

Ladies and gentlemen,

Thank you for the introduction, and welcome to the presentation of Equinor's Energy Perspectives 2022 – the 12th edition.

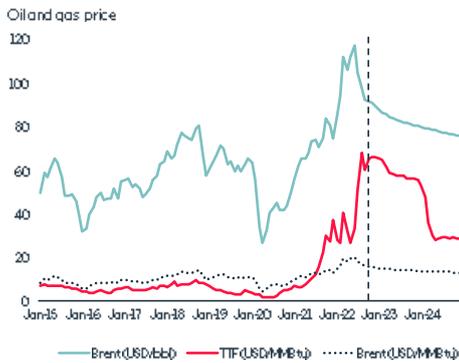
The report and presentation are independent work, prepared by analysts in the company. It intends to provide input to Equinor's strategy and be a fact-based contribution to the debate on global macroeconomic development and a sustainable energy transition.

This year's edition has been prepared in a period of extreme uncertainty and volatility in the markets, and with a terrible and tragic war in Ukraine as a backdrop. It is difficult, but still necessary, to try to see how the world economy and the global energy markets may develop in the coming decades.

This report and its data and conclusions would not be possible without the good work of many great colleagues - thank you very much - you are the best.

## We are in a world of extremes

Conflicts and unrest, lack of trust, market imbalances  
disastrous weather events



Source: Platt's, IHS Markit, ICE (projection)

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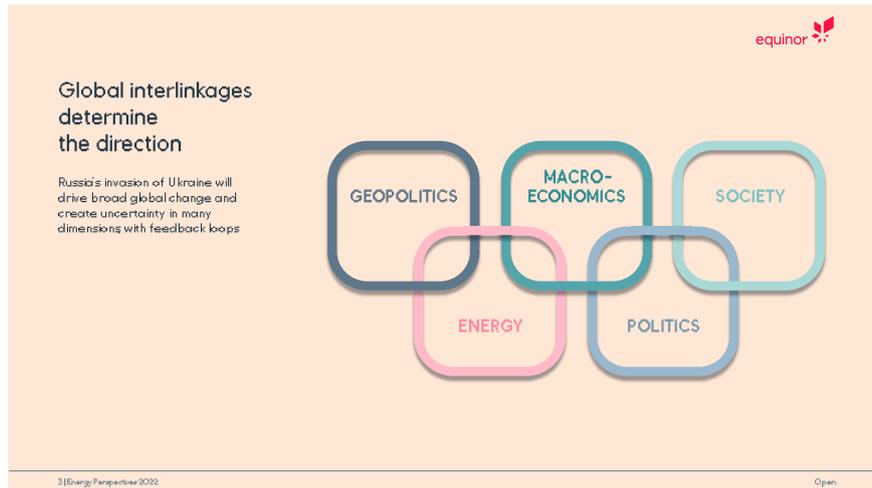
2022 is an extreme year, in many dimensions.

While the economy was slowly recovering from Covid, with bottlenecks in many supply chains, and increasing inflation in the world's commodity markets and especially in the energy markets, we were hit by a war in Europe. What little there was of trust between the world's great powers is being challenged and destroyed, and uncertainty about future cooperation and alliances is growing.

Extreme weather such as droughts and floods affect millions of people and worsen the food crisis.

Deliveries of gas from Russia to Europe have been reduced and gas prices have reached levels we have never seen before. The price of oil is traditionally higher than the price of gas in energy terms – as oil is more valuable and flexible. Since the summer of last year, gas prices in Europe have been much higher.

Security of energy supply and affordability have suddenly become acute topics in the debate on sustainability, in addition to the spotlight on decarbonisation. The discussion about intervention in Europe's energy markets to avoid the worst outcomes of the situation is loud.



Russia's invasion of Ukraine has implications in many interdependent dimensions.

The level of trust between the West and Russia is at rock bottom, and it will take many years before we have seen all the consequences of the breach of trust and the conflict. The war affects the relationship between all the great powers and contributes to intensifying uncertainty and security challenges.

The imbalances in the energy market are significantly reinforced by Russian oil and gas being withdrawn from the markets or having to be channelled to other countries than before, and we are now preparing for possible rationing of energy in Europe for the winter.

In addition, sanctions, bottlenecks, inflation and tighter monetary policy have negative macroeconomic effects, partly offset by increased public expenditure to stimulate the energy transition, and growth in military spending etc.

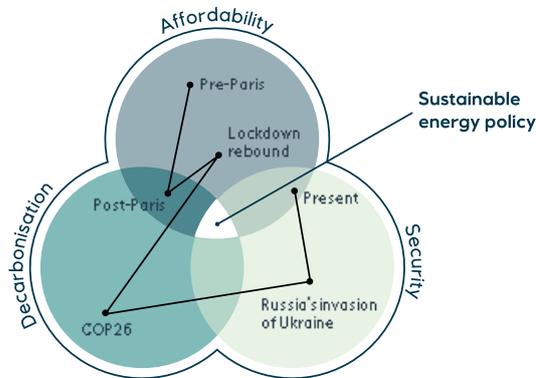
In a situation where the debt burden is high, authorities are forced to intervene in the markets in different ways, where we see a lack of trust in those in power in several countries, and where election results show increased support for political parties and opinions that are partly based on protectionist and populist ideas. The interventions also include increased taxes on energy companies, support for energy consumers, etc.

These are largely pushed forward in the societal debate as a result of increased cost of living, potentially giving rise to social unrest. We do not know the consequences for politicians or energy companies, nor how this affects support for the energy transition.

The various dimensions here are mutually dependent and so-called feedback loops can amplify or dampen developments.

## We see a vivid illustration of the energy trilemma

Sustainability requires a balanced approach



Source: Equinor



Source: United Nations

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We are now experiencing a very clear illustration of the various dimensions of the energy trilemma, i.e. the trade-off and balance between affordable, safe and decarbonised energy.

In recent years, the center of gravity in the trilemma has shifted several times - where the Paris Agreement in 2015 put decarbonisation prominently on the map. After Covid and towards COP26, with net zero targets established in more and more countries, this focus was further strengthened, and with plans for new green solutions, the notion of decarbonisation and rapid access to clean energy to replace fossil fuels was reinforced.

Economic growth and increased demand after Covid, bottlenecks on the supply side and reduced gas flows from Russia changed the picture completely, and suddenly the focus on supply security and costs was back in fashion. And, after 24 February, everyone understands that security of supply is the foundation for a sustainable energy system.

A sustainable energy transition must find a balance between the three different dimensions of the energy trilemma. As the UN's sustainability goals have stated all along.

## The net zero target is dominant

Countries with net zero targets set in law, policy documents or pledges



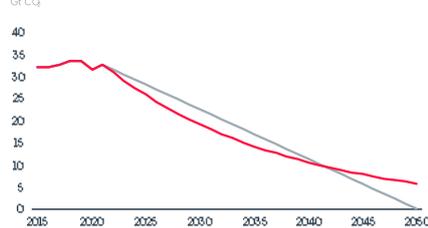
Goals for net zero emissions by the middle of the century, and for global warming not to exceed 1.5 degrees, have been established as goals or ambitions in more and more countries that cover large parts of the world's greenhouse gas emissions. The underlying drive towards an energy transition and reduced greenhouse gas emissions have not disappeared.

If we are to have a chance of achieving such goals, immediate and elaborate global cooperation is required in many dimensions, with a balancing of different considerations. Everyone must contribute. If not, it will be much more difficult.

## The 1.5°C target requires more than getting to net zero by midcentury

The carbon budget is extremely challenging: we need to deliver reductions with full speed, but prepare for overshoot

Annual energy-related emissions - an illustration

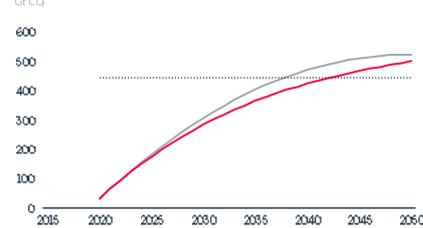


■ Linear decline ■ Covid decline

Source: IEA (history); Equinor (projections)

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Cumulative energy-related emissions - an illustration



■ Linear decline ■ Covid decline ..... Target

Source: Equinor (projections)

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It is important to be aware that the challenge of avoiding more than 1.5 degrees of warming is much more demanding than reaching net zero emissions by 2050.

As an illustration - if we had managed to reduce energy-related emissions linearly from now to zero in 2050 (the gray line), we would pass the carbon budget for 1.5 degrees of warming already before 2040.

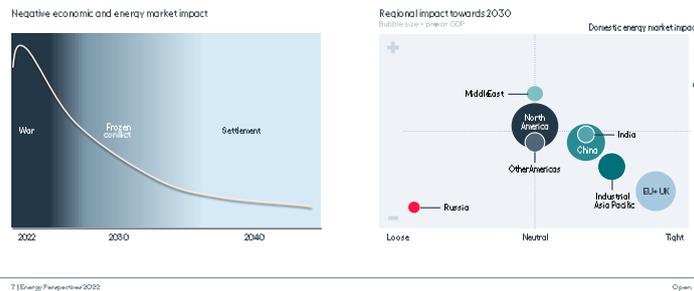
Alternatively, if we had managed to reduce annual emissions in percentage terms by the same amount as they fell in 2020 due to Covid - 2020 was a year of extensive shutdowns, lower activity levels and strongly negative economic growth (see the red line), we will not quite get to zero, and we pass the budget for 1.5 degrees warming just after 2040.

This illustrates how extremely demanding the 1.5 degree target is - we must be prepared that even if we are well on our way with strong emission reductions, the target may not be reached. And we're not on our way, yet.

At the same time, it is important to emphasize that all measures that move us in the right direction are important to implement. The best must not become the enemy of the good.

## Our take on the global development over the next years

The Russian invasion will have longlasting impact on the global energy system and economic growth



Our starting point for the most likely development in the coming years is that Russia's invasion of Ukraine will have long-term effects on economic growth and the energy system.

The war going on now, both militarily and economically, has massive negative effects, but to varying degrees in different regions, as we illustrate in the figure on the right. The negative effects on the economy and energy markets are strongest in Europe, with ripple effects for the rest of the world.

The war will not last forever and will probably turn into a period of what we can call a frozen conflict, with strong polarization between the West on the one hand and Russia/China on the other, and where other large emerging economies try to avoid taking sides.

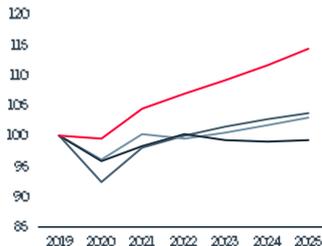
Policies in Europe will be aimed at independence from Russia, especially in the energy area, while also handling an increasing strategic competition between the US and China. This affects global supply chains, including those of raw materials and minerals that are important in the energy transition.

The uncertainty after 2030 is large, but we base our analysis on the fact that the level of conflict will gradually decrease, that we see an acceleration of the energy transition in Europe founded on greater energy self-sufficiency, and that Russian energy and resources will gradually reach markets in Asia to a greater extent .

## Our short-term outlook to 2025

Out of Covid, handling the energy crisis and supply bottlenecks, food inflation and globalisation

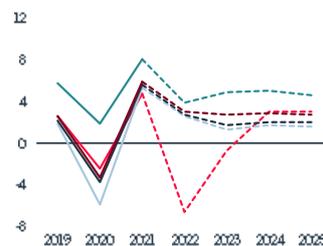
Coal, oil, gas and electricity demand  
Indexed, 2019 = 100



Coal Oil Gas Electricity

Source: IEA (history), Equinor (projections)

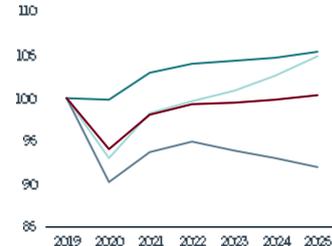
GDP growth  
% change/y/y



China North America European Union CIS

Source: © Oxford Economics Limited 2022 (history); Equinor (precast from Jun 2022)

Energy-related CO<sub>2</sub> emissions  
Indexed, 2019 = 100



Industrialised China Emerging & Developing Economies

Source: IEA (history), Equinor (projections)

In the coming years, we believe that development and the energy and climate policy agenda primarily be driven by a focus on energy security and cost. We will see an acceleration of the energy transition and decarbonisation where it coincides with the other considerations in the energy trilemma, but not where these considerations are contradictory.

Economic growth will be moderate, and particularly weak in Russia. Energy demand continues to grow, with strong growth in electricity and continued growth in oil and gas demand. Global CO<sub>2</sub> emissions are growing slightly in the coming years, driven by growth in emerging economies.

What happens after 2025? Can we envision significantly different development trajectories, based on different assumptions about energy and climate policy and technology development?



## Walls protect but also divide

### Walls

- Builds on historical and current market trends and policy signals
- Economic growth is a key driver
- Russia's invasion of Ukraine and geopolitical tensions have given rise to reappearance of obstacles
- Energy security increasingly important in the short-to-medium term

Yes, we can. We have called one possible scenario Walls. Walls protect, but they also separate and shut us out.

This scenario is based on what we have seen of market development, actual policy, policy signals and technology changes. Economic growth is the key driver in the energy markets. Obstacles to cooperation and lack of joint solutions to common challenges have become greater after Russia's invasion of Ukraine and the increase of geopolitical conflicts.

The walls have become higher and thicker. Energy security and the desire to be less dependent on others have become more important than before and will shape development. The need for protection against others with negative intentions has become greater.

In this scenario, we nevertheless see significant changes in a sustainable direction, driven by politics in individual regions, technology and economics. But the changes are not sufficient to reach climate goals.

## Bridges connect and enable

### Bridges

- A normative backcast scenario
- Consistent with a temperature rise of 1.5°C
- Immediate and coordinated international action needed
- Illustrates what it takes to get there

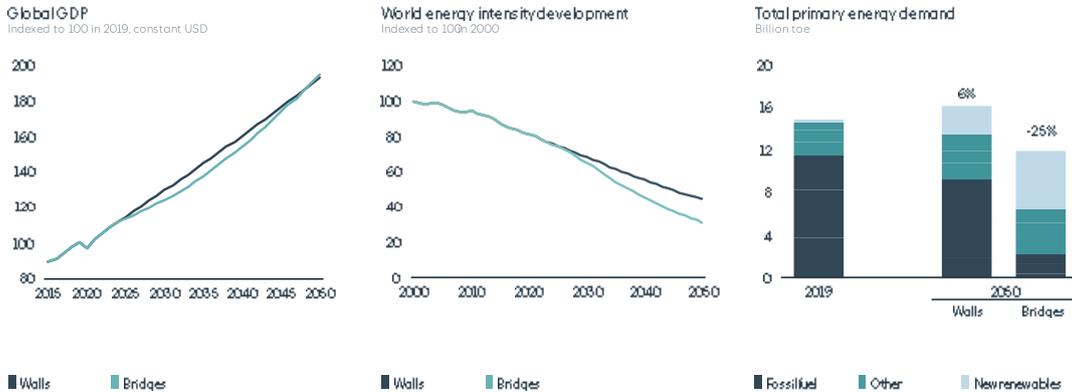
Then we can also imagine a completely different development. One that is absolutely necessary if we are to reach the 1.5-degree target.

We call this scenario Bridges. Bridges connect and enable collaboration and communication. Bridges are open and welcoming.

This scenario is a normative scenario that describes what is needed to reach the 1.5-degree target. It illustrates the formidable changes needed in the world's energy systems, beyond all the changes in Walls. With the changes only gaining real speed from around 2025, enormously strong means of action are needed to reach the goal, with coordinated international cooperation and technology development, and a pace of change that is very difficult to imagine right now.

## The global economy continues to grow and become more energy efficient

Reaching the 1.5°C target requires a reduction of 25% in total primary energy demand



Source: IEA and Oxford Economics Limited 2022 (history); Equinor (projections)

Both scenarios are characterized by continued economic growth and a world economy that is approximately twice as large in 2050 as today. Growth is fastest in Walls at the beginning, because the transition in Bridges is more costly, especially in the richest parts of the world. But eventually growth is faster in Bridges than in Walls, also because we avoid costs resulting from climate change.

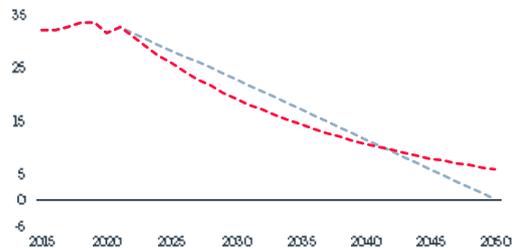
The energy intensity of the world economy is constantly improving, and faster in Walls than it has historically. However, if we are to deliver on the 1.5-degree target, we must see a significant change of pace in the decoupling between economic development and energy demand.

The energy transition is significant in Walls and radical in Bridges - see how the dependence on fossil fuels in the energy mix towards 2050 is reduced and replaced by energy efficiency and especially wind and solar energy in the two scenarios.

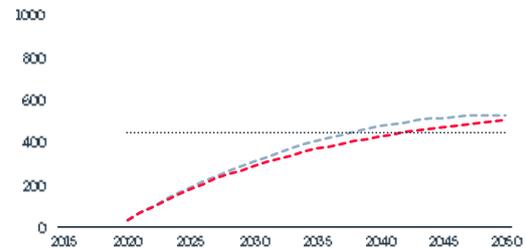
## Emissions in Walls and Bridges decline, but at very different speeds

The challenge of staying within the 1.5°C carbon budget is formidable

Annual energy-related emissions  
Gt CO<sub>2</sub>e



Cumulative energy-related emissions  
Gt CO<sub>2</sub>e



■ Linear decline ■ Covid decline ■ Walls ■ Bridges ..... Target

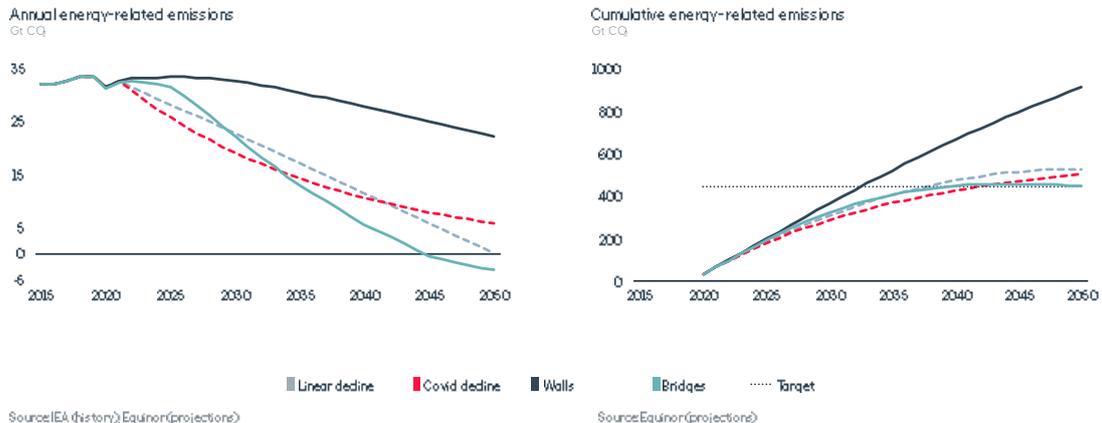
Source: IEA (history), Equinor (projections)

Source: Equinor (projections)

How do greenhouse gas emissions develop in the two scenarios?  
Here are the curves you have already seen, with illustrations of different reduction trajectories in relation to the carbon budget for the energy sector.

## Emissions in Walls and Bridges decline, but at very different speeds

The challenge of staying within the 1.5°C carbon budget is formidable

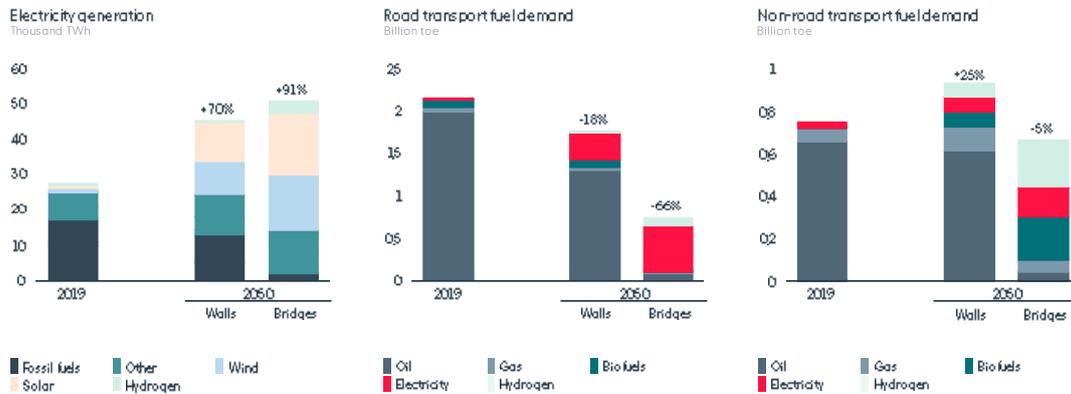


The emission trajectories in Walls and Bridges are very different. Since we do not believe in rapid reductions in the next two to three years, the development in Bridges must be extremely fast to avoid the total emissions exceeding the carbon budget significantly before 2050. Nevertheless, we believe that net negative emissions will be necessary before 2050 to compensate somewhat for not being able to stay completely within the budget - this requires the development of carbon removal technology (Direct Air Capture) and the use of natural carbon sinks, which take more than 4 billion tonnes of CO<sub>2</sub> out of the atmosphere annually from 2050.

In Walls, we pass the carbon budget for the 1.5-degree target already in the early 2030s, and emissions from the energy sector are still over 22 billion tonnes in 2050. Our models do not extend beyond 2050, so we do not really have a basis for assessing how and if we are approaching net zero after this. If we consider the trend in the emission reduction as a basis and compare with the IPCC's assumptions about carbon budgets, there is a basis for concluding that Walls suggests a global warming in the region of 2.2 degrees.

## Massive changes in different parts of the energy system

Electrification is the key element of the energy transition, and a major factor in efficiency improvements



Source: EIA (history), Equinor (projections)

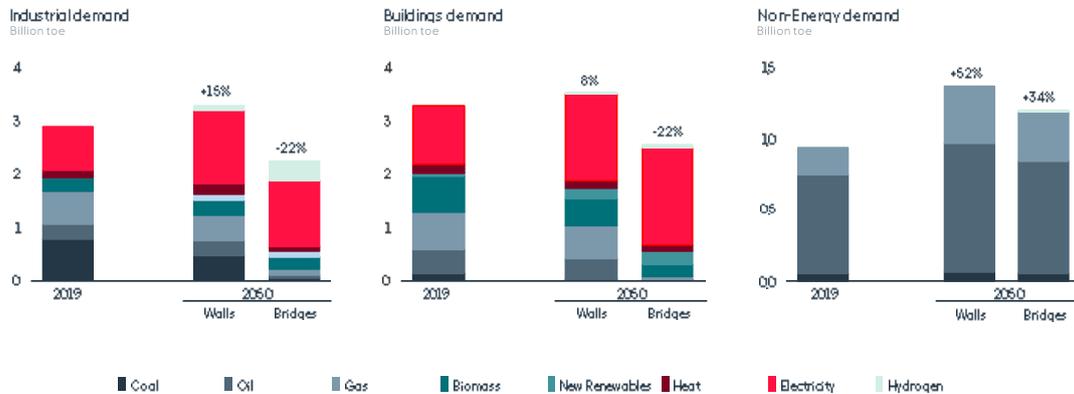
Moving forward towards 2050, the global energy system in both scenarios will undergo significant changes, both in size and composition.

Electricity is the #1 growth area and the key to higher energy efficiency, changing the energy mix and sustainability. In both scenarios, the consumption of electricity grows significantly, by 70 and 90% respectively, and the sources of electricity change radically. If we are to reach the 1.5-degree target as in Bridges, fossil fuels must be almost completely out of the power system (some gas remains and is equipped with carbon capture and storage). Wind and solar power are clearly the most important sources of electricity – a huge change from today.

In the transport sector, the changes are also drastic. If we are to reach the 1.5-degree target, Bridges imply that all road transport in 2050 will in practice be fossil-free, largely electrified and use less than half as much energy as today. In other parts of the transport sector (figure on the right) we also see significant shares of hydrogen, for example in the form of ammonia, in Walls and especially in Bridges.

## Electrification and efficiency improvements are keys in other sectors

Fossil fuels still needed as feedstock



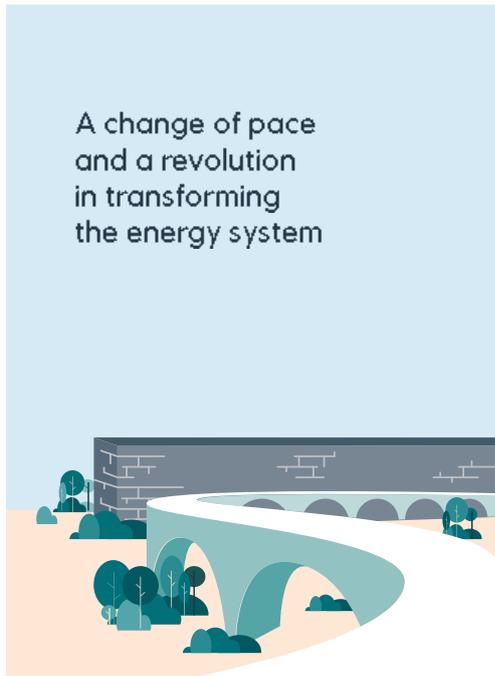
Source: EIA (history), Equinor (projections)

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Also, in other parts of the energy system, the key to the energy transition is electrification and efficiency improvements. Hydrogen plays a role in getting fossil fuels out of the mix in the industry sector in Bridges, while electricity is key in the building sector. In light of population growth and economic growth, growth in building stock and probable growth in the consumption of industrial products, the changes in both Walls and Bridges are demanding, to say it mildly.

Fossil energy sources will continue to play an important role as an input factor (raw material) in industrial production - with increasing demand in both scenarios - despite much more recycling and the focus on reducing the need for plastic packaging etc.



	History 1990 -2019	Walls 2019 -2050	Bridges 2019 -2050
Total primary energy demand CAGR%	1.8%	0.1%	-1.0%
Energy intensity CAGR%	-1.2%	-2.0%	-3.1%
Fossil fuel demand (Change in period- Gtoe)	4.5	-2.3	-9.2
Solar and wind in power generation (Change in period- Thousand TWh)	2	18	31

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To summarize – our two scenarios illustrate the difference between a change in speed and a revolution in the energy transition. The latter is needed if we are to reach the 1.5-degree target, and requires global cooperation, openness, technological development and community – along a bridge to the future.

It is important to emphasize all the changes in Walls as well. Compared to the development since 1990, Wall's implies a full slowdown in the growth of primary energy demand, much faster energy efficiency improvements, a clear decrease in the demand for fossil fuels and an enormous growth in the use of wind and solar energy.

The changes in Bridges are much, much bigger and faster. These are what is needed for us to achieve the ambition of avoiding more than 1.5 degrees of warming and illustrate how much more is needed than what we see the contours of right now. If we are to get all the way there, walls must be removed, trust restored, technology shared, and all good forces pulling in the same direction, over the same bridge.

“We build  
too many walls  
and not enough  
bridges.”

- *Attributed to Sir Isaac Newton*



The future is uncertain, and developments in the world economy and global energy markets can move in different directions and at different speeds. In a world where we continue to build walls and do not trust each other, technology, politics and innovation will nevertheless contribute to massive changes in the right direction.

But, if we are to reach the very ambitious climate targets, we must tear down the walls, build bridges, invest in new, unknown technology and to a significantly greater extent pull in the same direction. And we must do it very soon.

Thank you for your attention.