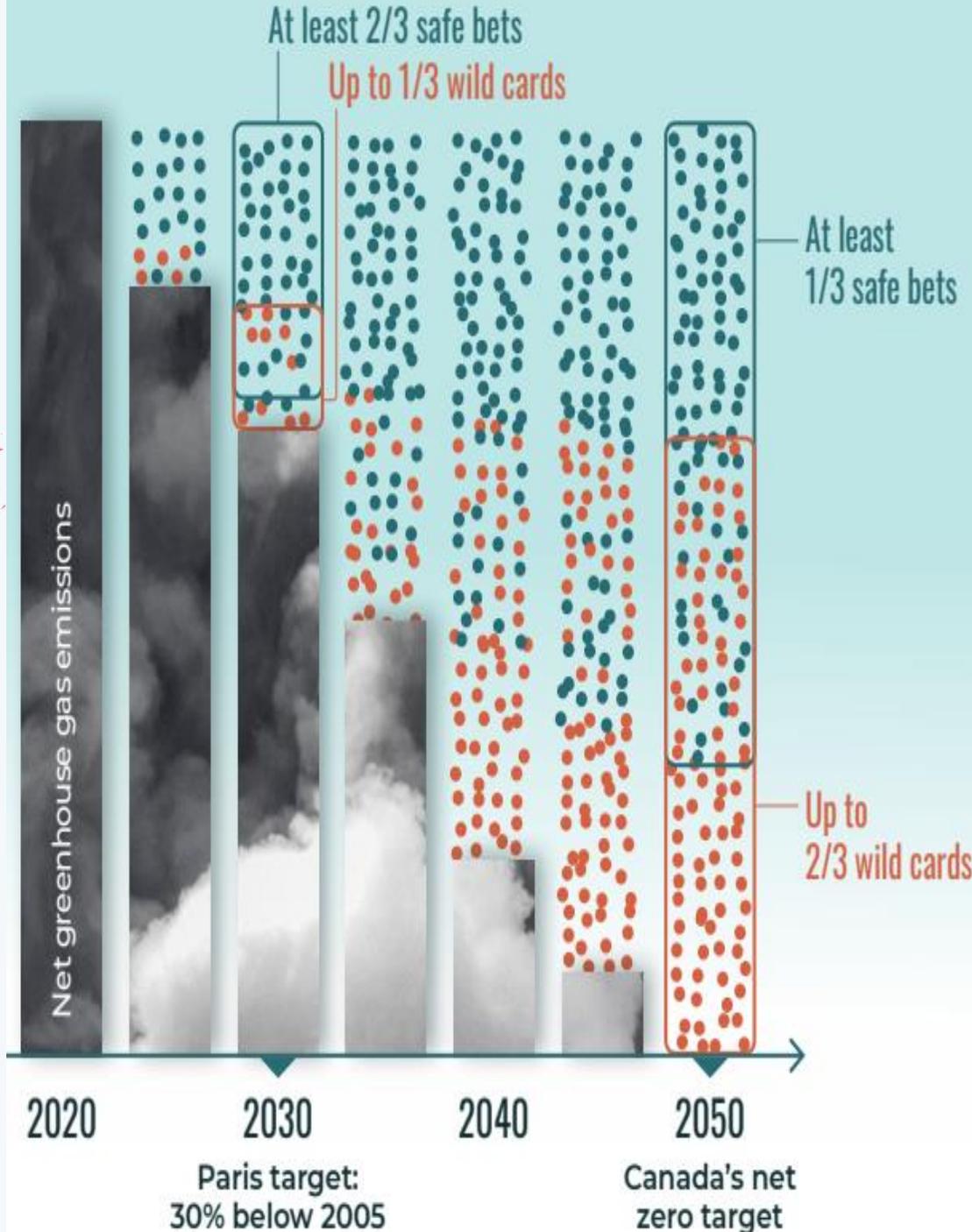
RENEWABLE
THERMAL
COLLABORATIVE

The Road to Net Zero

Countries with laws, policy documents or concrete timed pledges for carbon neutrality by target year



Source: Energy & Climate Intelligence Unit



IMPACTS OF POLICY

Figure 1: Impact of the IRA on levelized cost of energy in 2030

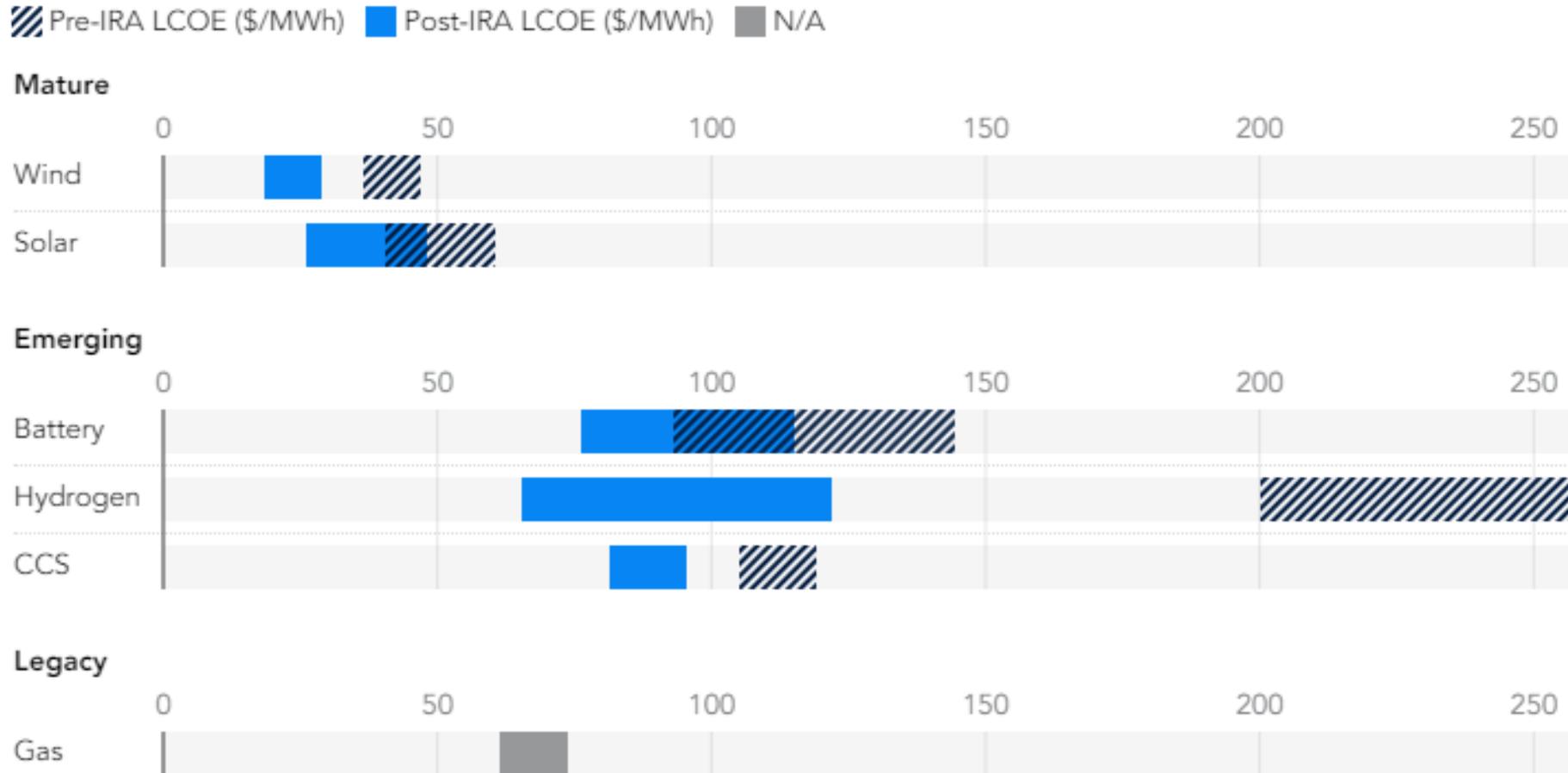
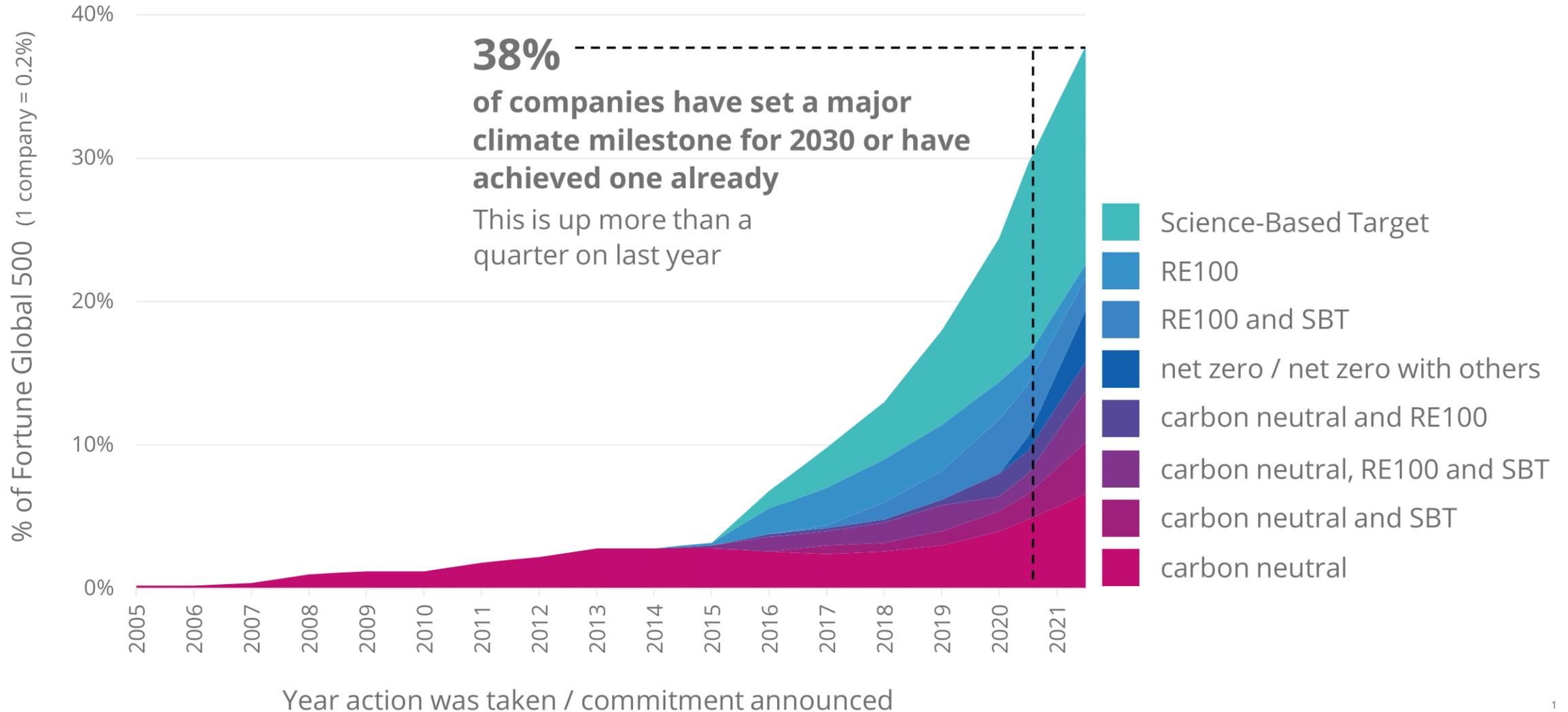


Figure 1: Date of Fortune Global 500 companies' public commitment that they are or will be by 2030: carbon neutral, meeting an RE100, Science Based Target or net zero target



HEADED IN THE RIGHT DIRECTION

Investable Industry: Established and Dynamic

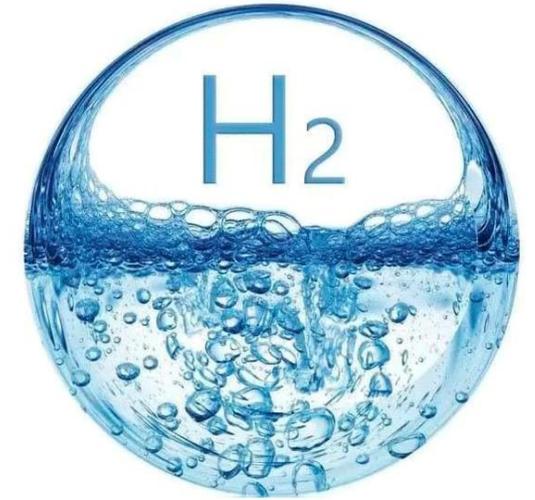
Renewable Technology: Always Improving

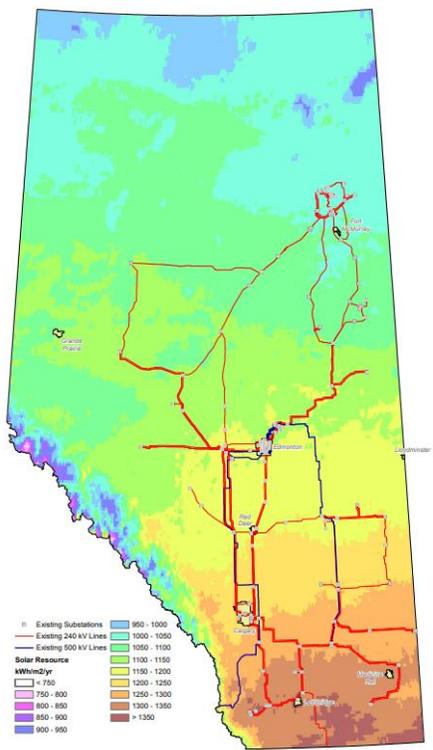
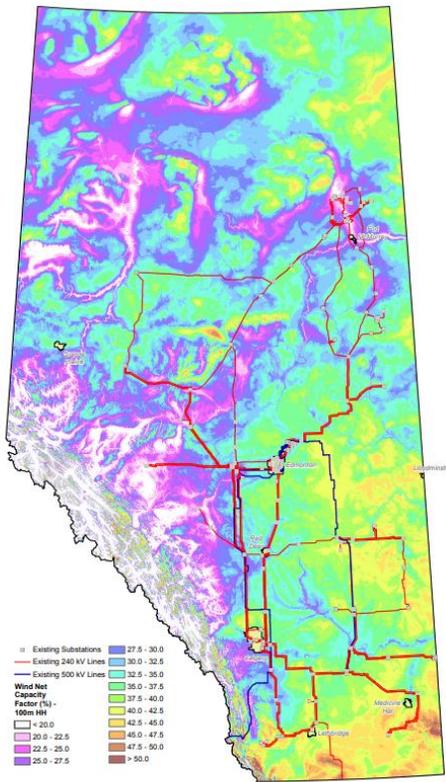
Beneficial Electrification: Opportunity Knocks

Enabling Framework: Committed Partners



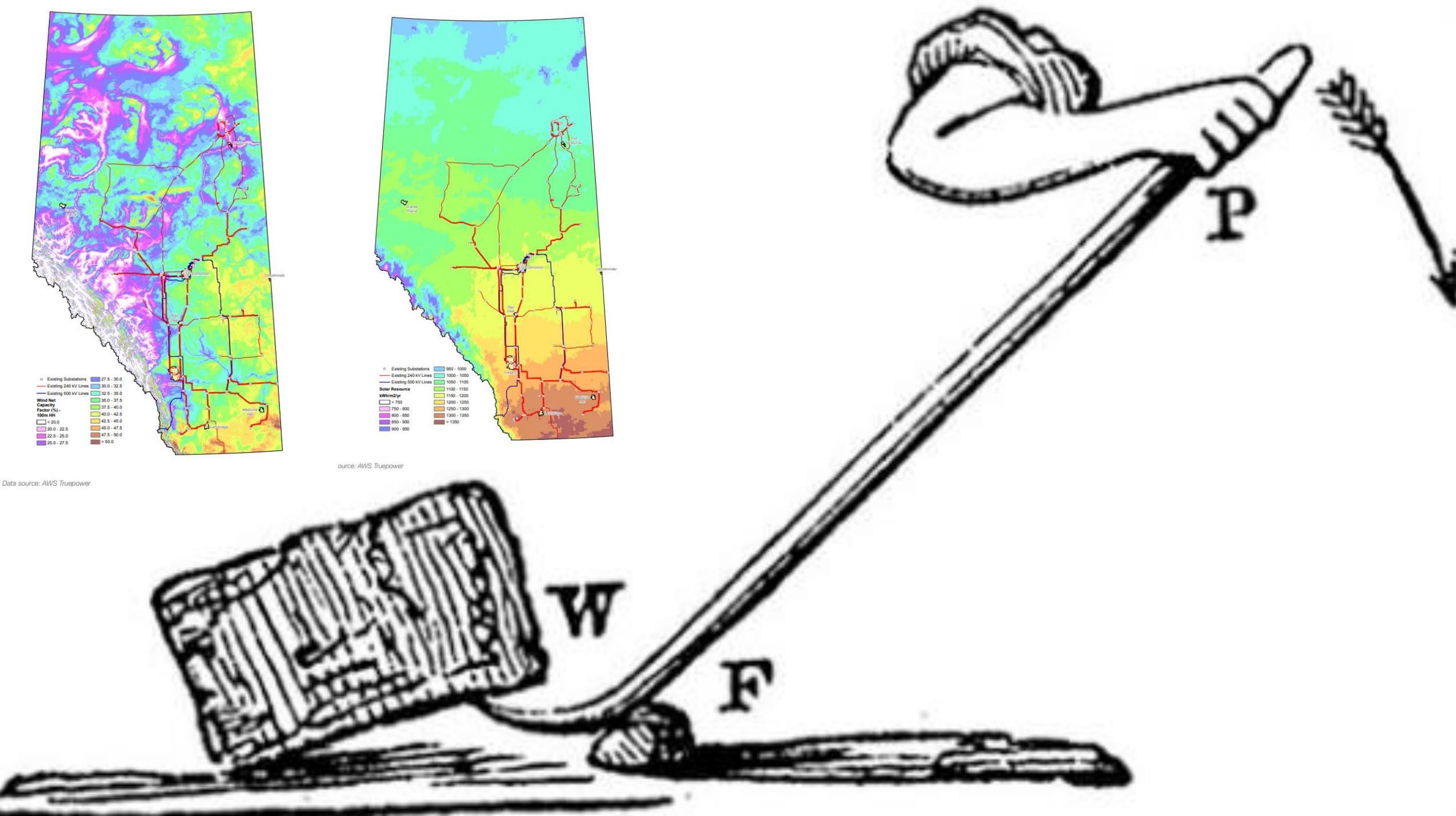
ATCO AND THE ENERGY TRANSITION

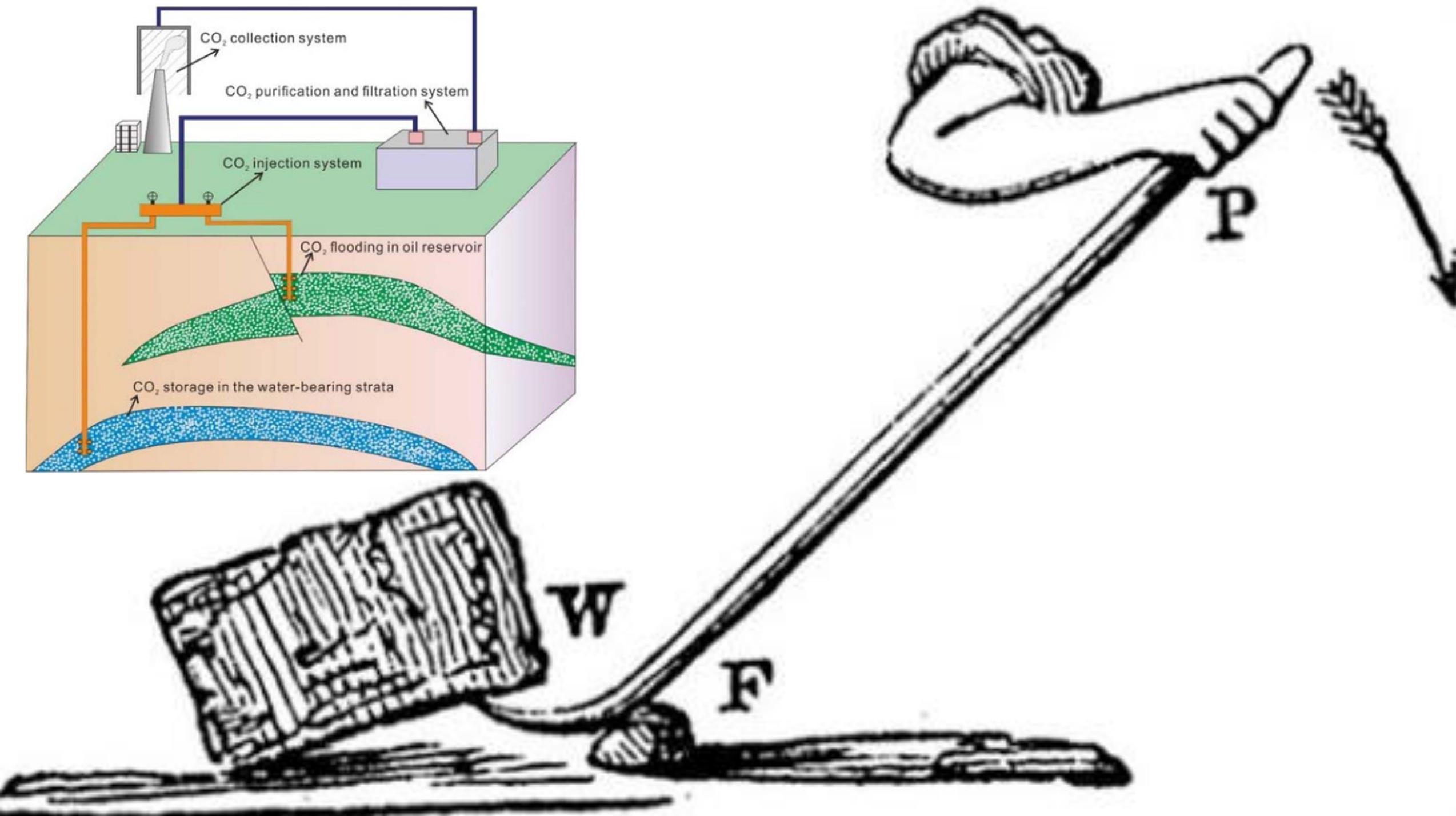
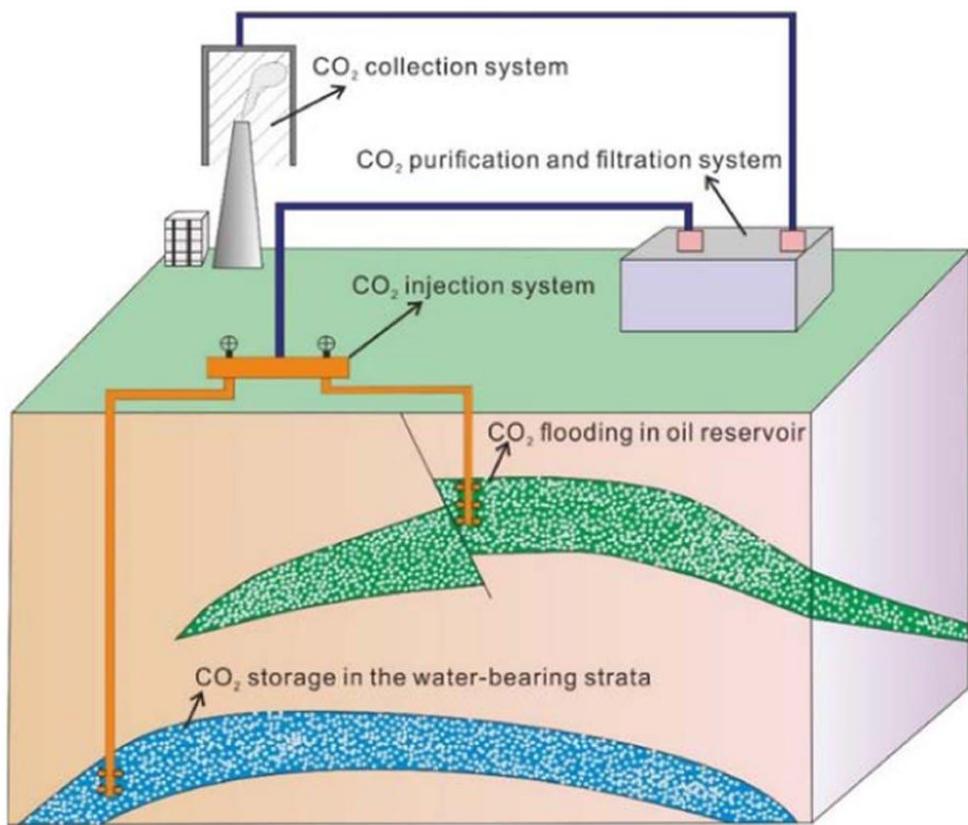




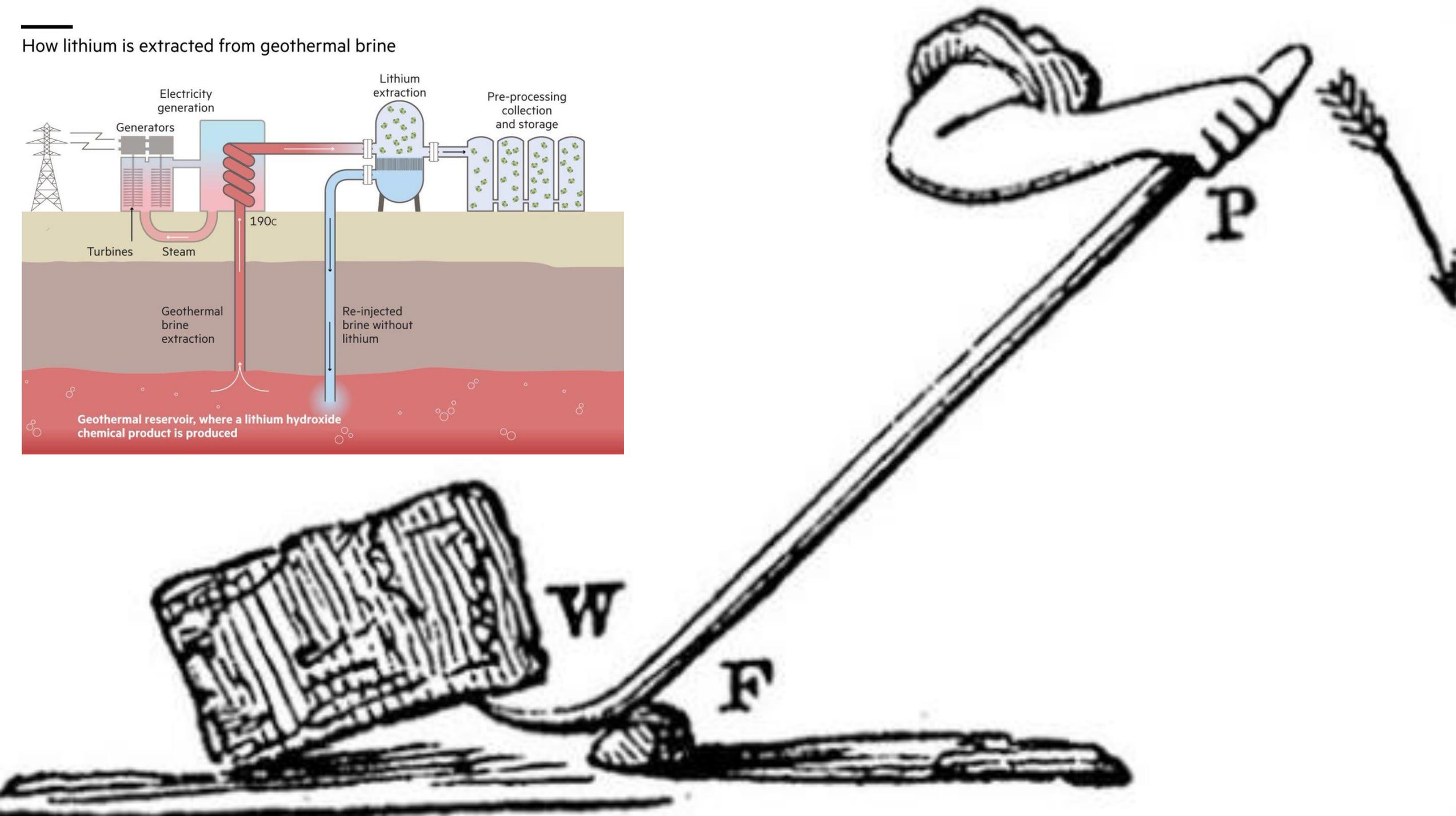
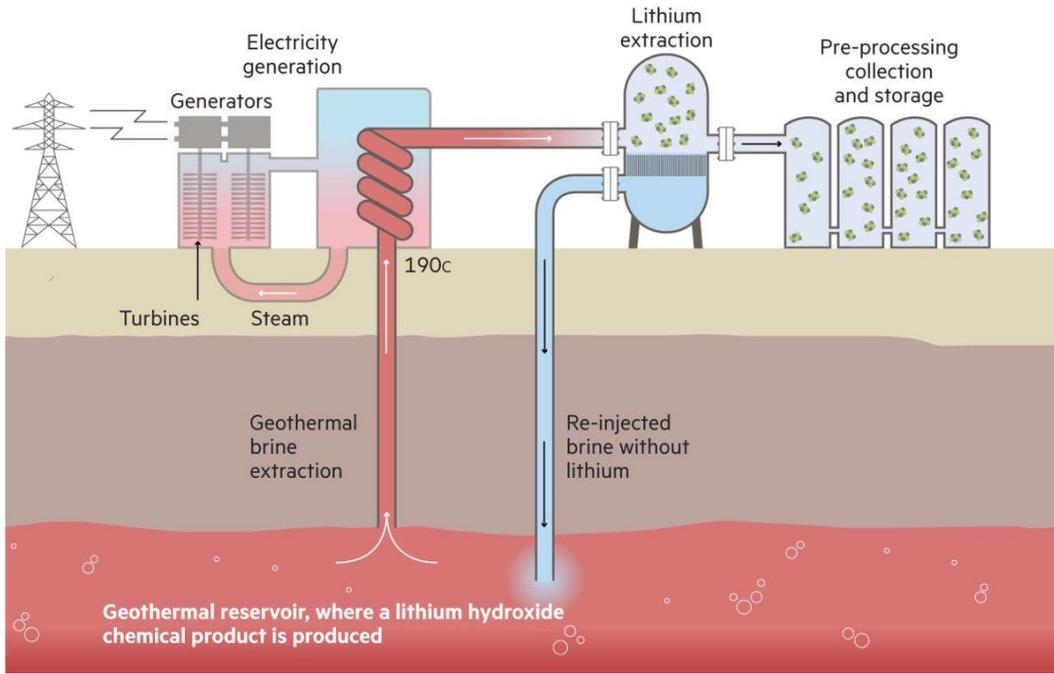
Source: AWS Truepower

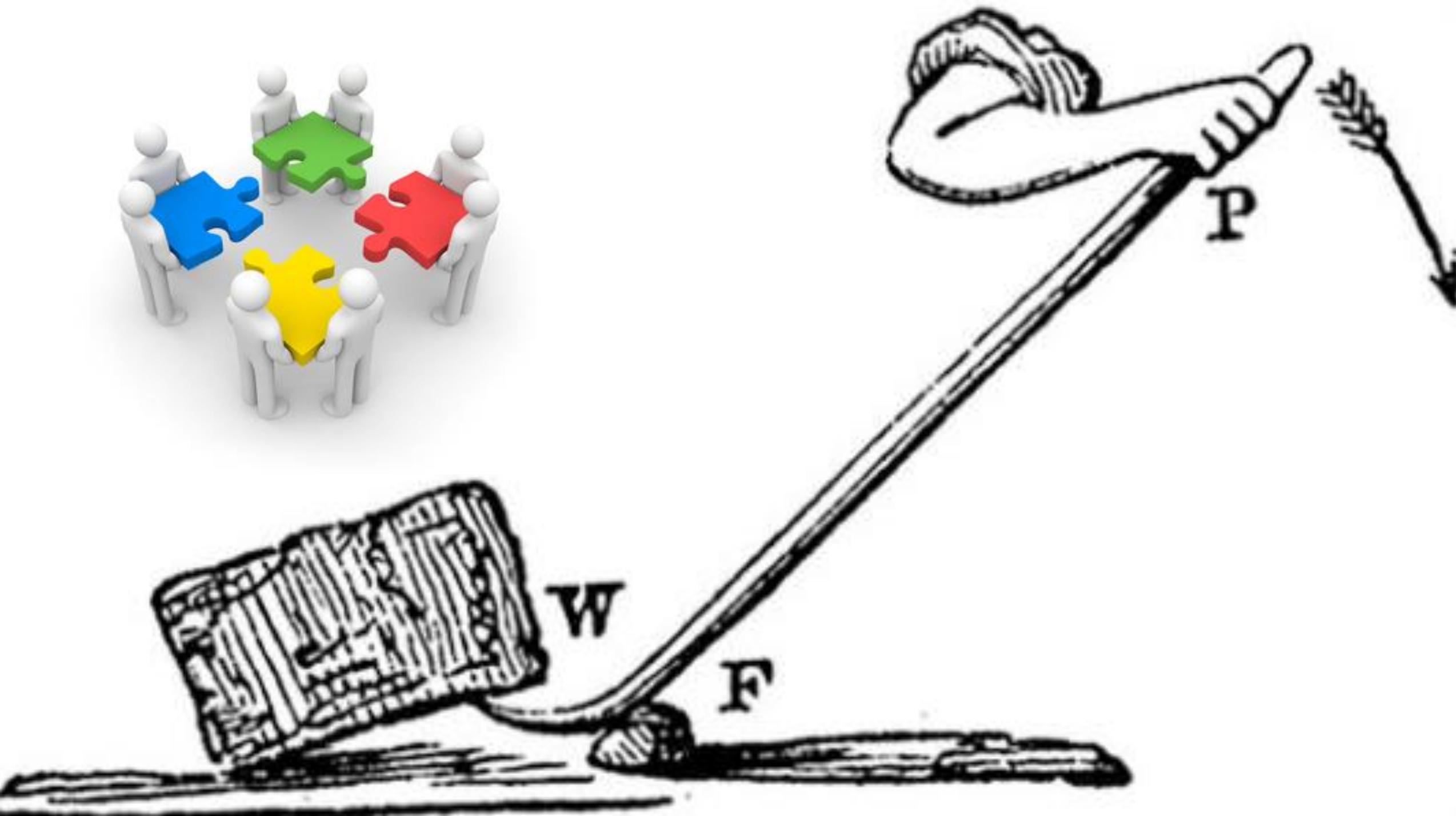
Data source: AWS Truepower





How lithium is extracted from geothermal brine





QUESTIONS?

Thanks For
Your Time!