What is the investment framework needed to perform the energy transition?

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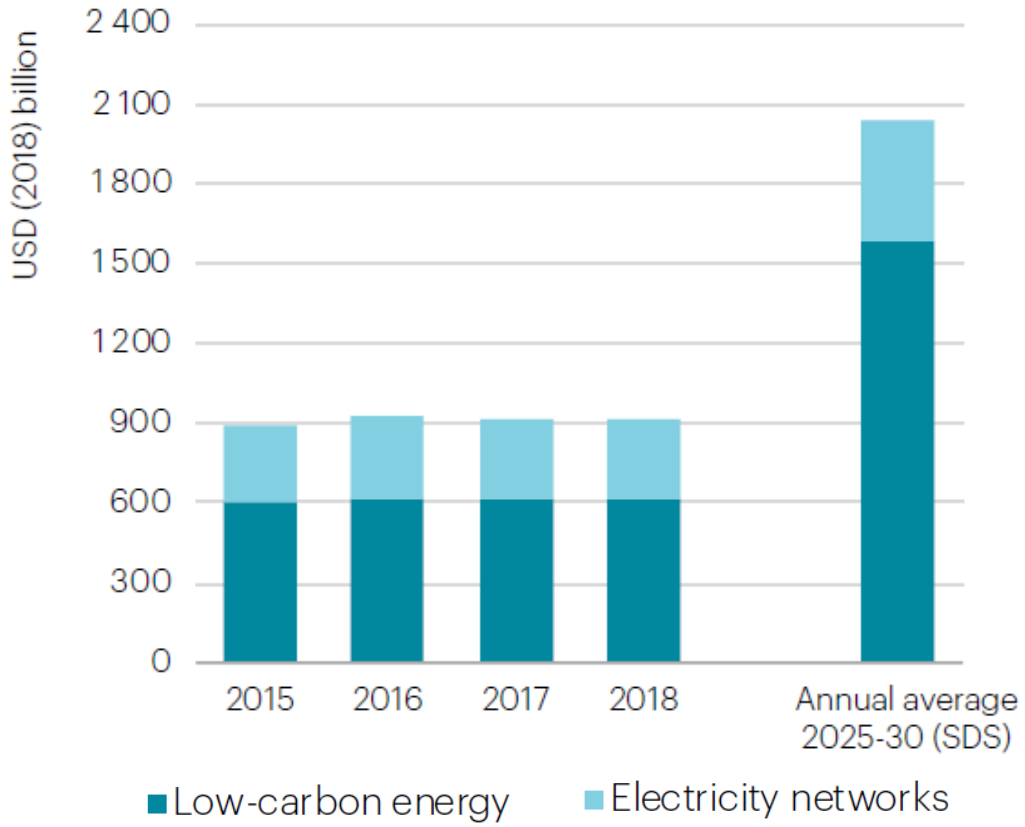
Low-carbon energy investment has stalled in recent years

The next decade is critical, as the global economy will have to undergo a deep structural transformation.

Investment in low-carbon energy (supply & demand) and grids 2015-18 and annual average investment 2025-30



Note: SDS = Sustainable Development Scenario

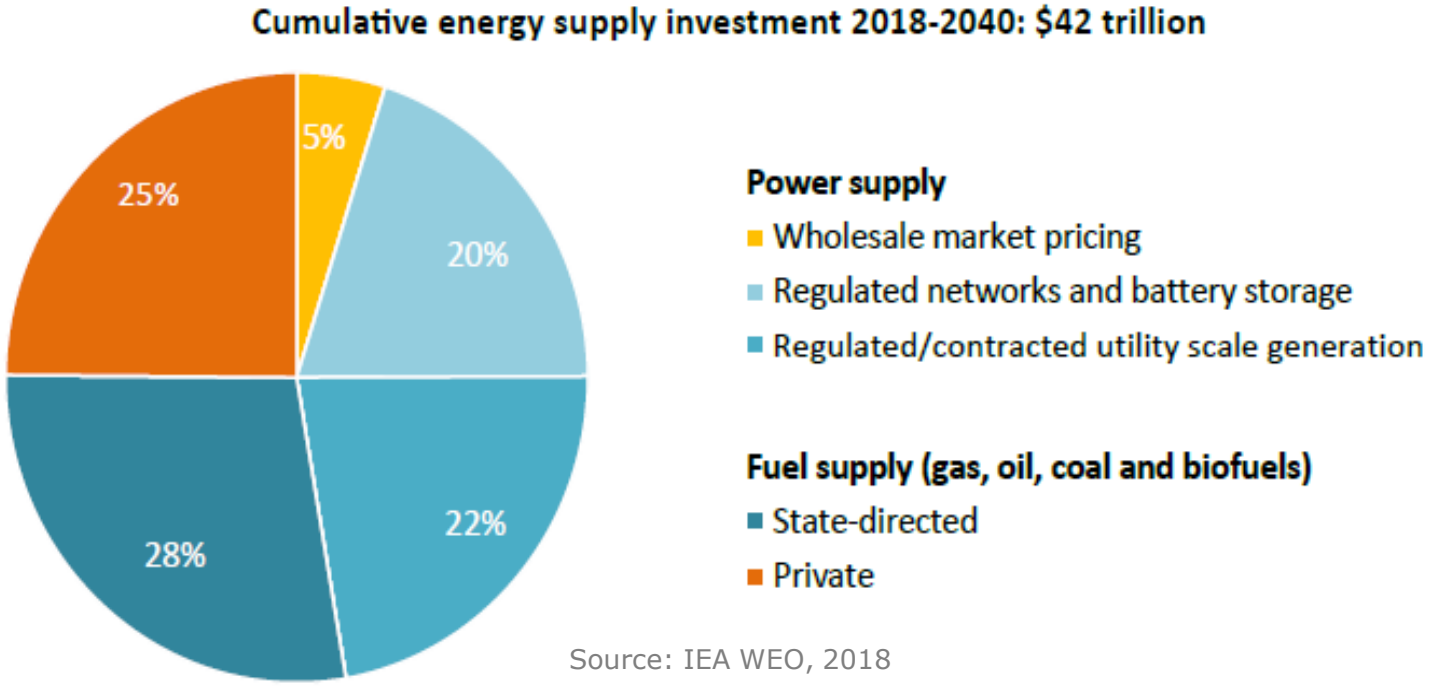
Source: IEA WEI, 2019

A rapid boost in renewables and energy efficiency investment is needed to keep Paris in sight.

Competitive markets still have a limited role on energy investment

According to the IEA, among the estimated USD 42 Trillion of accumulative energy supply investments required from 2018-40, 70% is either conducted by SOEs or respond to a full or partial revenue guarantee set up by governments, with just 30% corresponding to private market-driven investments, responding to prices set on competitive markets.

Cumulative supply investment 2018-40 by type in the New Policies Scenario



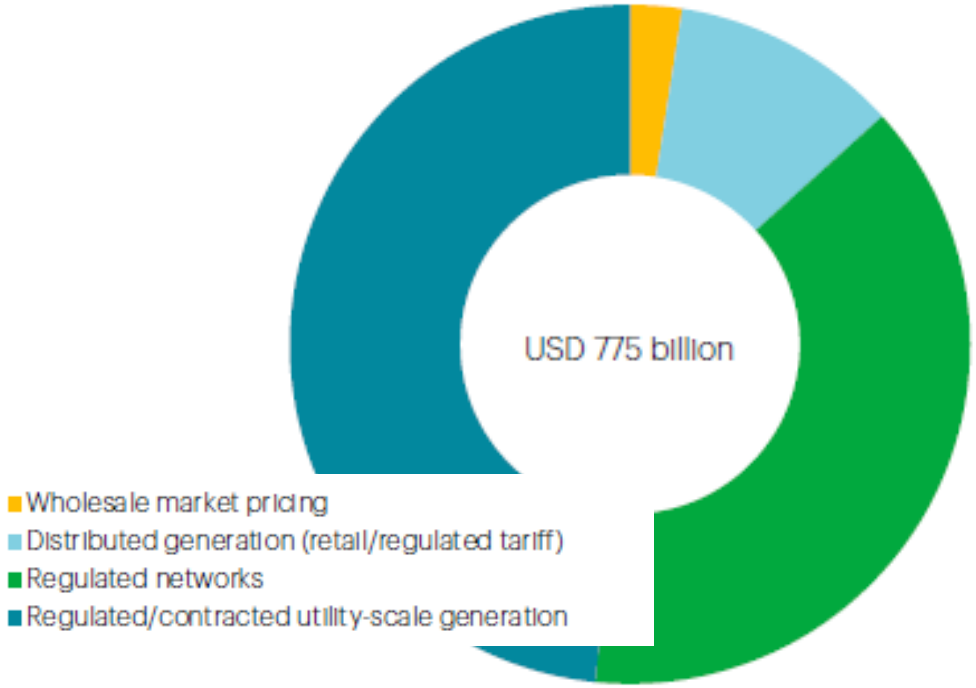
Source: IEA WEO, 2018

In order to minimize the cost of the transition it is crucial to retain the efficiencies delivered by market decisions to the extent possible.

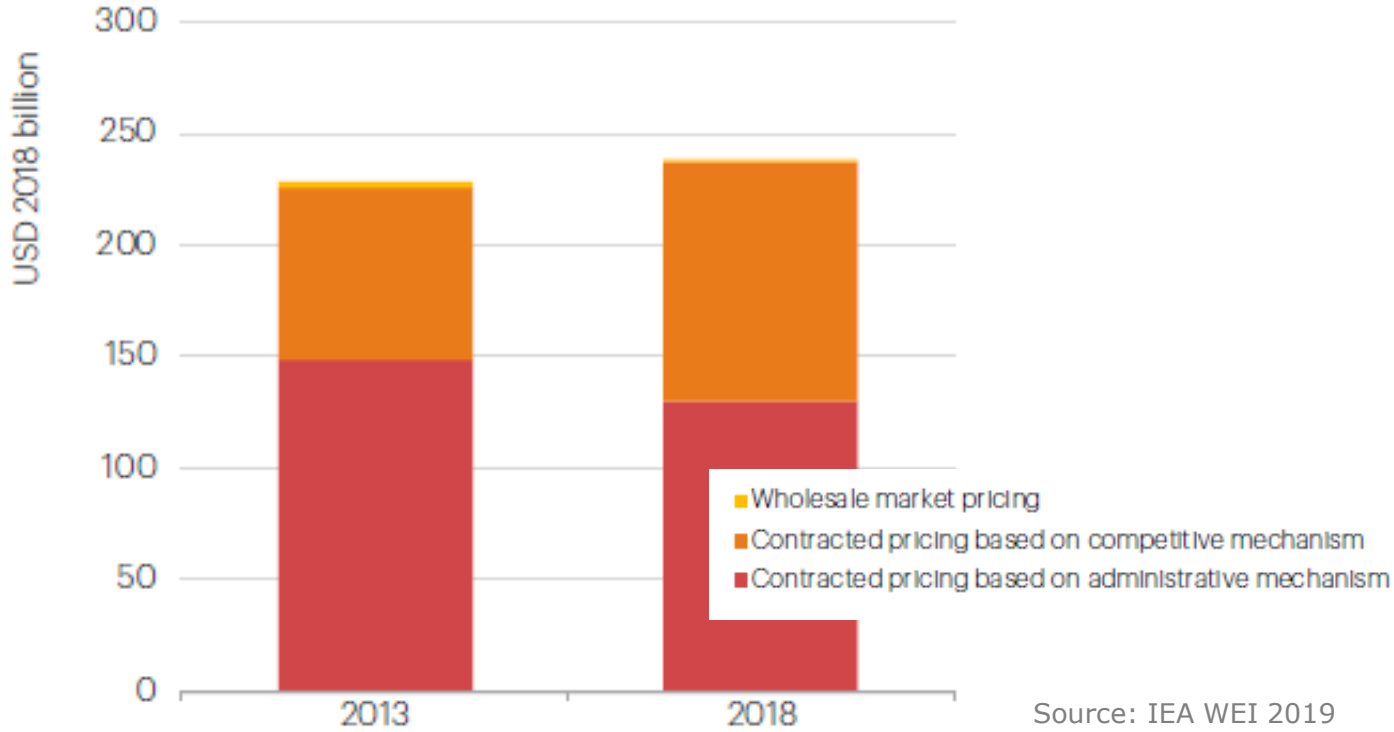
Global investment in the power sector

In 2018, over 95% of power sector investment was made by companies operating under fully regulated revenues or long-term contractual mechanisms to manage the revenue risk associated with variable wholesale market pricing.

Global power sector investment by main remuneration model, 2018



Global utility-scale renewable power investment, 2013 vs 2018

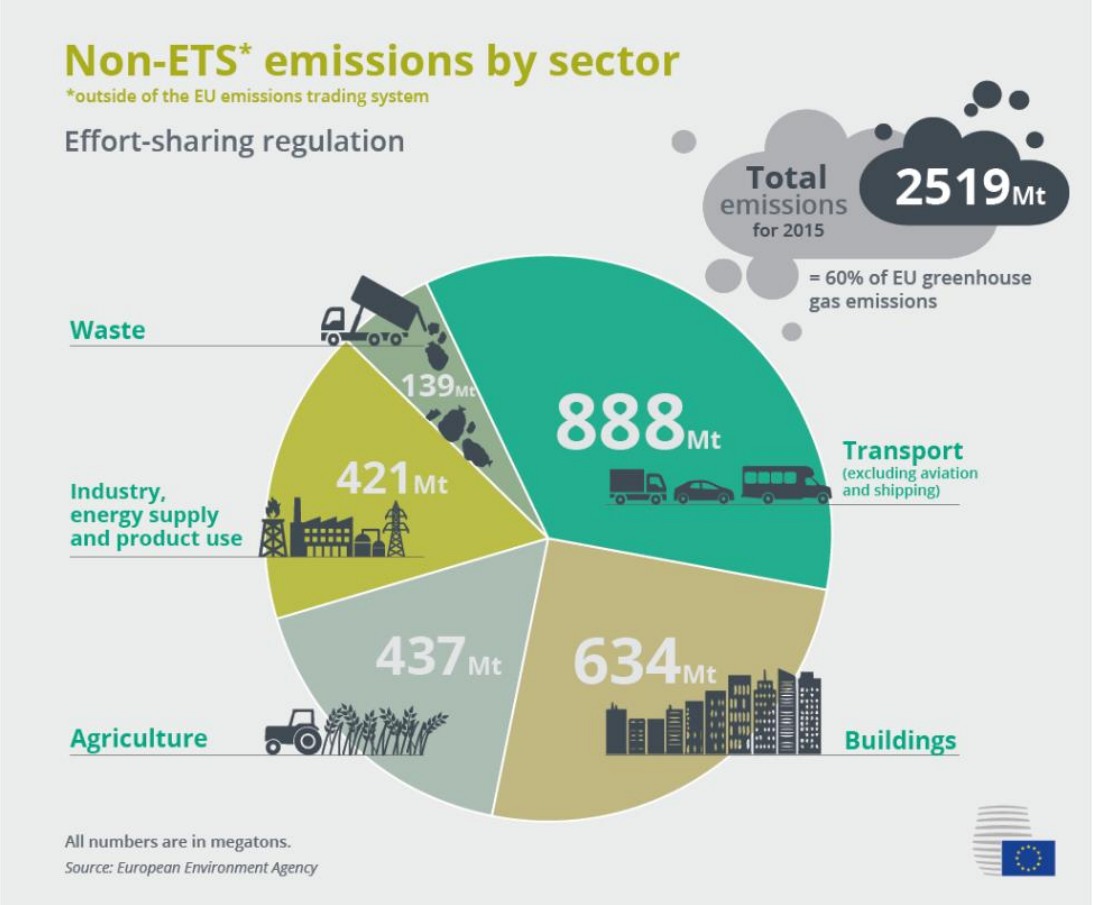


Source: IEA WEI 2019

Despite the commitment to the liberalization of the power sector and falling cost of renewables, the power sector continues to be driven by regulated framework.

Beyond electrons, greening the molecules

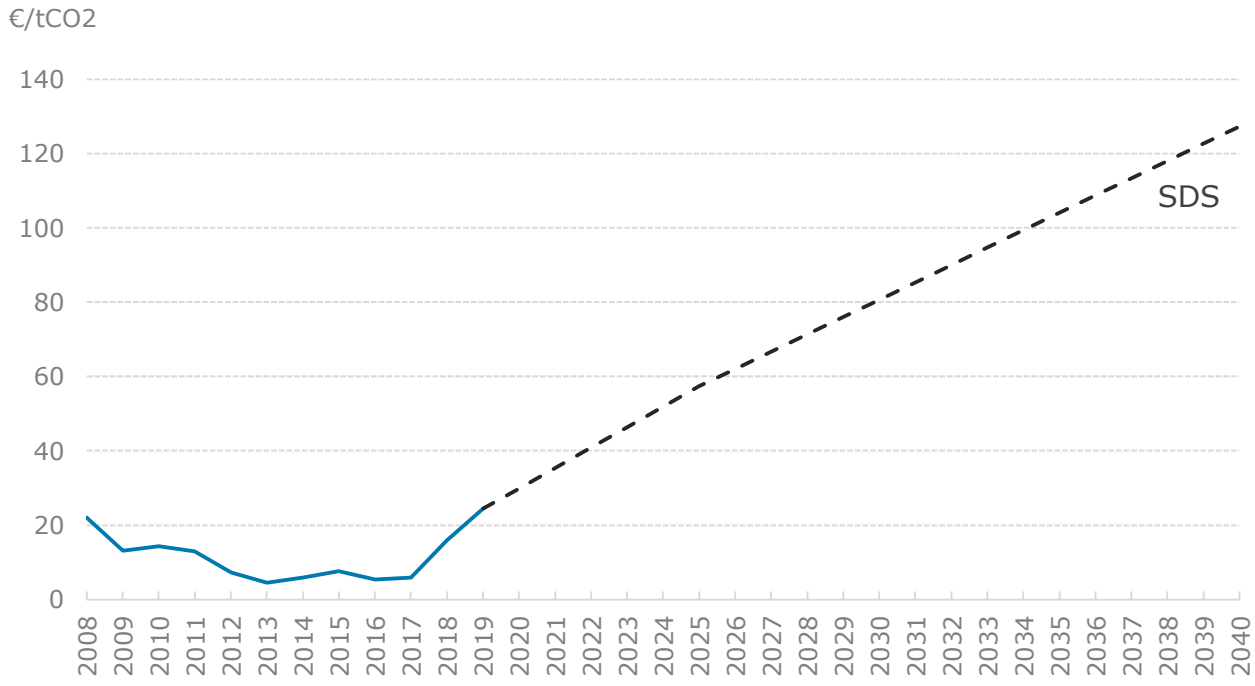
The European Commission's 2050 long-term strategy (A Clean Planet for All) states that the share of electricity in final energy demand will reach 53%.



We do not have (yet) all the technologies for a carbon neutral energy system. Incentives for R&D will be required to develop non-electric renewables (hydrogen and biomethane) and other facilitating technologies including CCS/U.

What is missing to unlock private investment?

A sufficient and predictable return for low carbon investments hinges on a robust and gradually rising long-term CO_2 price signal.



Source: Own elaboration based on data from Sendeco, Reuters and IEA WEO 2018

The very high CO_2 prices required to meet our climate objectives can be politically unacceptable. But long term'visibility on carbon pricing is essential.

A long-term CO_2 price signal is not enough

There are limitations to the effectiveness of national carbón taxes in the face of a global problem while higher and more certain carbon pricing *alone* does not address all the enhanced market risks for low-carbon investments i.e. fuel price uncertainty or low wholesale electricity price periods undermining returns as the system decarbonises.

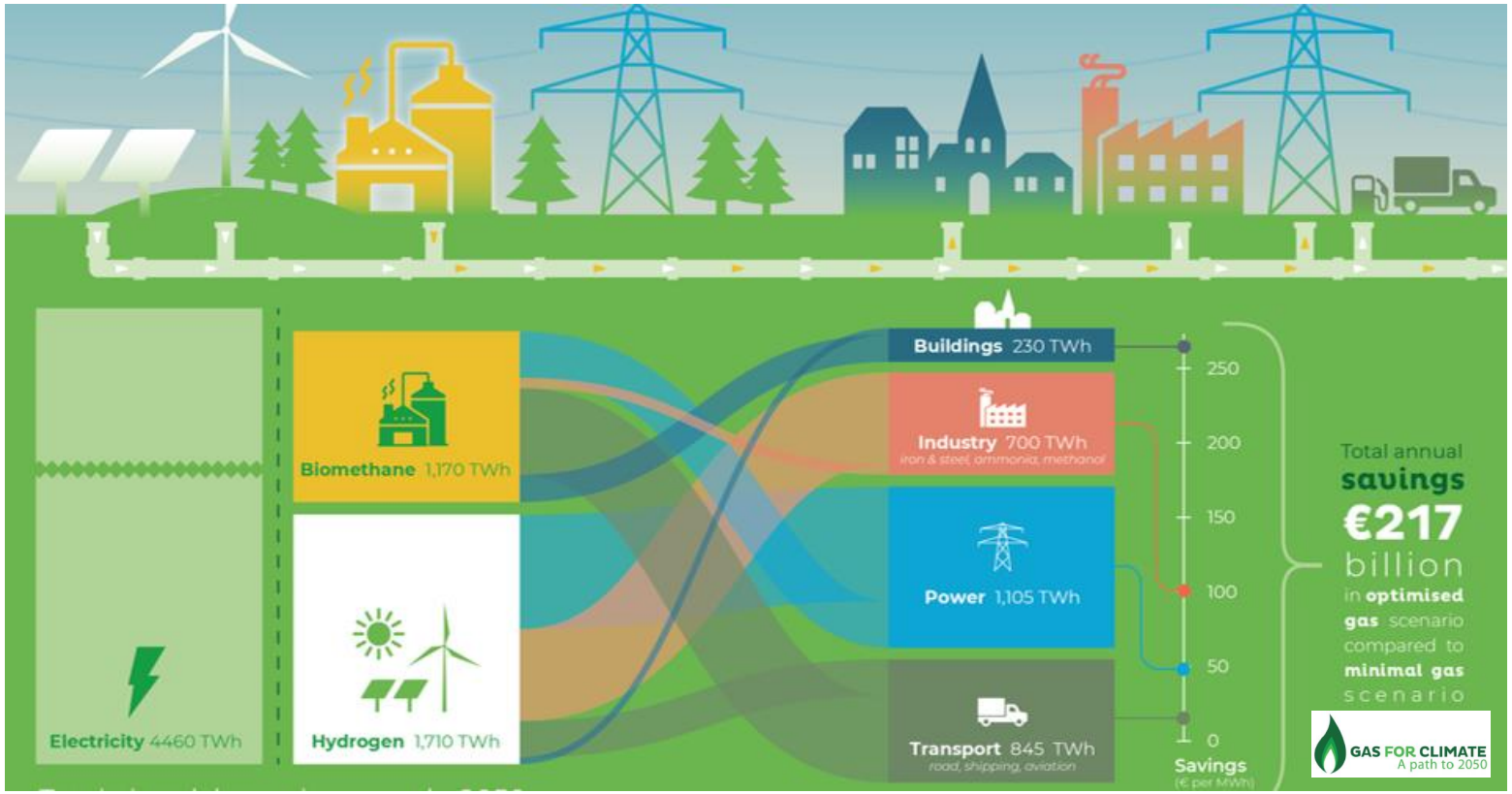
Price signal limitations

- Inelastic demand (reflecting lack of substitutes)
- Social cost changes over time
- Global damage vs local market price signals
- Industry competitiveness
- Affordability and distributional issues with carbon pricing
- Incentives to innovation and positive spillovers
- Regulatory risk

In the highly second-best context of climate policy, additional policy tools will be required to secure the funding for private investment in all sectors.

‘ Hard-to-abate’ sectors

A smart combination of renewable gas and electricity will be the optimal way to decarbonise the energy system in the EU. Price signals in sectors such as industry, residential or transport have limited impact on emissions reductions due to the lack of low carbon substitutes and the low demand elasticity.

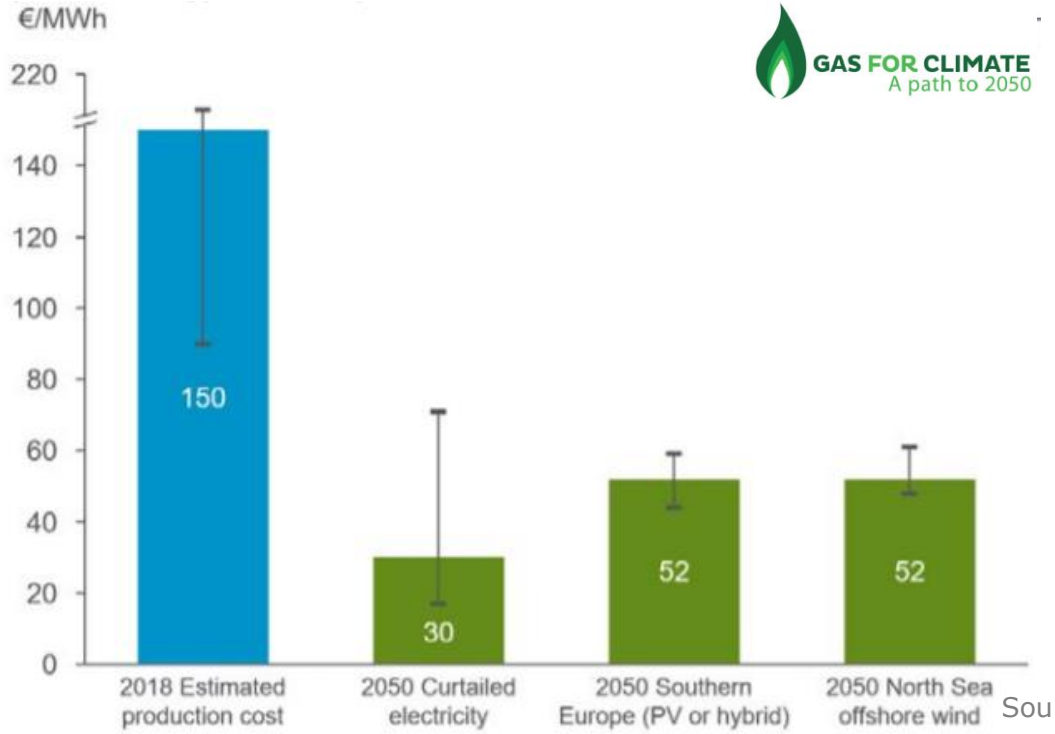


Mandatory standards, subsidies to infant industries and other command & control policy tools are needed as part of an industrial policy to promote green technologies.

Technology push needed for full decarbonisation

Hydrogen is the most promising energy carrier to provide seasonal storage and decarbonised energy for the needs of hard-to-abate sectors.

Green hydrogen expected cost reductions



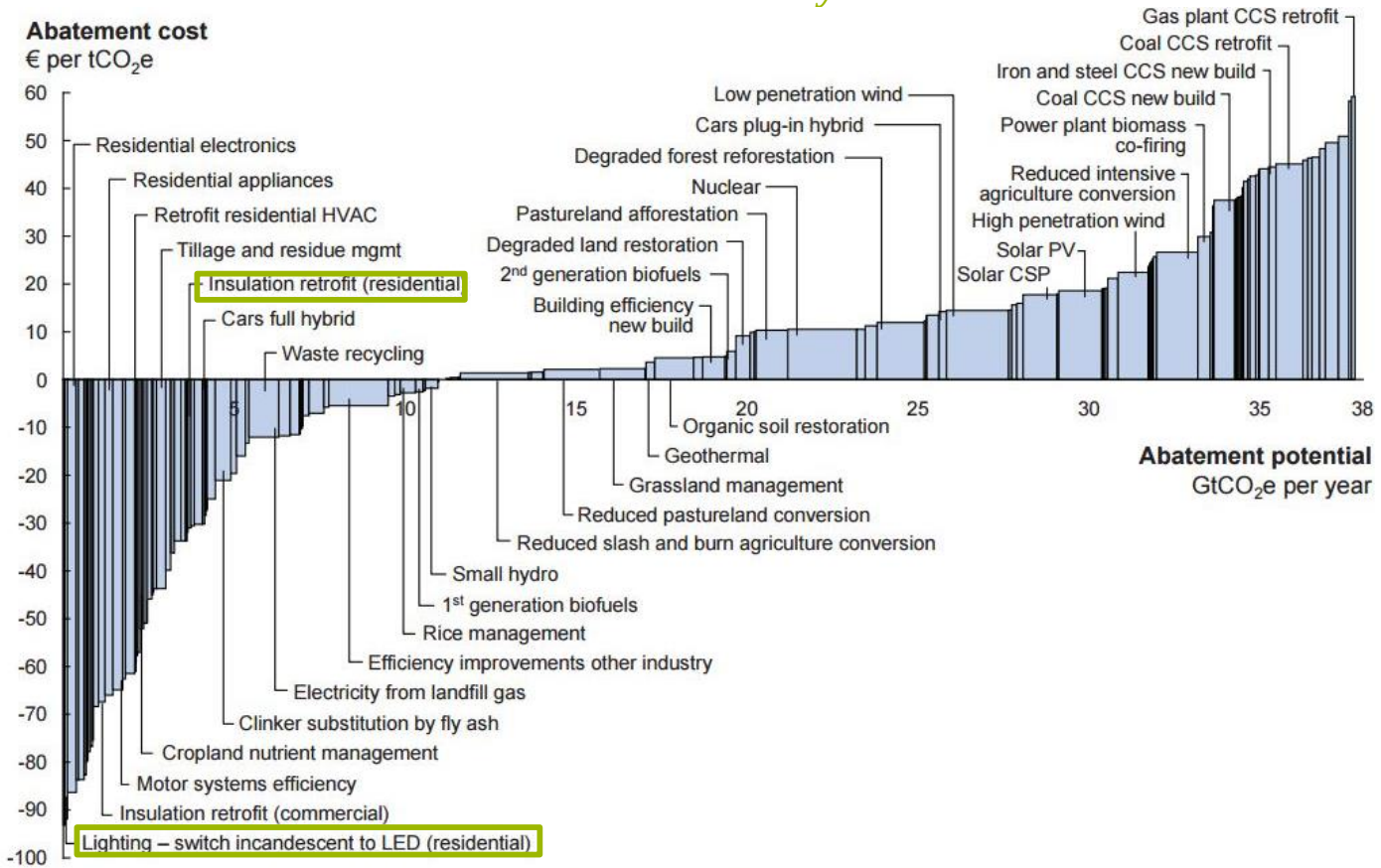
Source: Navigant-Gas for Climate, 2019

Green hydrogen is expected to achieve an affordable price in the near future, provided there are the right incentives to innovate in place.

Energy efficiency is a key component in all decarbonisation scenarios

Do energy efficiency investments deliver?

Global GHG abatement cost curve beyond BAU - 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

There are many explanations for the energy efficiency gap. The evidence shows that in most cases there is a weak business case in the absence of subsidies.

Concluding remarks

- A critical task for Governments is to ensure timely investments in green technologies and on an appropriate scale. Currently the private return to green investments lies significantly below the social return.
- The private sector responds to market incentives and price signals, but also to policy uncertainty.
- A robust and gradually rising long-term CO_2 price signal is essential but in the highly second-best context of green growth, industrial policy is needed to offset carbon underpricing and R&D externalities.
- Renewable energy sources have to go beyond the power sector and innovation is needed for seasonal storage and CO_2 capture and use.
- The evidence shows that support mechanisms are required to materialise the full energy efficiency potential.