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Council of European Energy Regulators

IRENA
International Renewable Energy Agency

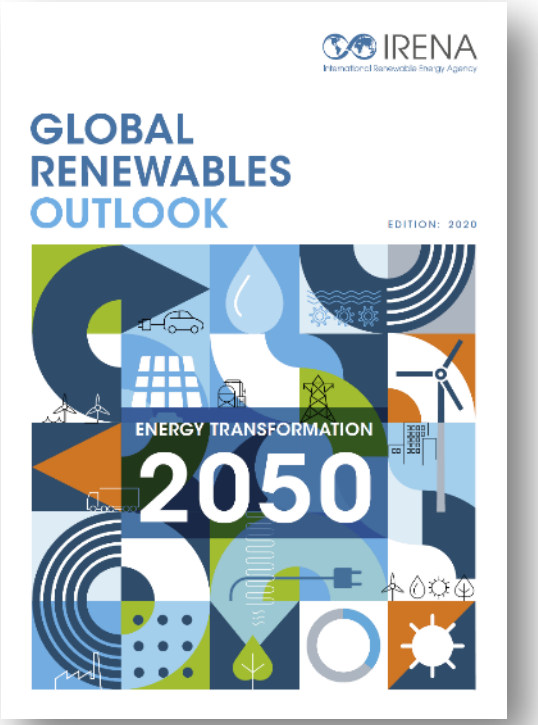
Presentation by Dr Dolf Gielen

15 min

Global Renewables Outlook (2020 edition)

IRENA's Global Renewables Outlook was launched on 20 April and covers:

- Transformative energy developments to pave a climate-resilient pathway to 2050
- Pathways towards deeper decarbonisation (industry and transport)
- Investment needs between now and 2050
- Socio-economic impacts incl. jobs, GDP, welfare
- Moving towards transformative decarbonisation of societies (Green new deal)
- Short and mid-term opportunities and needs
- *Latest effort: show strategies to reconcile stimulus and energy transition*



https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020

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Impacts of the crisis

- RE generation continues to grow and % rose significantly across EU April-May
- Fossil fuel prices have dropped significantly
- CO_2 permit price trends - forward prices hold steady
- RE capacity additions have dropped somewhat
- EV sales are down but by less than other car sales

Impacts of the crisis

EX: European electricity market May 2020 (EU + Switzerland, Western Balkans)

Compared to May 2019:

- Load -10.0%; Generation -9.8%
- RE generation 103 TWh +8.1%; **48% RE generation share**
- Coal generation -33.3%; gas generation -18.4%

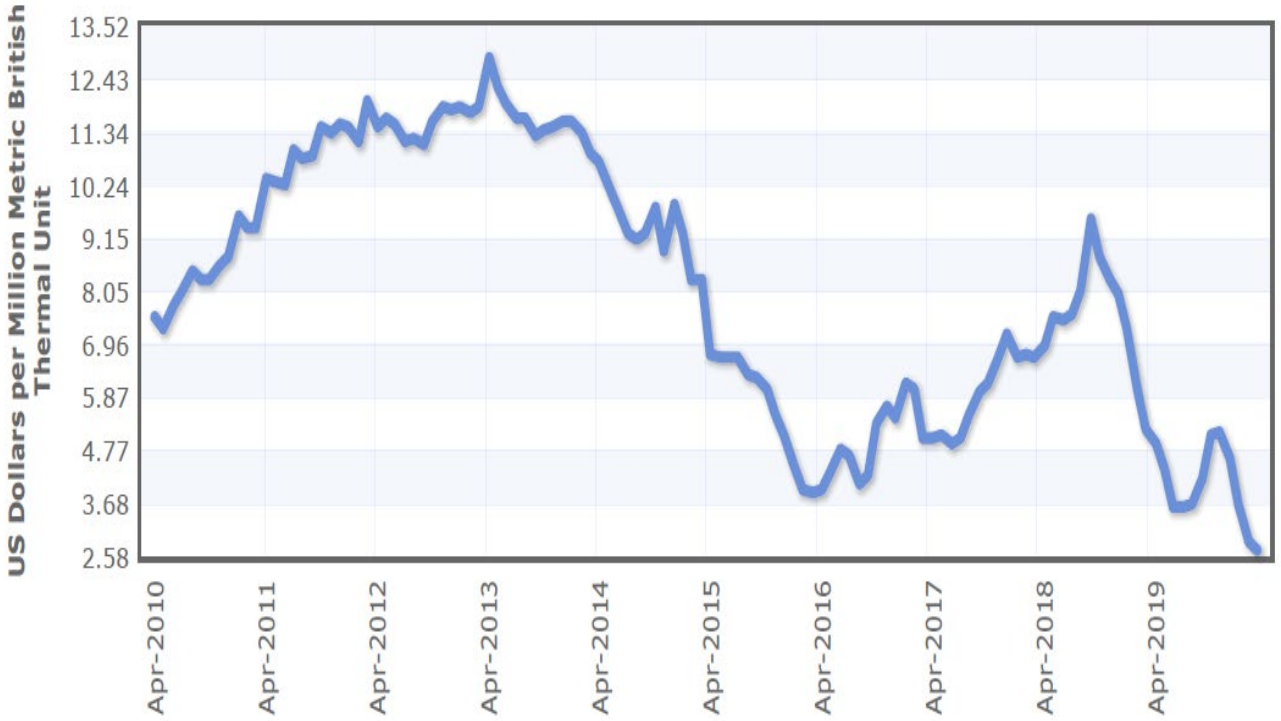
Renewables grow while coal and gas decline

It is possible today to operate the European power system with high RE shares

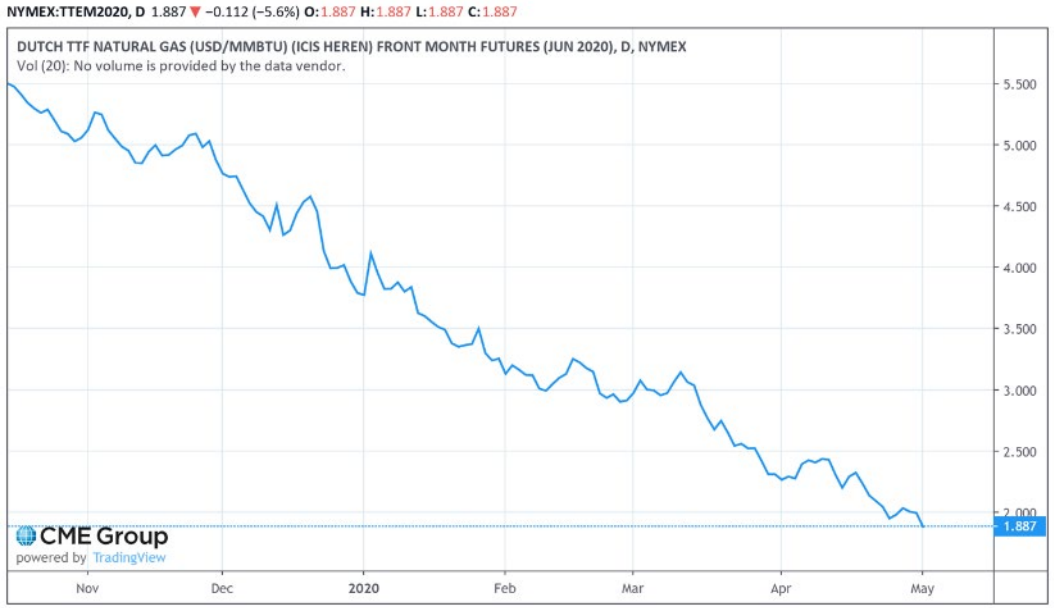
Source: Wårtsilå

Fossil fuel prices have fallen –
A combination of supply and demand factors

Europe Russia gas import price [USD/MBTU]



Dutch Title Transfer Facility Gas prices Nov - May 2020



This year in Europe:

Gas 4 → 2 USD/MBTU

Brent oil 70 → 37 USD/bbl

Thermal coal 70 → 55 USD/t

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European CO_2 permit prices hold steady

Fuel price developments and permit prices explain the coal power generation drop

Source: Ember

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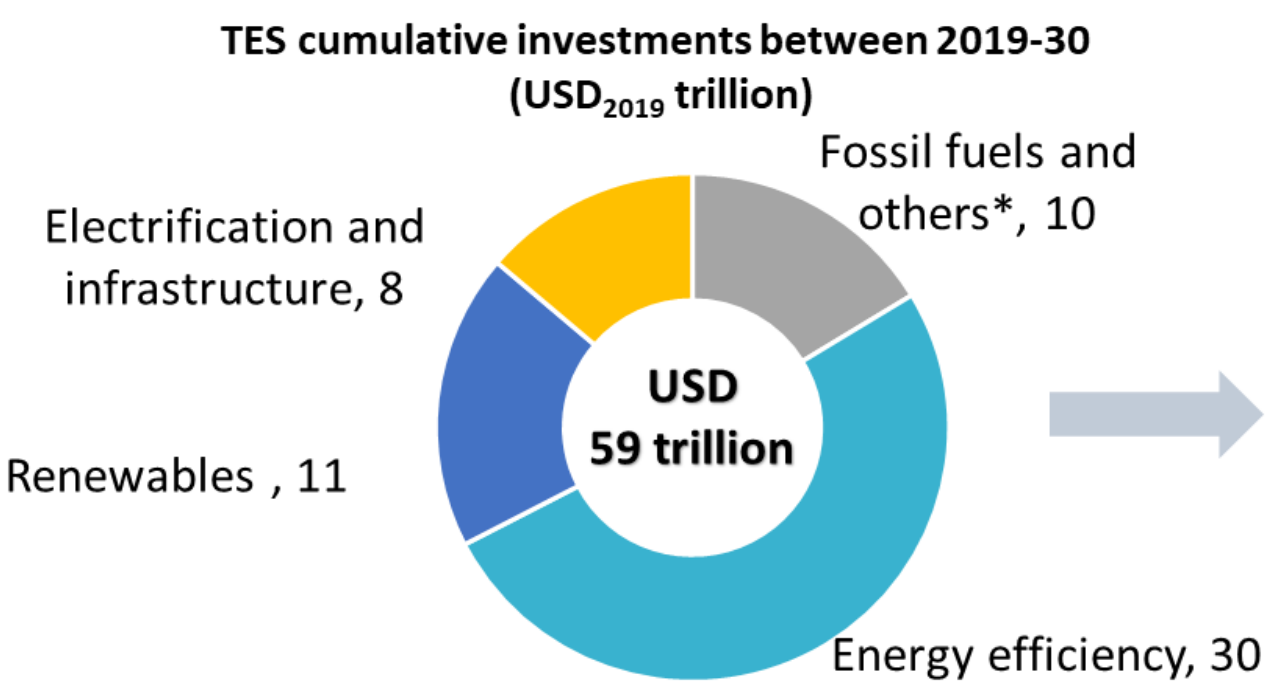
Global 2019-2030 Energy Transition investment needs



Energy sector average annual investments 2019-30:

USD 5.4 trillion per year

Clean energy average annual investments, 2019-30:

USD 4.5 trillion per year

European options for the stimulus package

- Energy efficiency – notably buildings retrofit
- Renewable power generation – notably wind & solar
- Electric vehicles
- Infrastructure: charging, electricity & greening of gas grids

- Need for criteria such as:
  - Timeliness and ability to scale up
  - Job creation and economic impact
- Stimulus package design should look beyond fiscal stimuli

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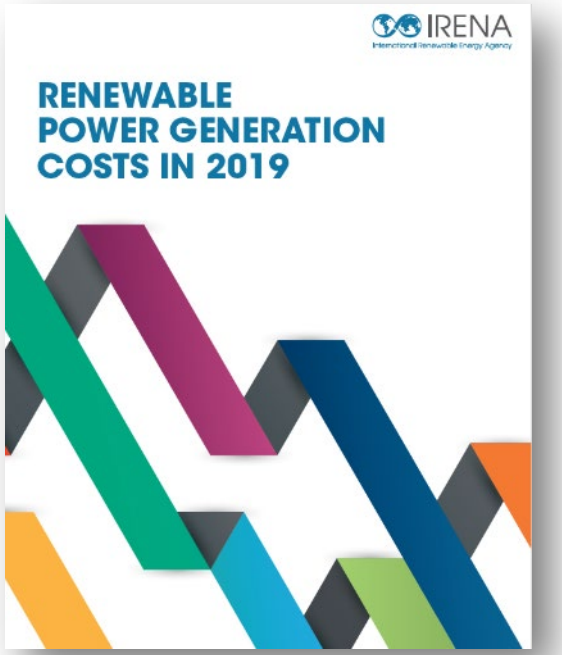
Building retrofit

- Average gain 1% per year (9% for 12% of buildings)
- Total average annual EE investments Euro 280 billion/yr 2012-2016
- In 2019, €1.5 trln construction output in the EU, 18m workers
- Need to increase renovation rate from 1% to 3%/yr - a tripling is needed – leverage public funds with private investments
- Construction activity in March was down 13% compared to previous year, operating at 60-80% in DE, FR, ES, 30% in IT in May
- Capacity to expand will limit investment potentials

Solar and Wind power is increasingly competitive

- More than half of the renewable capacity added in 2019 achieved lower power costs than the cheapest new coal plants.
- On average, new solar PV and onshore wind power cost less than keeping many existing coal plants in operation, and this trend accelerating.
- Replacing the costliest 500 GW of coal with solar PV and onshore wind next year would cut power system costs by up to USD 23 billion every year and reduce annual CO_2 emissions by around 1.8 Gt, equivalent to 5% of total global CO_2 emissions in 2019.
  - It would also yield an investment stimulus of USD 940 billion, equal to around 1% of global GDP.



June 2020

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Renewable power investment opportunity

- Wind energy installations for 2020 are expected to be 30% down compared to industry forecasts
- International supply chain problems
- Access to financing and financing cost uncertainty
- Falling wholesale prices affect investment decisions
- Invest in rooftop solar or Building-Integrated Photovoltaics (BIPV) technologies
- Ministers from Lithuania, Poland, Greece, Spain, Latvia, Estonia, Austria and Luxemburg call for an EU industrial policy to expand renewables supply chains in Europe
- ‘Strategic Investment Facility’ seeks to unlock €150 billion of investments in renewables and energy storage technologies
- More flexible permitting rules and more flexible approach to State Aid ?

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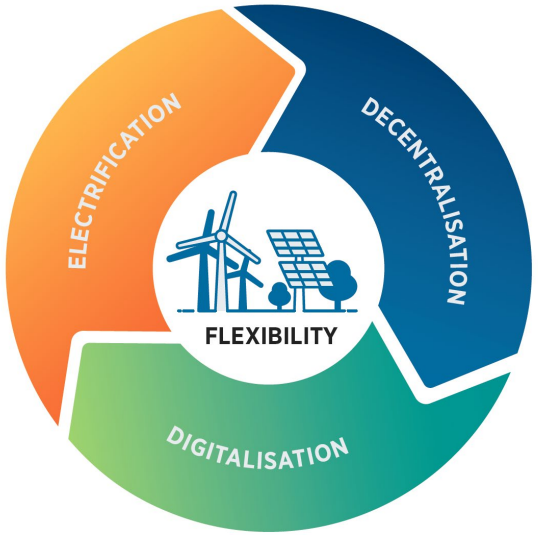
30 key innovations for power system flexibility



ENABLING TECHNOLOGIES

1	Utility-scale batteries
2	Behind-the-meter batteries
3	Electric-vehicle smart charging
4	Renewable power-to-heat
5	Renewable power-to-hydrogen
6	Internet of Things
7	Artificial intelligence and big data
8	Blockchain
9	Renewable mini-grids
10	Supergrids
11	Flexibility in conventional power plants

BUSINESS MODELS

12	Aggregators
13	Peer-to-peer electricity trading
14	Energy-as-a-service
15	Community-ownership models
16	Pay-as-you-go models

MARKET DESIGN

17	Increasing time granularity in electricity markets
18	Increasing space granularity in electricity markets
19	Innovative ancillary services
20	Re-designing capacity markets
21	Regional markets
22	Time-of-use-tariffs
23	Market integration of distributed energy resources
24	Net billing schemes

SYSTEM OPERATION

25	Future role of distribution system operators
26	Co-operation between transmission and distribution system operators
27	Advanced forecasting of variable renewable power generation
28	Innovative operation of pumped hydropower storage
29	Virtual power lines
30	Dynamic line rating

Source: IRENA (2019), Innovation landscape for a renewable-powered future: Solutions to integrate variable renewables

Electromobility

- Sales doubled: EV accounted for 6.8% of passenger car sales in Europe in the first quarter of 2020 (ACEA)
- The rollout of EV chargers was postponed in 11 European countries
- Charging is down, affecting the profitability of new chargers
- New EV factories and new battery factories represent a significant investment opportunity – nearly 50 GWh planned (EIB)
- Lower ICE sales make it easier to meet CO_2 targets
- Car scrapping and efficient ICE subsidies may create jobs but don't create significant environmental benefits (ICCT)

Source of hydrogen – today and 2050

A shift to clean hydrogen, key roles for blue and green H2

In 2050:

Two-thirds of hydrogen produced could come from green hydrogen

1700 GW electrolyzers from 0.3 GW today

Nascent industry limits stimulus investment potential

Today

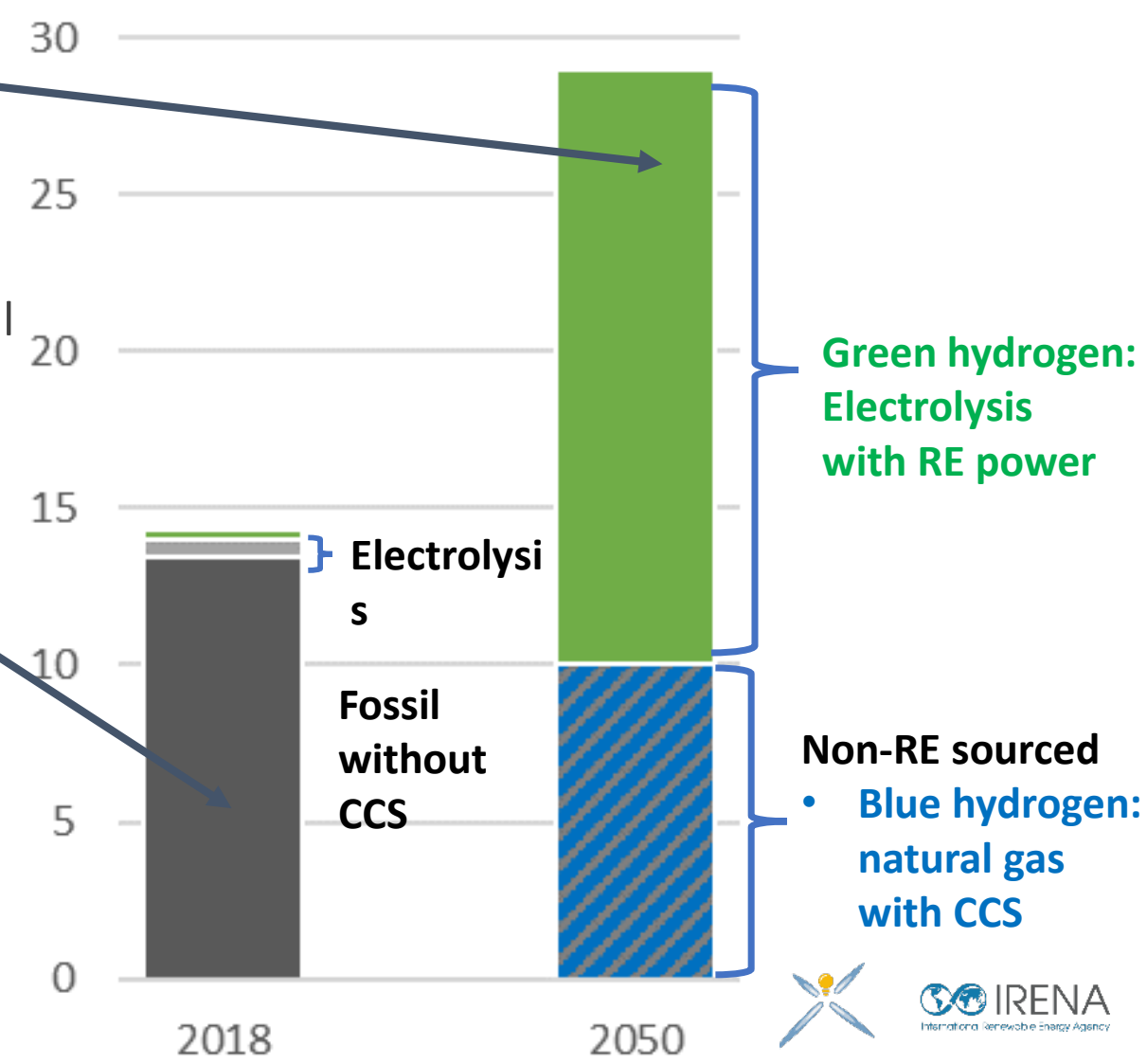
About 14 EJ hydrogen produced

mainly from fossil source - **green**

and blue hydrogen production is

negligible

Demonstration projects with electrolysis – with increasingly large sizes (> 50 MW)



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