



30 years ago 30 years from now

A WORLD OF ENERGY REVOLUTIONS



A WORLD OF ENERGY REVOLUTIONS

- 30 years of energy and climate expertise to support clients and partners
- 30 years of data science, modelling and forecasting, intelligence and research
- 30 years seems like a perfect timing for observing our moving world

CONFERENCES SCHEDULE

Replay available - Sixty years of global economy and energy transitions

March 15th - Energy systems in a deep decarbonisation future

March 22nd - New energy demand trends in the North and South

March 29th - The energy transition, a challenge for all of us!





Chair

Silvana MIMA

IRHC

CNRS





Sixty years of global economy and energy transitions

SPEAKERS TOPICS

- The trends and structural changes in the development of the primary energy supply to be expected
- Possible pathways to net zero greenhouse gas emissions by 2050
- How are oil and gas companies adapting to the decarbonisation challenge?

ROUND TABLE

PLEASE, ASK YOUR QUESTIONS

IN THE Q&A BOX

DURING THE PRESENTATIONS

AND ROUND TABLE!

(?)







Quentin BCHINI

Project Manager Global Energy Forecasting Department

Enerdata





Professor

Cedric PHILIBERT Research Associate IFRI



SciencesPo Paris School of

International Affairs



Major changes of the energy system and the energy world projections in 2050

Quentin BCHINI Enerdata



EnerFuture scenarios: key indicators



EnerBase: existing measures, extrapolation of historic trends



EnerBlue: additional realistic measures, aligning with NDC (Nationally Determined Contributions) emission targets



Enerdata

EnerGreen: scenario compatible with a temperature increase below 2°C

Average evolution (%/a)	1990 - 2020	2010 - 2020	2020-2050			
			+3-6°C			
Carbon intensity	-1.5%	-2.1%	-1.9%	-3.0%	-7.3%	CO ₂ emissions released to produce one unit GDP
Energy intensity of GDP (final)	-1.4%	-1.7%	-1.6%	-2.1%	-3.7%	Energy consumption necessary to produce one unit of GDP
Carbon factor	-0.1%	-0.4%	-0.3%	-0.9%	-3.7%	CO ₂ emissions released for an average unit of energy consumption



Global primary mix in different scenarios



- From 80% now, fossil fuels stay at 75% in 2050 in EnerBase and 66% in EnerBlue but fall down to 34% in EnerGreen
- RES + nuclear reach 66% in EnerGreen vs 25% in EnerBase



Electrification as a pillar of energy transition...



• Electrification is key to deep decarbonisation pathways across all final demand sectors

Enerdata

• In addition, there are often major efficiency gains associated to electrification => e.g. in electric vehicles or heat pumps

...provided electricity generation is decarbonised



Source: Global Energy Forecasting, Enerfuture

Enerdata

Energy systems in a deep decarbonisation future 10

Abatement by option in the power sector

Comparison with the World Energy Outlook



Source: Global Energy Forecasting, Enerfuture, IEA's World Energy Outlook

Global Energy and carbon intensity by scenario



Source: Global Energy Forecasting, Enerfuture, IEA's World Energy Outlook

- Deep-decarbonization pathways can vary widely in their assumptions and results
- The WEO offers a more technology-focused outlook while EnerFuture scenarios put a strong emphasis on efficiency and behaviour





Possible pathways to net zero greenhouse gas emissions by 2050

Cedric PHILIBERT

IFRI



The IEA's Net Zero Emissions report

Enerdata



- Solar and wind delivering 70% of global electricity total renewables ~90%
- Share of electricity in final energy demand jumping from ~20% to ~50%.

Biomass, solar and wind, the pillars of a low-carbon energy world Total energy supply, 2000 - 2050 600 500 Other renewables Wind **Solar** 400 Hydropower Traditionnal biomass **III** 300 Gaseous biomass Liquid biomass Solid biomass 200 Nuclear Gas Oil 100 Coal Source: IEA 2021, NZE 0 by 2050 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 Efficiency and electrification keep final energy demand below the 2025 peak Enerdata

Most relevant areas for low-carbon hydrogen use

- Green ammonia and methanol for their industrial uses
- Refineries (to upgrade and clean fuels)
- Direct iron reduction in steelmaking with H₂
 - Electrowinning eventually more efficient
- NH₃ as fuels (shipping...)

Enerdata

- MeOH/synthetic HCs as electro fuels/feedstocks
 - To chemical industry and aviation
 - Sustainable if the carbon is taken from the air
 - Can be combined with the production of biofuels
- H₂/ NH₃ storable/shippable fuels in power systems
 - To complement solar and wind in *Dunkelflaute*
- Maybe *some* long-range trucking and industrial heat



Efficiency, renewables and electrification of end-uses



Source: IEA 2021, *NZE by 2050*

• Goverments, firms, local authorities and citizens must all be part of the change





How are oil and gas companies adapting to the decarbonisation challenge?

Manfred HAFNER SciencesPo Paris School of International Affairs



HELPING YOU SHAPE THE ENERGY TRANSITION

About Enerdata:

Enerdata

Enerdata is an independent research company established in 1991, specializing in the analysis and forecasting of energy and climate issues, at world and country level.

Leveraging our globally recognised databases, intelligence systems and models, we assist our clients in designing their policies, strategies and business plans.



Thank you for your attention!

https://www.enerdata.net/