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By: Ashim Paun, Lucy Acton, Amit Shrivastava, James Pomeroy and Tarek Soliman

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# Fragile Planet

## The politics and economics of the low-carbon transition

As the world strives to cut greenhouse gas emissions to combat global warming...

We rank 67 countries with the policies, institutions and economic potential to decarbonise

We present the Climate Leaders Group of Seven Nations (the C-7), headed by Germany and Sweden, and also the EM-Leaders, including China



Play interview with  
Ashim Paun

**Disclosures & Disclaimer:** This report must be read with the disclosures and the analyst certifications in the Disclosure appendix, and with the Disclaimer, which forms part of it.

**Figure 1.**
**HSBC 2019 C-7 (Climate Seven Group of Countries) + top 3 EM countries**
**1<sup>st</sup> Germany**


- ◆ 36% emissions decline since 1979 peak
- ◆ 1st place for policy outlook and 2nd for potential to respond
- ◆ 2nd place for green opportunities

**6<sup>th</sup> United States**


- ◆ Recent growth in use of renewables
- ◆ Non-state actors pushing forward with climate plans
- ◆ 3rd place for green opportunities

**2<sup>nd</sup> Sweden**


- ◆ Over 60% of primary energy mix 'clean'
- ◆ Targeting zero net emissions by 2045
- ◆ Lowest emissions pc of C7 Group

**7<sup>th</sup> United Kingdom**


- ◆ Accelerated emissions declines over the past decade
- ◆ 75% reduction in coal use in primary energy mix between 2012 and 2017
- ◆ Long term aim of at least 80% emissions reduction by 2050 (vs 1990)

**3<sup>rd</sup> Austria**


- ◆ Hydro power 25% of primary energy mix
- ◆ Strong policy outlook and potential to respond
- ◆ 5th place for green opportunities

**EM – 1<sup>st</sup> Czech Republic (13<sup>th</sup> overall)**


- ◆ Declining emissions following economic reform
- ◆ Policies to further improve energy efficiency
- ◆ Highest ranking EM state on climate policy support

**4<sup>th</sup> France**


- ◆ 2nd lowest emissions pc of C7 Group
- ◆ Nuclear 48% of primary energy mix
- ◆ Long term target of carbon neutrality by 2050

**EM – 2<sup>nd</sup> China (14<sup>th</sup> overall)**


- ◆ 1st place for green opportunities
- ◆ Pledge to reach peak emissions around 2030
- ◆ Targeted 60-65% fall in carbon intensity of GDP by 2030 (vs 2005)

**5<sup>th</sup> Denmark**


- ◆ 47% fall in emissions since 1996 peak
- ◆ Significant energy efficiency improvements since 1970s
- ◆ High use of renewables and natural gas

**EM – 3<sup>rd</sup> Korea (15<sup>th</sup> overall)**


- ◆ Highest ranking EM state for potential to respond
- ◆ High share of nuclear in primary energy mix
- ◆ Innovative economy aligned with future green opportunities

# Executive Summary

- ◆ The world faces climate risks and must decarbonise...
- ◆ Some countries are better equipped, politically and economically
- ◆ Our multi-factor analysis of 67 countries identifies the global leaders across developed and emerging markets

***This is an executive summary of our main report. For access to the main note, please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com).***

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Paris Agreement creates risks for countries, but also opportunities

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An evolving series of frameworks for climate analysis

The 2015 Paris Agreement has focussed global attention on the need for countries to address climate change risks. But not all countries are equal, in terms of either their ambition or ability to achieve economies which are low-carbon and aligned with greenhouse gas emissions trajectories which scientists say are necessary to limit warming to 2°C, the most widely-adopted maximum warming target for 2100. The associated transition in national energy systems and broader economies to a low-carbon world will present risks, but also opportunities.

This report is the latest in our ***Fragile Planet*** series, and a collaboration between our analysts from across climate change, economics and equities. We have previously set out a broad framework for understanding *national level climate vulnerability*, with metrics covering physical risks, socio-economic impacts, energy transition indicators and the potential of countries to respond to climate risks. We followed this with a report in which we developed a method for analysing *risks to agro-commodities*, commodity markets and national economies dependent on agriculture.

We start this most recent report with a question:

***Which countries have the political economy – the policy, government and institutions, economic diversity and energy resources – to give them a competitive advantage as the world progresses with a low-carbon transition?***

We answer this question through analysis of 67 countries in the MSCI developed, emerging and frontier market categories<sup>1</sup>, covering 80% of the world's population and 94% of GDP.

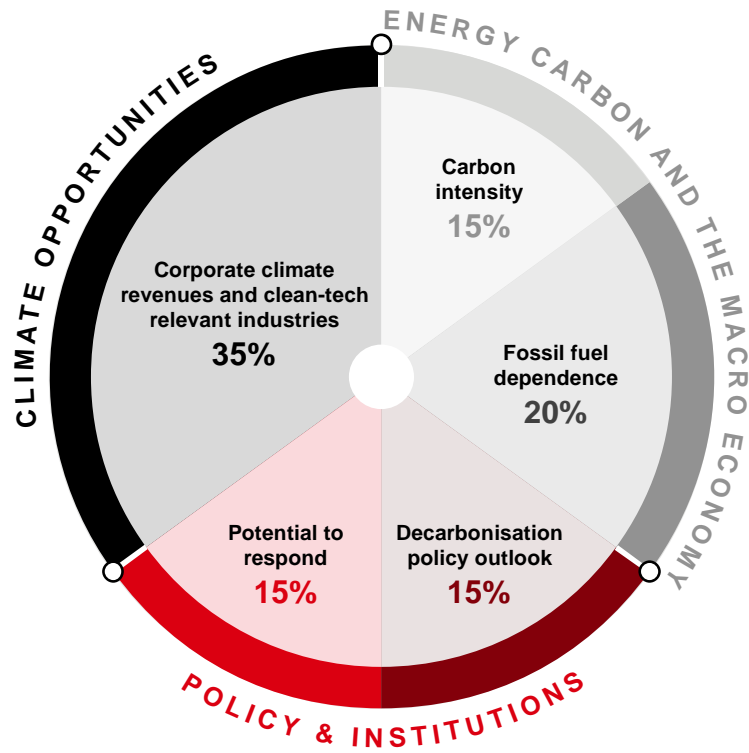
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Identifying the leaders

From page 13, we provide tear-sheets for each of the seven countries which are best placed for the low-carbon transition – we call these the 'HSBC Climate-Seven Group of Countries' or 'C-7', led by Germany. **European states dominate the higher rankings, with the US in 6<sup>th</sup>, and MENA and other hydrocarbon economies prevalent at the bottom of the table.** Figure 1 shows which countries form the C-7, and also the three best-placed EM states in our analysis. These tear-sheets include details on the seven countries' energy systems, economic structure and emissions trajectory, as well as tables of policies designed to lower carbon. Our findings are based on an analysis of the following five areas, as per Figure 2, incorporating **29 indicators**.

<sup>1</sup> Our analysis of MSCI developed, emerging and frontier market categories excludes Hong Kong and Taiwan.

**Figure 2: The political economy of the low-carbon transition – key factors**



Source: HSBC



## Energy, carbon and the macro economy

### Global warming targets

To limit global warming, the world must lower its greenhouse gas emissions. All 197 parties to the United Nations Framework Convention on Climate Change (UNFCCC) have either signed or ratified the Paris Agreement. The most important goal of the Paris Agreement, in our view, is to **hold the increase** in global average temperature to **well below 2°C** above preindustrial levels (in 2100) and to **pursue** efforts to limit the temperature increase to **1.5°C** above pre-industrial levels. To achieve these goals, virtually all countries around the world will need to remove carbon and other GHGs from their energy systems and broader economies.

All countries consume energy, for use in homes, services, industry and transport. A high proportion of energy consumed – over 85% – comes from burning fossil fuels.

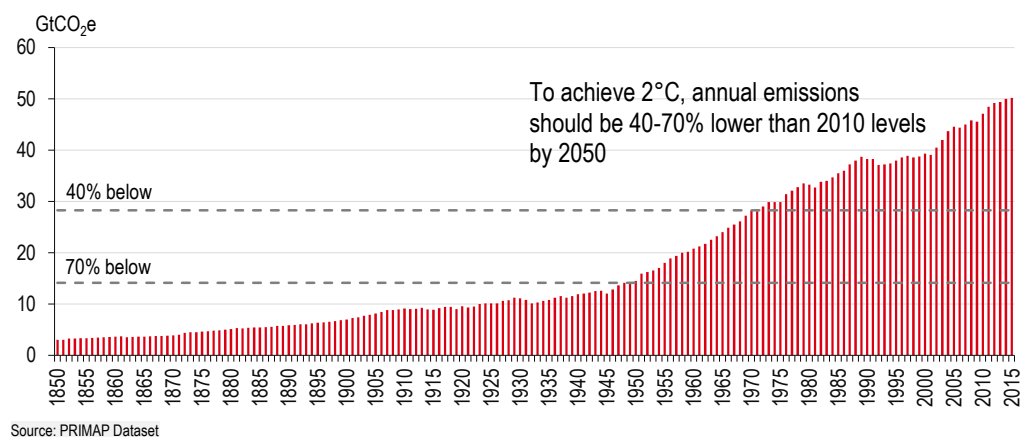
### Greenhouse gas emissions

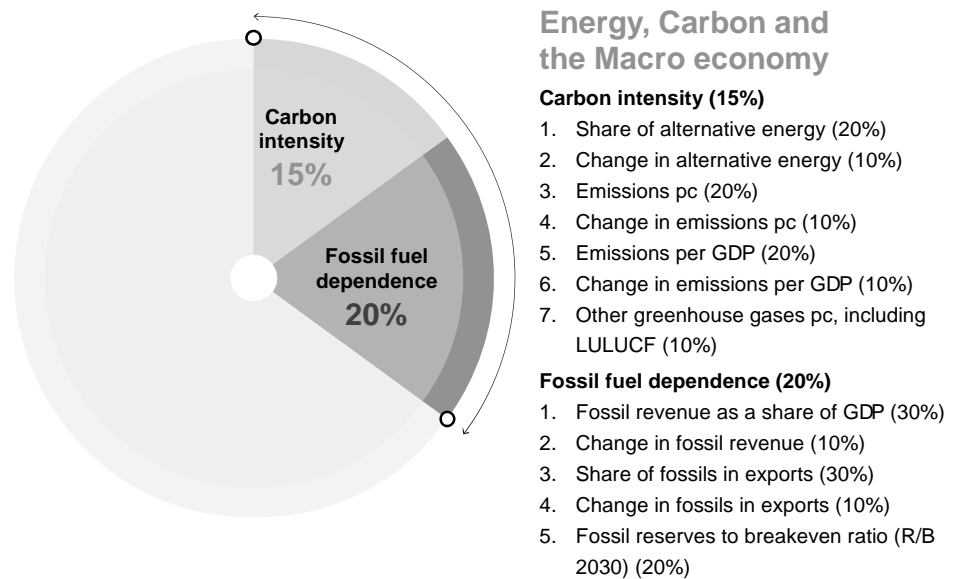
Around 70% of GHGs come from burning fossil fuels for energy; in terms of which sectors using fossils generate emissions, the power generation sector is highest, mostly via coal and gas use, followed by the transport sector as the next highest emitter, almost entirely via oil.

And meanwhile, GHGs are still rising, with the International Energy Agency (IEA) reporting that 2018 CO<sub>2</sub> emissions were the highest yet (Chart 1 shows annual GHGs since 1850).

In this section, we look at *how embedded carbon is in national economies*. Figure 3 lists the full range of metrics.

**Chart 1: Global historical annual greenhouse gas emissions (1850-2015)**



**Figure 3: Indicators for energy, carbon and the macro economy**


Source: HSBC, Data: World Bank, PRIMAP, Wood Mackenzie. Note: Alternative energy includes nuclear. LULUCF = Land use, Land use Change and Forestry

### 1. Carbon intensity

How embedded are fossil fuels? We measure the carbon intensity of a country per its domestic economic activity and per capita levels, as well as the extent to which it is moving towards clean energy.

We start with metrics to look at a country's emissions per capita, per unit of GDP, the share of non-fossil fuel energy, and emissions from land use change and forestry per GDP to integrate an understanding of the importance of agriculture and other activities which can have a significant impact on a country's overall net emissions profile.

We consider both current levels as well as change indicators in these areas – this is about both crediting those countries with low-carbon profiles *and* about capturing transition over time.

Overall, we find that **France, Switzerland** and **Spain** lead across the combination of these macroeconomic climate factors. More than in other sections of this analysis, EM and FM nations feature intersperse the rankings throughout, with **Romania** and **Slovenia** in 4<sup>th</sup> and 5<sup>th</sup> places.

### 2. Fossil fuel dependence

To what extent is a country's economy dependent on fossil fuels? Here, we look at shares of GDP and exports coming from fossil fuel based activity and how these shares have changed over time. We also factor in oil and gas reserve sizes and average lifecycle production costs, acknowledging that low-cost producers are more likely to generate potential in a 2°C-aligned world, given fossil fuels will still be used in harder-to-decarbonise sectors, such as shipping, aviation and petrochemicals. **Kenya, Jordan** and **Lebanon** come out on top overall.

**Credit for low carbon countries  
and those who are reducing  
carbon from higher levels**

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# 85%

Fossil fuels still underlie the majority of energy consumption

**Fossils in GDP and exports:** We think achieving diversification is key and look here at the extent to which the 67 countries under consideration are diversified in relation to fossil fuel, their exports and their economic production. **Kuwait, Saudi Arabia and Oman** are the three countries with highest earnings from fossil production, predominantly oil in these cases. **15 of our sample of 67 countries** are *net* exporters of hydrocarbons, in economic terms. **Nigeria, Kuwait and Qatar** have heavy dependence on exports although these shares have declined in the last ten years.

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# 45%

Fossil fuel revenue in Kuwait's GDP, the highest in our sample

### Picking winners and losers amongst hydrocarbon states

Even in a 2°C world, we are very likely to use some oil and gas, particularly in sectors where it is technologically much harder to replace them, including aviation and shipping (see [The second frontier](#), 15 January 2019) as well as petrochemicals.

“ Even a world aiming for zero emissions can use *some* fossil fuels, given the earth can absorb carbon dioxide - and so those countries who can produce oil and gas at *lowest cost* are likely to continue to take profit

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### Using fossils in a zero carbon world

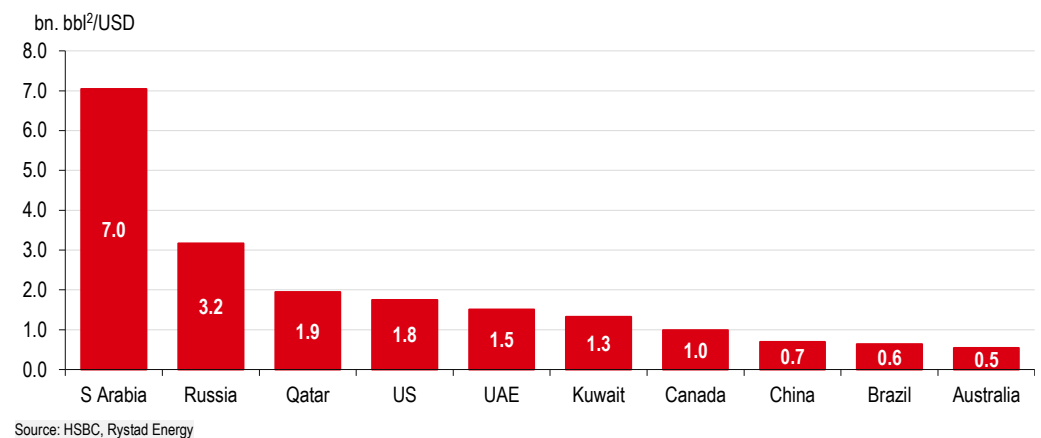
Even in a world aiming for net zero emissions later this century, the use of *some* fossil fuels in certain harder-to-address sectors is foreseen. These emissions can be offset, given that the earth – particularly forests - can absorb some carbon dioxide. And so we argue that those who can produce oil and gas at the *lowest cost* are likely to continue to take profit from the sector<sup>2</sup>. Thus we include a metric to capture which countries we believe are better placed to sell *oil and gas* in a world which is moving away from fossil fuels. This is a *single datapoint* - a *ratio of reserve to breakeven-prices in 2030*, which we abbreviate to **R/B-2030**.

**R/B-2030:** Via this methodology, we are able to rank countries on this R/B-2030 ratio to argue which are economically better placed to meet global demand for oil and gas beyond 2030. A

<sup>2</sup> We assume thermal coal use is eradicated in a world aiming to meet Paris Agreement warming targets, and so do not credit countries here for coal reserves

higher numerator – reserves – gives a higher ratio, as does a small denominator – breakeven prices. Saudi Arabia comes through with the highest R/B-2030 ratio, having both large reserves and a low weighted average breakeven cost of production across these – i.e. we conclude that **Saudi Arabia** is best placed to find economic upside in providing oil and gas in a lower carbon world. **Canada** has under one third of the 2P reserves in 2030 and a little over twice the average breakeven, meaning it has a much lower ratio. Chart 2 shows the ten countries which have the highest R/B-2030, with Canada is 7<sup>th</sup> place.

**Chart 2: Oil & gas reserves-to-breakeven ratio of the top 10 countries (2030e)**



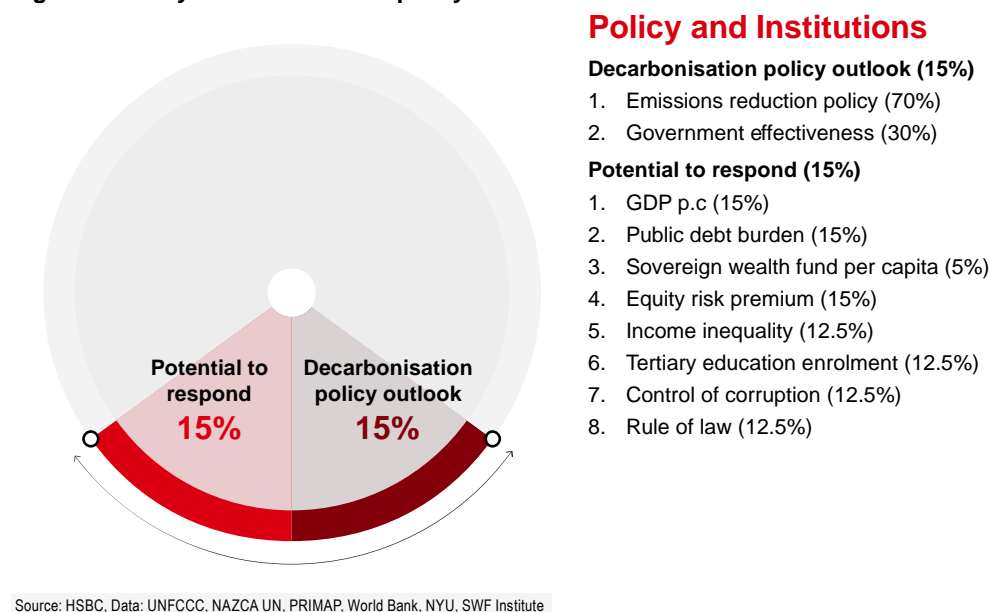
**For further detail on any of the data or rankings mentioned in this section, please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com).**



## Policy and institutional quality

We now move from the previous section's consideration of carbon risks and fossil fuel embeddedness in economies to, in this section, an analysis of **which countries are better placed to address climate risks**.

Figure 4: Policy and Institutional quality indicators



### 1. Potential to respond to climate risks

First, we look at the **potential of countries to respond** – via metrics which consider financial resources, social metrics and institutional quality metrics which we believe can guide how prudently a country will use its wealth in relation to its long-term sustainable development, including mitigation of climate change.

**Norway** tops the list in terms of potential to respond, followed by **New Zealand** and **Australia**, and then the other three larger Nordic economies. **Five EM/FM countries feature in the top-20** here – Republic of Korea, Estonia, Czech Republic, the UAE and Saudi Arabia.

### 2. Decarbonisation policy outlook

Next, we look forward in an attempt to understand how countries are placed to address climate change. To understand this, first we consider **pledges made towards achieving Paris Agreement goals**. We use a point-scoring method for the pledges countries made towards the Paris Agreement, also incorporating the existence of long-term targets and carbon pricing schemes. Additionally we use the World Bank's **Government Effectiveness indicator** to understand, in which countries, governments are more likely to be able to turn policy into reality.

To differentiate between the Paris Agreement pledges, we have developed a basic scoring system, outlined in Table 1, which focuses on countries' ambition for emissions reduction,

inclusion of sector-measures and targets, and any climate adaptation plan the countries have set as per their NDCs/ INDCs<sup>3</sup>.

#### Co-benefits

We recognise that for many countries, contributions to the Paris Agreement come predominantly through adaptive responses to climate change – however, we do not score this section heavily in this analysis, as we are more focussed on mitigation. Nevertheless, we include a single point in the scoring available, given co-benefits between adaptation and mitigation.

**Table 1: Emissions reduction policy - scoring methodology**

Metrics	Score
GHG emissions	<b>0-8</b>
- No quantitative target	0
- Conditional target	1
- Weak relative target	2
- Strong relative target	3
- Weak absolute target	4
- Moderate absolute target	5
- 2°C aligned	8
Sectoral contribution explained (no/yes)	0/1
Adaptation plans (no/yes)	0/1
Long term targets (no/yes)	0/1
Carbon pricing (no/yes)	0/1
<b>TOTAL</b>	<b>Max 12</b>

Source: HSBC, UNFCCC, Note: GHG pledges, adaptation plans, sectoral contributions as per NDCs, carbon pricing as per national policies and long term targets as per country communication to UNFCCC

**Overall, European countries dominate** in terms of decarbonisation policy outlook, with **Germany** on top – with only Canada (9<sup>th</sup> place), the US (14<sup>th</sup>) and New Zealand (13<sup>th</sup>) permeating the top-20 from outside the region. Of the top 20, Slovenia and the Czech Republic are considered non-DM.

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<sup>3</sup> Scores on the absolute emission target for EU countries are based on 2030 targets under the effort sharing mechanism for non-ETS sectors: targets ranging between 36%-40% (inclusive) relative to 1990 levels are identified as 2°C aligned, 14%-35% as moderate and 0-13% as weak targets. The same classification of target range largely holds for the non-EU countries. Relative emission targets are either based on the emission intensity of GDP, emission per capita or business as usual (BAU) projection. These targets are difficult to score as the projected emissions are loosely defined. Countries with a relative target of 25% or more are broadly identified as having strong relative targets and the rest as having weak relative targets.

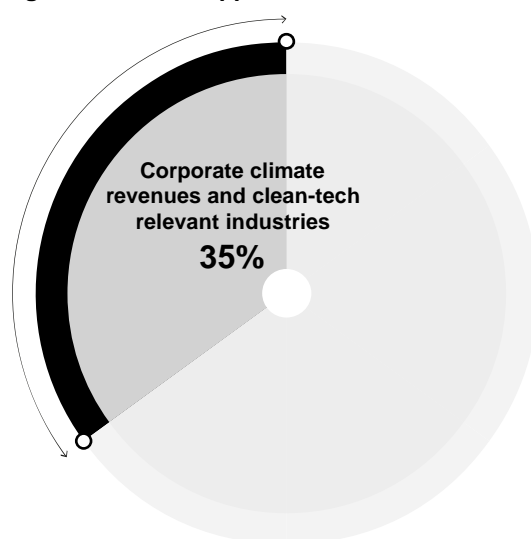
## Climate Opportunities

In this section, we move from policy to the opportunity set – which countries are better placed to benefit economically from producing technologies and products where demand will be driven by a decarbonising world.

**Greater resilience through  
climate revenues**

Being resilient through the low-carbon transition is not only about being better placed to transition away from high-carbon domestic activities or having the policy outlook to move away from fossil fuels. We see the transition as an opportunity for those able to sell the products and technologies which allow it to happen. Indeed, we believe those countries which can generate more revenues as the global economy decarbonises are likely to be among the most resilient. In this section, we seek to identify in which countries there are companies earning more revenues from climate change aligned themes. Plus, we look forward and ask which countries have parallel industries to clean-tech production necessary to the transition, suggesting the green industrial opportunities that are likely to be the easiest to transition into, given what a country already knows how to do. This part of our analysis is captured in Figure 5.

**Figure 5: Climate opportunities indicators**



### Climate Opportunities

**Corporate climate revenues and  
clean-tech relevant industries (35%)**

**Climate revenues:**

1. Absolute levels (10%)
2. Relative to GDP (10%)
3. Change in absolute level (10%)
4. Change in relative to GDP (10%)
5. Momentum of absolute revenues (10%)
6. Momentum of relative revenues (10%)
7. Green Complexity Potential (40%)

Source: HSBC, Data: HSBC, World Bank, Mealy et al

### 1. Corporate climate revenues and clean-tech relevant industries



**We believe those countries which can generate more revenues as the global economy decarbonises are likely to be among the most resilient**

<sup>4</sup> For more information about the HSBC Climate Solution's Database, please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com).

We also consider Green Complexity Potential - a metric from the University of Oxford Institute for New Economic Thinking. This considers path dependency of industrial development – enabling us to build in a consideration of which countries are more likely to be able to make the products the world needs for the low-carbon transition, given what they produce today.

“ **Countries are more likely to diversify into products or industries that require production capabilities similar to what they currently possess**

**Penny Mealy and Alexander Teytelboym, University of Oxford**

Overall, we find **China, Germany** and the **US** are the countries best-placed to make profits as the world moves towards a lower-carbon future. At the other end of the spectrum, countries which are economically more dependent on fossil fuel production, particularly in the MENA region, as well as poorer countries, populate the lower end of our rankings.

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## Concluding thoughts and overall rankings

In our main report<sup>5</sup>, we cover each of these headline areas in turn. **European states dominate the higher rankings, the US coming in 6<sup>th</sup>, and MENA and other hydrocarbon economies prevalent at the bottom of the table.** Decisions around appropriate weightings given to indicators followed discussions amongst the authors at the HSBC Climate Change Centre of Excellence.

**From page 13, we look at the table-topping seven countries on this analysis in more detail, as well as the three EM leaders.**

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We believe it is important for investors to understand which countries are best-placed for the low-carbon transition. The economic outlook over the next few years may create challenges in terms of climate transition. Our economics team expects global growth to continue to be just shy of 3% per year over the next decade with much of this growth (70%) to come from the emerging world. These parts of the world are getting steadily wealthier, causing changes in individuals' consumption patterns: more towards car ownership, air travel and energy consumption more broadly. Across the emerging world we expect millions of people to move to cities over the next decade and even more to rise to middle class status.

**“ As the world addresses climate change risks - decarbonising and reducing use of fossil fuels - we think some countries will have a competitive advantage**

### Trade still rising

This growth will likely increase global trade volumes at a steady basis, with more trade taking place between emerging markets. For all of the concerns surrounding trade protectionism in recent years, many parts of the world have been signing multilateral trade agreements which will help to lift trade flows. Unless trade policy turns even more protectionist, global trade volumes should keep increasing.

This continued expansion in energy demand, consumption and urban populations means that the need to transition to a lower-carbon energy mix will only get more pressing. And as the world addresses climate change risks by decarbonising human activities and reducing use of fossil fuels, we think some countries will have a competitive advantage. We believe those with the policies, institutional quality, economic diversity and low-cost energy resources, will have lower cost burdens in achieving 2°C-aligned economies and enjoy revenue benefits associated with driving the world down this pathway.

<sup>5</sup> Please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com) if you would like access to our main report.

# Tear sheets / country profiles

## Climate-Seven Group of Countries – C-7

1. Germany
2. Sweden
3. Austria
4. France
5. Denmark
6. United States
7. United Kingdom

## Top EM performers

1. Czech Republic
2. China
3. Korea





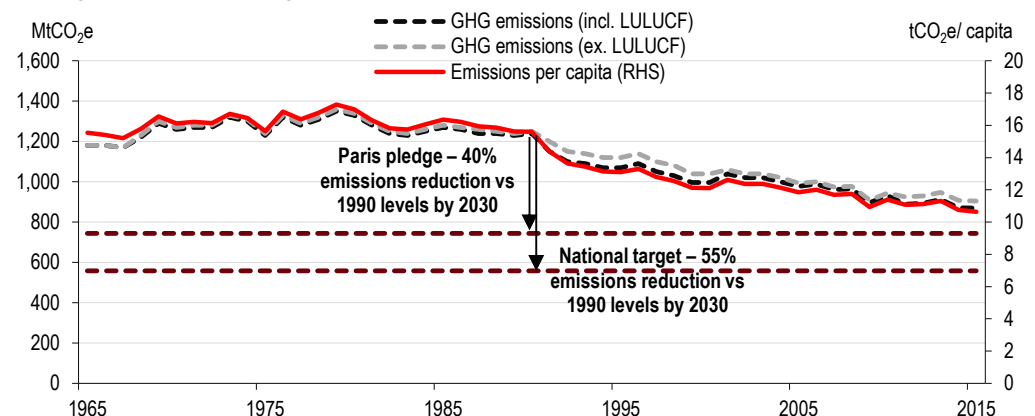
# 1. Germany

- ◆ Germany is very well-placed for the low-carbon transition, given a particularly large cleantech industry and strong policy
- ◆ The country's emissions are down 36% from a 1979 peak, as renewables, coal and nuclear have replaced coal in the energy mix
- ◆ Plenty of fiscal room and a move away from manufacturing could help

## Declining emissions...

Germany's emissions have been coming down over recent decades, as can be seen in this chart. As a European Union member state, the country must contribute towards the bloc's headline 2030 target of a 40% GHG reduction vs 1990 levels. Germany has set national targets of a 40% cut by 2020 and a 55% cut by 2030.

### Steady decline: Germany's GHG emissions

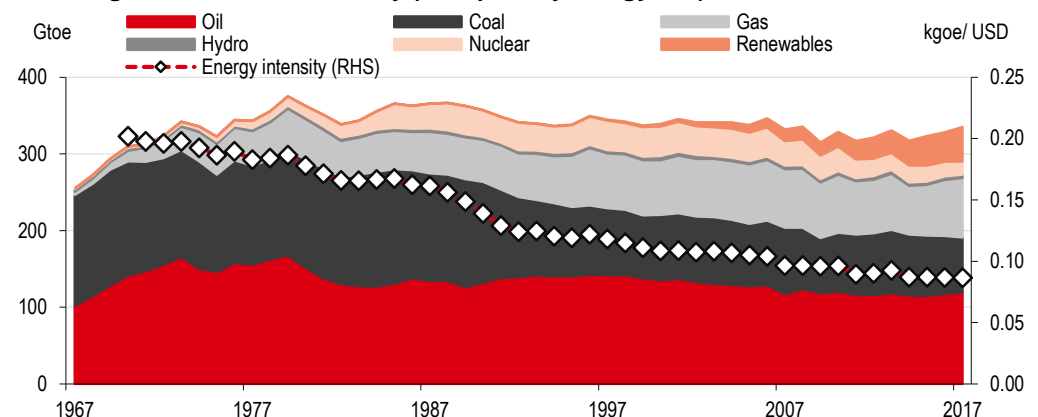


Source: PRIMAP, World Bank. Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

## ...as coal dependency has fallen

The national decline in GHG emissions can be partially explained by the reduction in coal use, particularly since the late 1980s, with natural gas and renewables replacing its use as fuel feedstock in power generation. The use of energy has become more economically efficient also, with energy per unit of GDP down 57% since 1970, - this chart below shows an energy supply system in transition. Nevertheless, Germany remains a carbon-heavy economy, with fossils making up 80% of total primary energy, and it ranks just 27<sup>th</sup> out of 67 on carbon intensity.

### Shrinking role for coal in Germany (total primary energy mix)

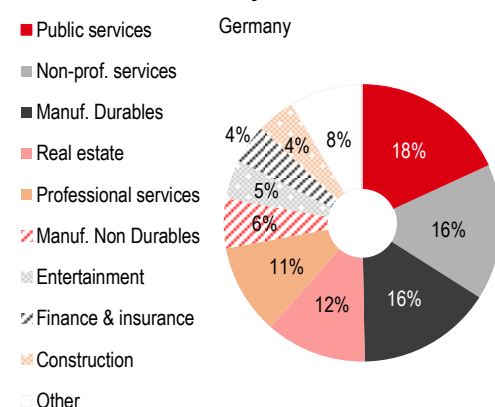


Source: BP Statistical Review, World Bank

## Domestic auto industry and the low carbon transition...

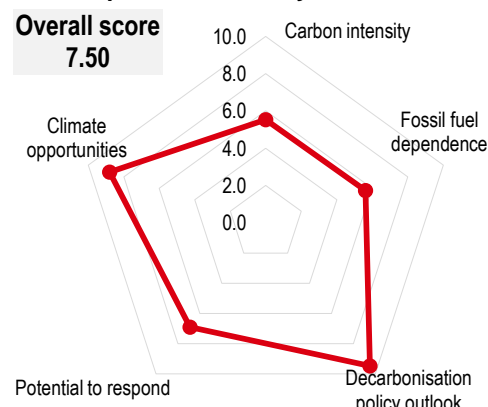
Germany's changing energy system is in turn understood by the underlying sectoral mix – despite the country's mighty reputation as an industrial powerhouse, this is now mostly a service economy, as the pie chart below shows. The medium-term outlook for economic growth is relatively downbeat owing to a shrinking working-age population. Our 2030 projections point to growth of just 1.3% over the course of the next decade or so as a result. The future mix of growth within the economy will be a function of the future of the autos industry, which is increasingly closely tied to the low carbon transition (we discuss the role of the transport sector in meeting global warming targets in [The second frontier](#), 15 January 2019) and how the services side of the economy can develop.

### The German economy is diverse



Source: UNCTAD

### Climate political economy radar



Source: HSBC

## Strong climate revenues

Overall, Germany ranks first for policy *and* potential to respond to climate change (2<sup>nd</sup> place). Germany's overall first place is further driven by its 2<sup>nd</sup> place ranking on climate opportunities relating to the low-carbon transition, as seen in the pentagonal scoring-radar above. Looking forward, the company has a raft of policies and targets in place which, if achieved, can support a continued shift away from carbon, with major examples in the table below.

### National policies for low carbon transition

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- 40% GHG reduction by 2020, 55% by 2030 and 80-95% by 2050 (vs. 1990 level)</li> <li>- 20% reduction in primary energy consumption by 2020 and 50% by 2050 (vs. 2008)</li> <li>- Renewables to make up a minimum 80% of gross power consumption by 2050</li> <li>- Nuclear power phase out by 2022</li> <li>- Energy sector targets 62% GHG reduction by 2030 vs. 1990 level</li> <li>- Transport sector targets GHG reduction of 40-42% by 2030 vs. 1990 level</li> <li>- Buildings target 67% GHG reduction by 2030 vs. 1990 level</li> </ul>
<b>EV incentives and policy support</b>	BEV subsidy of EUR4,000 per vehicle and PHEV subsidy of EUR3,000 until 2019 or until the subsidy pool of EUR1.2bn is exhausted
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) - the scheme through 'cap and trade' aims at reducing emission by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC



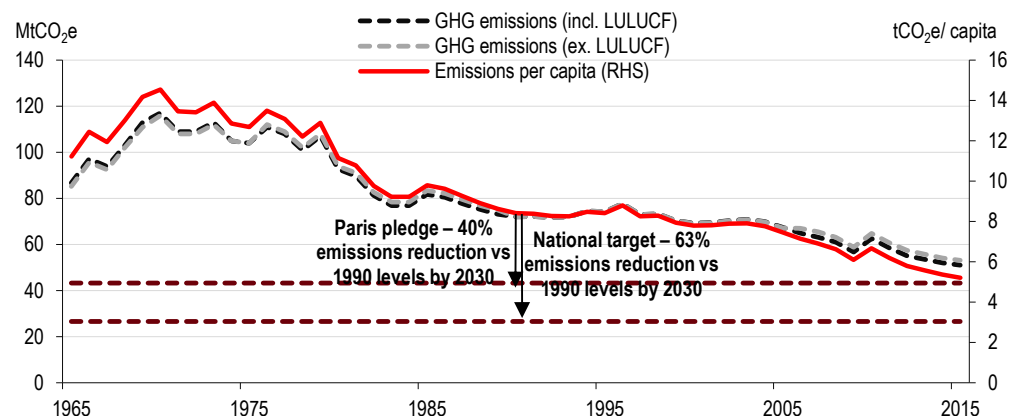
## 2. Sweden

- ◆ 67% of the primary energy mix is 'clean'
- ◆ Ambitious targets and policies and a strong green opportunity set underpin Sweden's second position in the C-7 Group
- ◆ Sweden's economy remains healthy, focusing on high-tech services

### Low emissions...

Sweden's greenhouse gas emissions have fallen over recent decades, and particularly rapidly over the past five years, as the country nears its national target to achieve a 40% reduction in emissions by 2020 (from 1990), and moves towards its long-term target of being a zero net GHG emission economy by 2045, with emissions from activities on Swedish territory 85% lower vs 1990 by 2045. Sweden has the lowest emissions per capita of the C-7 Group.

### Sweden's decarbonisation continues since peak in 1970

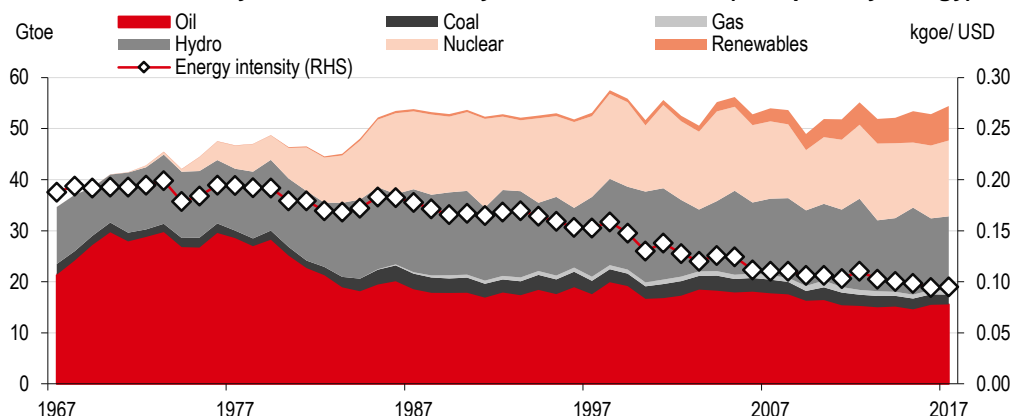


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

### ...linked to clean power

The absence of coal in Sweden's energy mix and the widespread use of hydro-energy, nuclear power and renewables largely explains Sweden's relatively low emissions; over 67% of the primary energy mix comes from "clean" energy sources compared to 23% in 1970. National policies have assisted with the steadily declining energy. Sweden has committed to improving efficiency by 20% by 2020 (vs 2008). Policies include tax relief for power intensive industries that follow energy reduction and efficiency policies. But, oil use in transport is the only material fossil fuel exposure and we expect this to be the focus for future Swedish energy transition.

### Low-carbon electricity means oil is the only fossil used in scale (total primary energy)



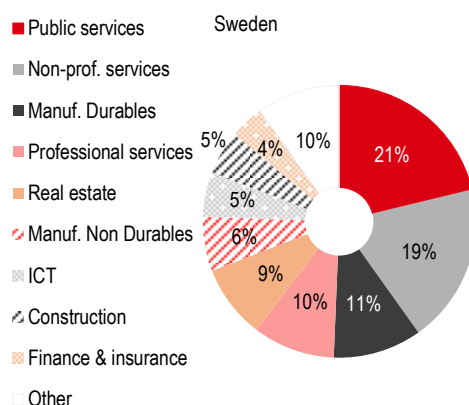
Source: BP Statistical Review, World Bank

## Growth drivers

As with all of our C-7 economies, Sweden is largely a service economy. The economy has continued to transition away from manufacturing and into high-end technology. Whereas we used to think about the Swedish economy in terms of Volvos and flatpack furniture, nowadays the economy is more synonymous with the likes of Spotify, King and iZettle. The growth outlook over the medium-term remains more optimistic than for the majority of the developed world, with a still-growing working-age population, a highly educated workforce and a healthy fiscal position. Our 2030 forecasts point to trend growth of 1.8% over the course of the next decade.

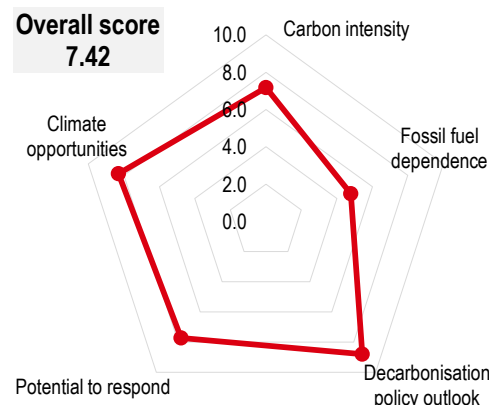
Sweden's domestic company exposure to climate sectors, particularly those relating to building efficiency, underpin the country's high overall score. The country also ranks extremely highly in terms of potential to respond and performs well under the overarching decarbonisation policy outlook.

### Services are key for Sweden



Source: OECD STAN database. Note: Shows breakdown of output in the economy. Latest data

### Climate political economy radar



Source: HSBC

## Broad sectoral decarbonisation policies

Sweden has successfully implemented a number of policies to help towards achieving some of its more ambitious targets, see targets and policies table below. In the transport sector, Sweden is targeting a zero fossil fuel vehicle fleet by 2030. In the buildings sector, the country is targeting energy efficiency improvements in the home.

Non-state actor ambition is also assisting with Sweden's national progress. The city of Malmö has become carbon neutral thanks to city wide thermal energy storage systems. The capital, Stockholm, has invested heavily in city planning and smart transportation grids.

### National policies for low carbon transition

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- To be a net zero emission economy by 2045, with negative emissions beyond this date</li> <li>- Emissions from activities on Swedish territory 63% lower by 2030, 85% lower by 2045 (vs 1990 level)</li> <li>- 50% energy intensity reduction by 2030 compared to 2005 level</li> <li>- Transport sector targets at least 70% reduction by 2030 compared to 2010 level</li> </ul>
<b>EV incentives and policy support</b>	Passenger vehicles with emissions levels lower than 50 g CO <sub>2</sub> /km have been granted a 40 000 kronor (roughly EUR 4 000 or USD 4 400) rebate since 2011
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) - the scheme through 'cap and trade' aims at reducing emission by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC



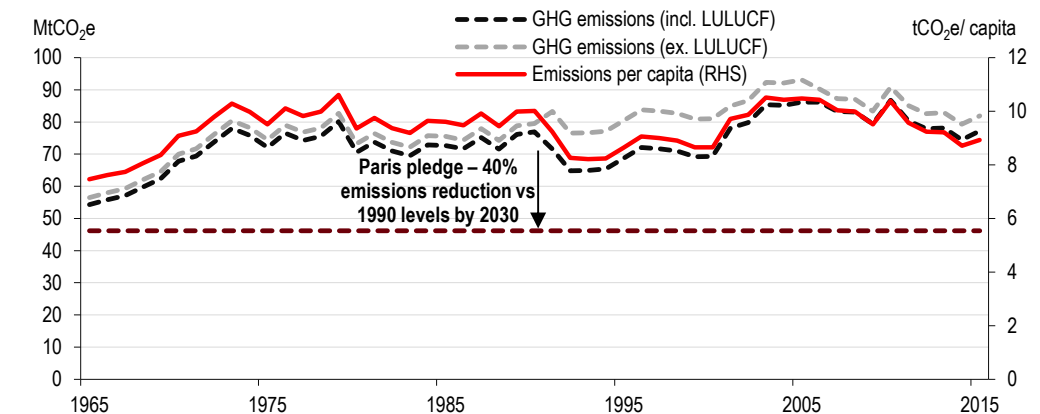
### 3. Austria

- ◆ Hydro-power forms a large part of Austria's transition story
- ◆ A strong policy regime and climate opportunities set pushes Austria into the top three of the C-7 Group
- ◆ The economy will likely grow slowly and is heavily focused on services

Emissions down, efficiency up

Austria's emissions trend over time has been a little different to many of the other C-7 economies. A rise over the 1990s, according to the UNFCCC, was largely due to growing volumes of transport fuel sold in Austria (but consumed abroad). Since the early 2000s, emissions have generally trended down, thanks in large part to improved energy efficiency.

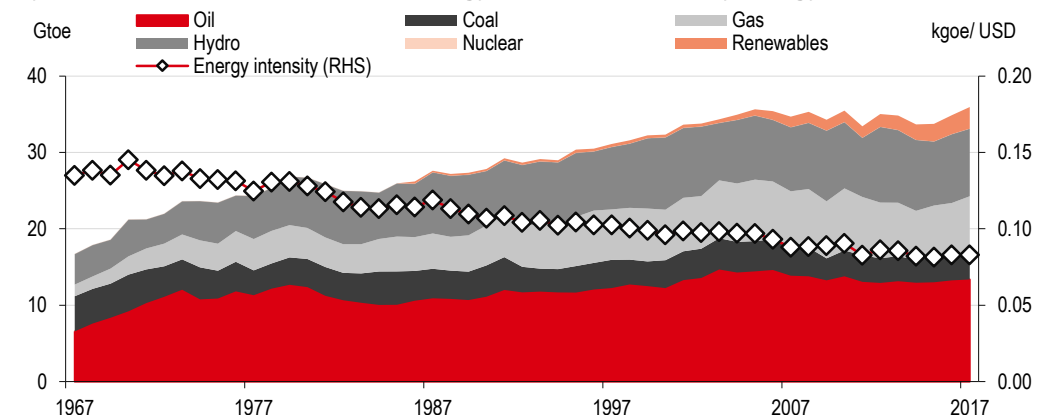
#### Austria's sticky emissions



Lots of hydro from Alpine melt...

Austria has an interesting energy mix, with only a small share of coal. Hydro-power has been a valuable source of clean energy – 25% of the share of the primary energy mix. Historically, there has been a large amount of policy focus and finance in this area. Further hydro-powered plants are being built or planned. Use of renewables (ex nuclear and hydro) has increased from an extremely low level over the past decade, now making up 8% of the primary energy mix.

#### Hydro is the important low-carbon energy source (total primary energy mix)

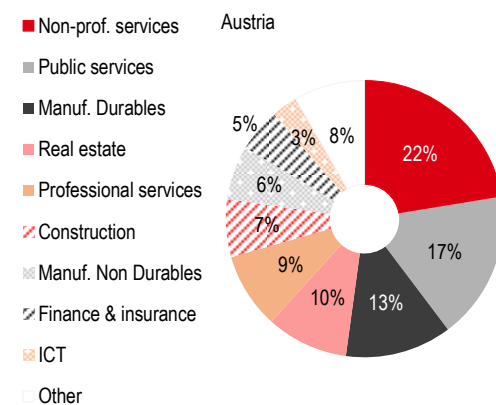


### Climate opportunities are strong

Austria's economy is very reliant on services, and trend growth is expected to be relatively slow over the coming decade or so. Our medium-term projection is for growth averaging 0.9% per year, as a result of an ageing population and an already high level of GDP per capita. The economy is very services-heavy with manufacturing accounting for a very small share of output.

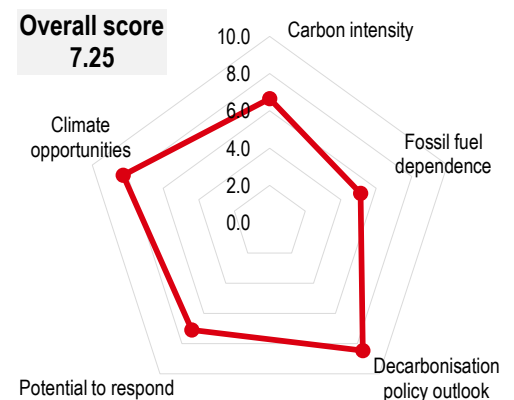
Nevertheless, Austria scores very highly in terms of climate opportunities, ranking 5th of all economies in the sample. Austrian companies are earning significant revenues from climate sectors including clean power. Austria also has strong decarbonisation policy outlook and potential to respond, as shown on the climate political economy radar chart.

### Austria's economy has a small manufacturing sector



Source: UNCTAD

### Climate political economy radar



Source: HSBC

### From power focus to transport policy

Austria's policy for funding higher levels of clean power generation has helped with emissions reduction in recent years. Other areas of policy focus have been in the transport sector; a number of cities and regions in the country operate 'low emission zones', with restrictions for heavily polluting vehicles such as buses and heavy goods vehicles.

### National policies for low carbon transition

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- Reduce GHG emissions by 36% by 2030 vs. 2005 level</li> <li>- Target reduction of transport emissions by around 7.2 million CO<sub>2</sub>e to around 15.7 million t CO<sub>2</sub>e (currently: 22.9 million t CO<sub>2</sub>e)</li> <li>- Target increased share of renewable energy in gross final energy consumption to 45 - 50% by 2030. Current share is 33.5%</li> </ul>
<b>EV incentives and policy support</b>	Subsidy of 3000 Euros for BEVs
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) - The scheme through 'cap and trade' aims at reducing emission by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC





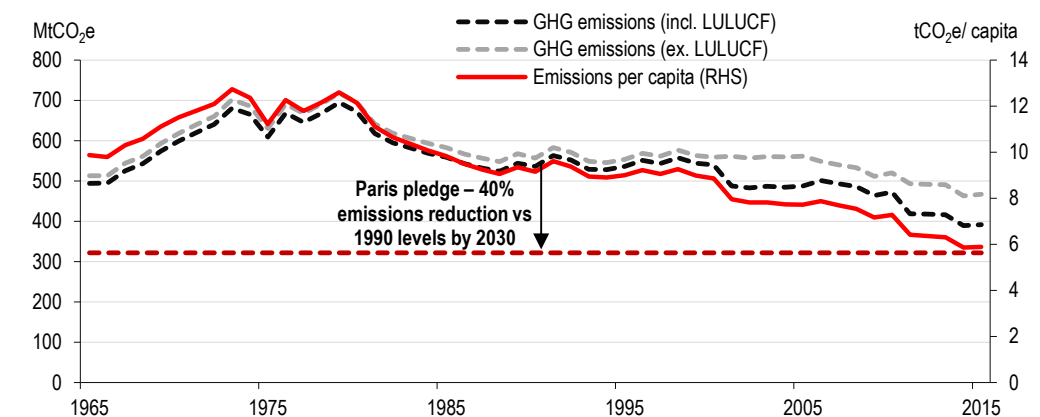
## 4. France

- ◆ Long-term plan for carbon-neutrality by 2050
- ◆ Nuclear power plays a significant role in the overall French energy mix, with oil driving the majority of emissions
- ◆ Slow growth and a large government sector will play a role

**Emissions are low and declining**

In line with most European nations, France's emissions have been steadily declining. The country has, with and since the adoption of the Paris Agreement, been something of a leader on international climate diplomacy. A more rapid period of decline can be seen between 2008 and 2015, although this can partly be explained by the global economic slowdown. Under the country's long term plan, they are targeting net carbon neutrality by 2050, consistent with 1.5 degrees. France has the second lowest emissions per capita of the C-7 Group.

### French emissions continue drift downwards

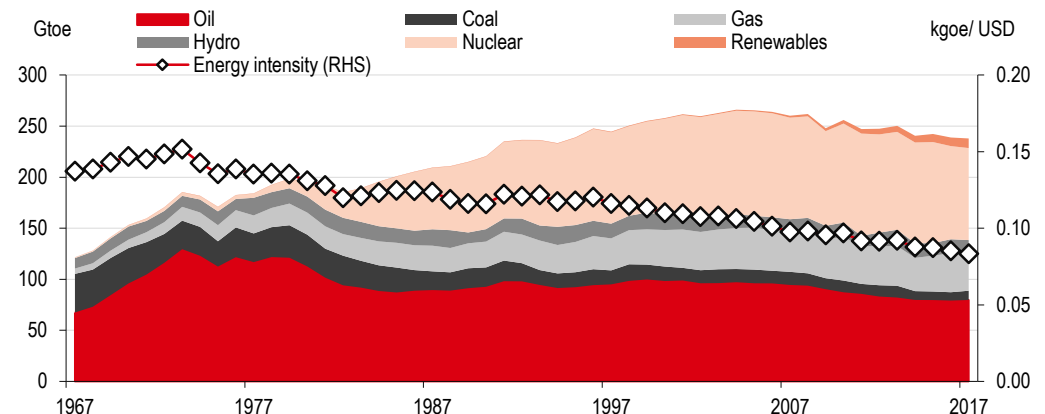


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

**Nuclear still crucial**

Nuclear energy plays a large role in France's primary energy mix; 38% of the mix. Oil (used in the transport sector) forms the lion's share here. Under the country's climate plan, hydrocarbon exploration plans will be phased out so that no coal, oil and gas will be produced domestically by 2040. Energy efficiency has been improving at a modest, but steady, rate over time.

### Nuclear still the largest source of primary energy (total primary energy mix)



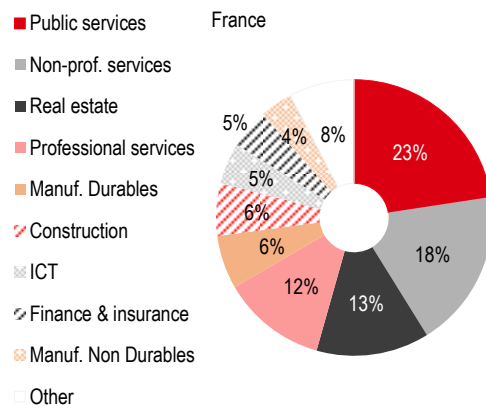
Source: BP Statistical Review, World Bank

France's economy looks set to grow relatively slowly over the medium term. The economy faces a dual challenge of rapidly-slowing population growth and high levels of indebtedness that will limit any future growth. We expect growth to average around 1.2% over the course of the next decade. The large government sector means that the economy is relatively slow-moving and is less prone to the global cycle than some of its European neighbours. As with much of the developed world, the economy continues to shift to services provision, but industry remains a bigger share of the economy than most of its peers.

**Strong policy outlook and climate opportunities**

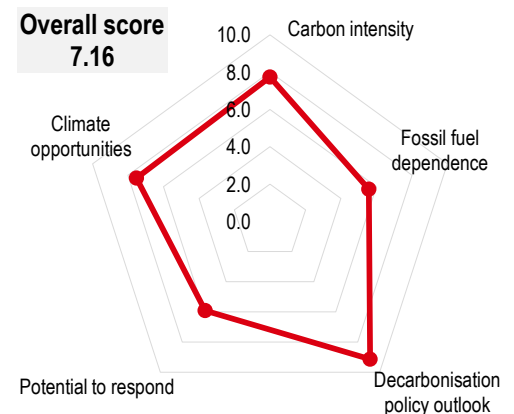
As shown on the climate political radar, France scores less well on the “potential to respond” indicator within transition risks. This can be explained by the economy's lack of sovereign wealth fund, but mostly by France's large public debt to GDP ratio; 96% of GDP in 2015, which gives them less headroom to use borrowing in achieving decarbonisation goals. Nevertheless, the country performs extremely well on policy and on climate opportunities (ranking 2 and 10 respectively). France has companies earning significant revenues from climate sectors, particularly those relating to industrial and building efficiency.

**France has a large public sector**



Source: OECD STAN database. Note: Shows breakdown of output in the economy. Latest data

**Climate political economy radar**



Source: HSBC

**Power and transport**

French policy targets focus heavily on the primary energy mix and the split between nuclear, renewables and fossils. European ETS membership and transport sector policies – transport is the highest emitting sector in the economy – are important areas of focus for France. The ‘gilets jaunes’ protests have shown how popular opinion must be on side with environmental aims, in many cases.

**National policies for low carbon transition**

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- 40% reduction target for all its emissions by 2030 vs. 1990 level</li> <li>- Binding target of at least 27% renewable energy use by 2030</li> <li>- Indicative energy efficiency target of at least 27% by 2030 (to be revised in 2020)</li> <li>- Long term target of carbon neutrality by 2050, consistent with 1.5 degrees</li> <li>- No domestic production of coal, oil or gas by 2040</li> </ul>
<b>EV incentives and policy support</b>	- Proportion of EVs in new vehicle registrations to increase from 1.1% in 2015 to 12.1% in 2030
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) - The scheme through 'cap and trade' aims at reducing emissions by 43% from 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC



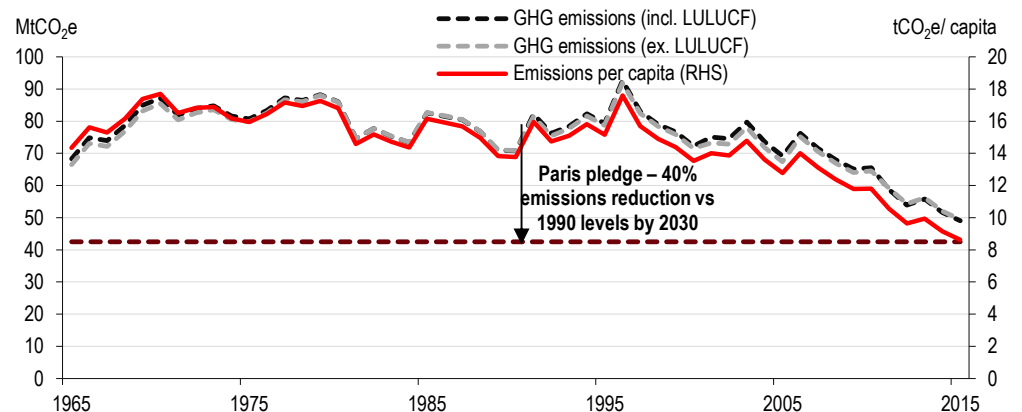
## 5. Denmark

- ◆ 47% decline in emissions since a peak in 1996
- ◆ Use of renewables and gas, coupled with big improvements in energy efficiency, mean Denmark is well placed on energy transition
- ◆ The economy is well-placed for a green transition

### Falling fast...

Dramatic falls in Denmark's emissions highlight the country's recent impressive progress on decarbonisation. The country has said that it aims to be a "low emission society by 2050", but is yet to commit to actual emissions targets. Many of the more specific Danish targets relate specifically to the energy mix. Despite recent progress, Denmark's emissions per capita are still 66% higher than neighbouring Sweden.

### 20 years of rapid decline

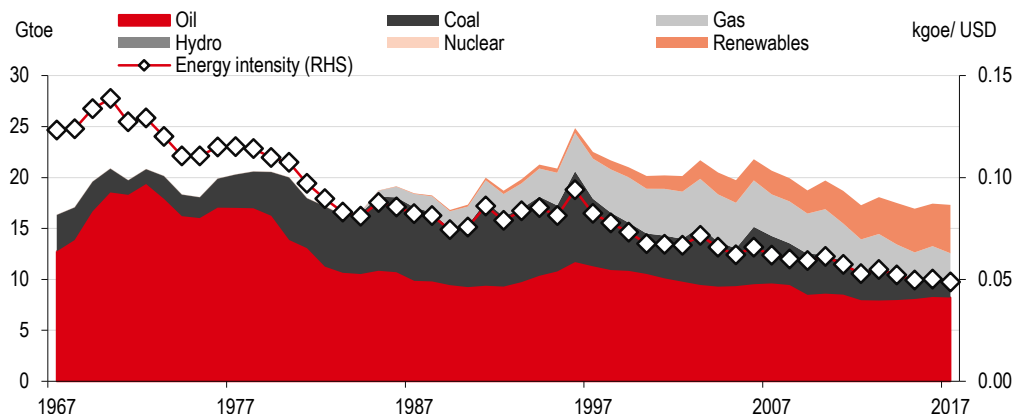


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

### Oil in transport is persistent

Denmark's overall energy consumption remains heavily weighted towards oil (47% of primary energy mix), although this share has decreased massively from the 1970 share of 89%, thanks to the uptake of renewables and gas in power generation. The national target is to be entirely independent of fossil fuels by the year 2050.

### Renewables going mainstream (total primary energy mix)



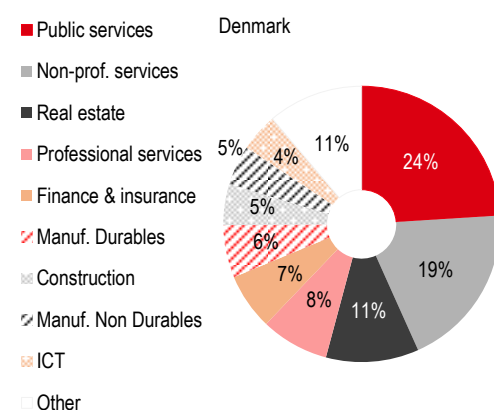
Source: BP Statistical Review, World Bank

The Danish economy remains in good health, having delivered substantially in recent years. Households and Corporates combined have lowered their debt levels relative to GDP by 25ppts over the past five years, leaving the economy less exposed to shocks in the global economy. Trend growth will likely be low, though, at around 1.3% per year, due to having a high level of income today. Depending on how the urban area is defined, roughly 20-40% of the population of the country live in Copenhagen, which scores extremely highly in international studies for the most environmentally friendly cities in the world, with more than half of the population commuting via bicycle.

## Lots of wind

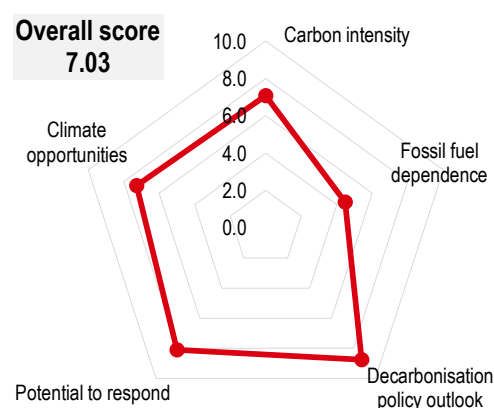
Denmark's high score with climate opportunities comes from domestic company exposure to climate related sectors, in particular wind power.

### Denmark's large public sector and professional service economy help lower emissions



Source: OECD STAN database. Note: Shows breakdown of output in the economy. Latest data

### Climate political economy radar



Source: HSBC

## EU alignment

National policies are generally in line with the EU policies, with some further aims at a national level. Policies that are addressing transition in the transport sector, such as a ban on new fossil fuel cars by 2030, and improvements to city infrastructure that will allow for more bike usage and cleaner mass public transport, are contributing factors to Denmark's position in the C-7 group.

### National policies for low carbon transition

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- Coal and oil for heating purposes to be phased out by 2030</li> <li>- Phase out fossil fuels by 2050</li> <li>- Target reduction in gross energy consumption of 14.5 % in 2020 compared with 2006</li> <li>- Electricity and heating supply to be 100% covered by renewable energy by 2035</li> <li>- Transport sector emissions reduced by 20% by 2020 vs. 1990 levels</li> </ul>
<b>EV incentives and policy support</b>	Plan to ban new fossil fuel cars by 2030
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) - The scheme through 'cap and trade' aims at reducing emissions by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC



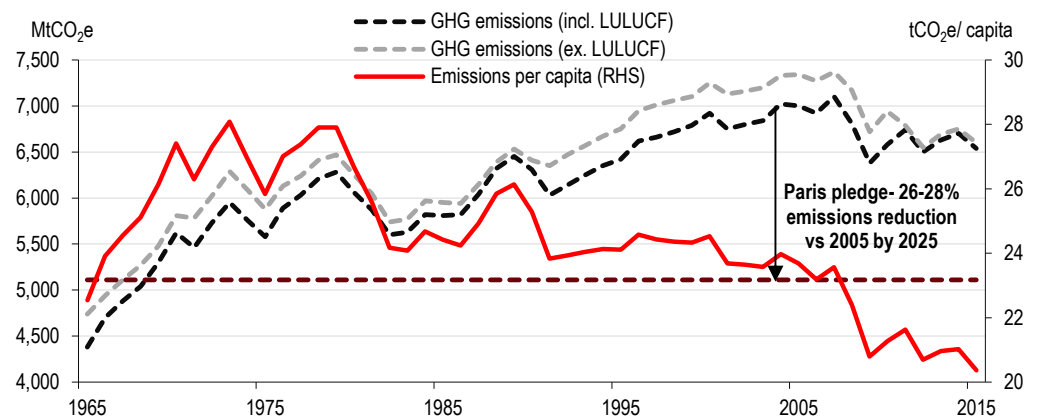
## 6. United States

- ◆ Steadily rising emissions until the past decade
- ◆ The US Administration withdrew from the Paris Agreement but efforts from non-state actors in the US are noteworthy
- ◆ Steady economic growth and a shift to services will help lower emissions

Steadily rising emissions up to the past decade...

The US emissions profile is interesting; absolute emissions rose steadily over the decades until the mid-2000s. By contrast, as the population continued to rise, emissions per capita have been trending down since the 1990s. In June 2017, the US Administration under President Trump withdrew from the Paris Agreement, weakening Federal commitment to the process, although due to the terms of the Agreement, formal exit will not be granted until November 2020. Until the exit, the US has a commitment to reduce emissions by 26-28% by 2025 (below 2005 levels), but any future commitments beyond this are unclear.

### Absolute emissions levels remain high

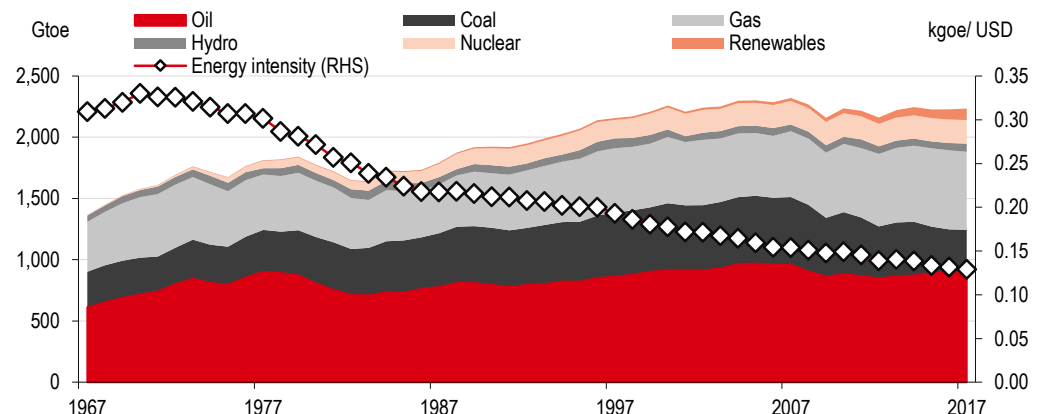


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

...but reliance on fossil fuels remains

The economy still generally relies on fossil fuels in the primary energy mix; making up 84% of the mix (coal, oil and gas shares are 9.7%, 46.7% and 19.8% respectively). There has been some growth in renewables over the previous decade, but it remains at a very low level.

### Fossils continue to dominate (total primary energy mix)



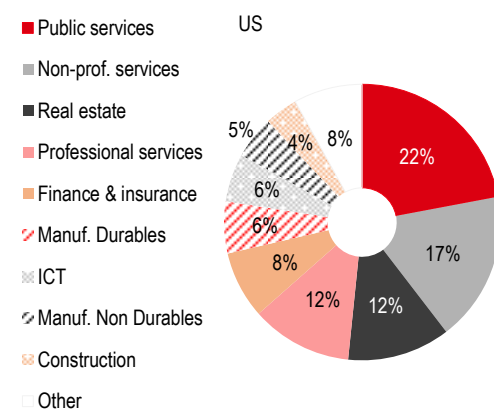
Source: BP Statistical Review, World Bank

In our view, the US economy will remain the biggest in the world for much of the next decade, before it is overtaken by China. The economy is very consumption and services orientated despite historical strength and a small revival in the manufacturing sector. Trend growth is estimated to be just shy of 2% over the course of the next decade, with consumer spending on services likely to be the main driver of this.

### 3<sup>rd</sup> place for climate opportunities

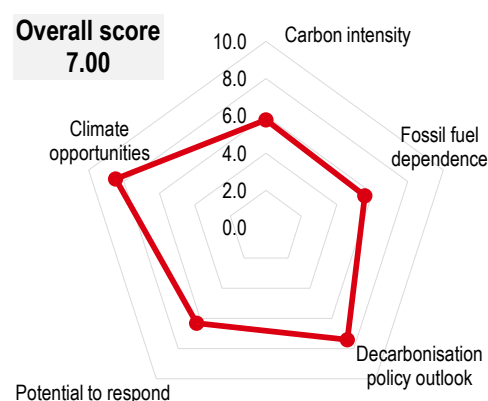
Despite the heavy services-leaning, the US scores particularly highly in terms of climate opportunities, ranking 3<sup>rd</sup> of all countries in the sample. Corporate climate related revenues stand out, particularly in buildings, transport and industry efficiency sectors.

### Manufacturing has shrunk in importance to the US economy



Source: UNCTAD

### Climate political economy radar



Source: HSBC

We have written extensively on US climate policy see, particularly following the US withdrawal from the Paris Agreement, and the US Administration's abolition of the Clean Power Plan, replacing it with the ACE – Affordable Clean Energy rule.<sup>6</sup>

### Non-state action

In reality, while the direction of Federal climate policy may be weakening, we believe that the climate actions of non-state actors (cities, states and companies) in the economy are significant and will help the US greenhouse gas emissions trajectory will continue in a downwards trend.

### National policies for low carbon transition

<b>Paris pledge</b>	Reduce GHG emissions by 26-28% by 2025 below 2005 level
<b>National policies</b>	
Targets	Reduce GHG emissions by 26-28% by 2025 below 2005 level
EV incentives and policy support	USD 7,500 subsidy available per EV
Market Mechanism	California Cap and Trade: Covers electricity, large industrial facilities (>=25,000 MtCO <sub>2</sub> e annually), distributors of transportation, natural gas and other fuels. Cap declines about 3% annually from 2015-20. The penalty is in the form of an increased obligation of four allowances per ton of emissions.

Source: HSBC

<sup>6</sup> Please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com) if you would like access to other climate reports





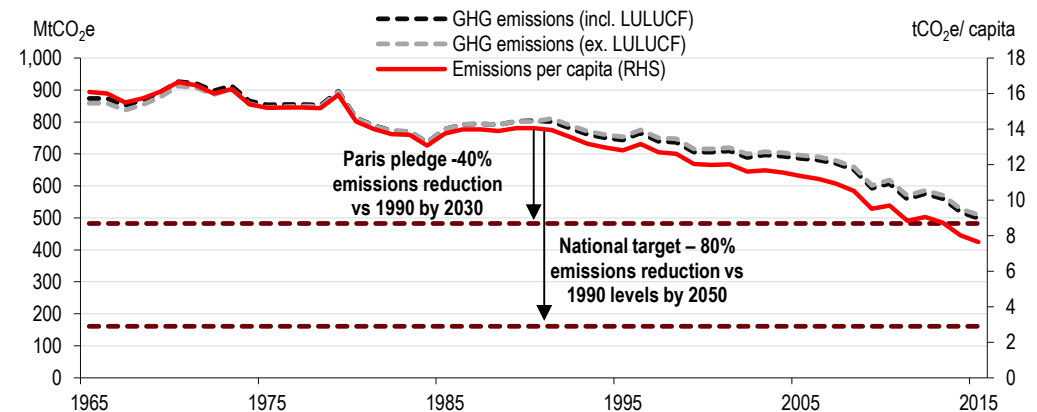
## 7. United Kingdom

- ◆ Downward emissions trajectory accelerated over past decade
- ◆ Successful implementation of power generation and transport related policies will cement the UK's low-carbon energy transition
- ◆ Real estate and services dominate the economy

### Recent improvements in emissions

The UK's emissions have been falling steadily over the decades, with particularly rapid progress over the previous 10 years, as government policy has become more focussed on decarbonisation and a renewables build out. The UK is the 6<sup>th</sup> highest ranking economy on our carbon productivity measure, driven for a large part by its low levels of emissions per unit of GDP, and recent declines in emissions per capita.

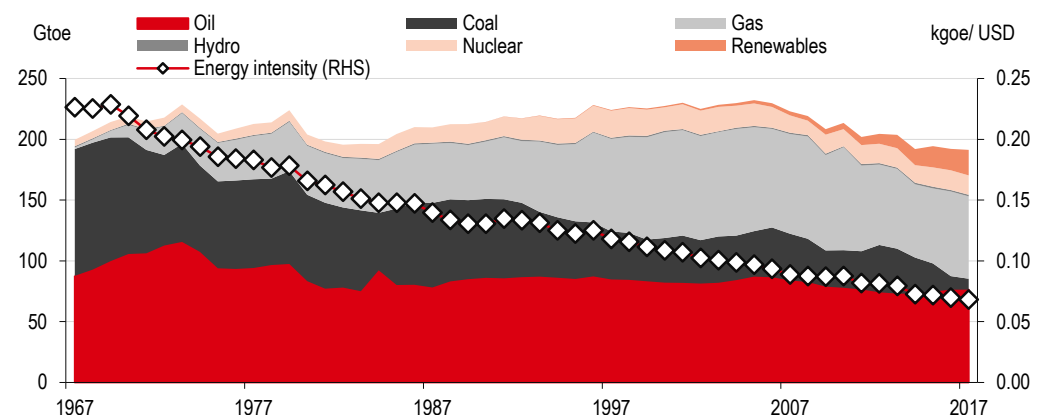
### Particular progress with emissions reduction over the previous decade



### Significant progress with moving out of coal

While the UK's reliance on oil in the primary energy mix has remained relatively constant over the previous three decades, the move out of coal has been significant, particularly over the five years from 2012 to 2017, where coal as a share of total primary energy fell 75% from a 19% share to 5%. The national target is to entirely phase out coal from power generation by 2025. Renewables in the total primary energy mix has picked up. Meanwhile, UK energy intensity has improved by 3.4 times from 1965 to 2017.

### Recent successful efforts to move out of coal successful



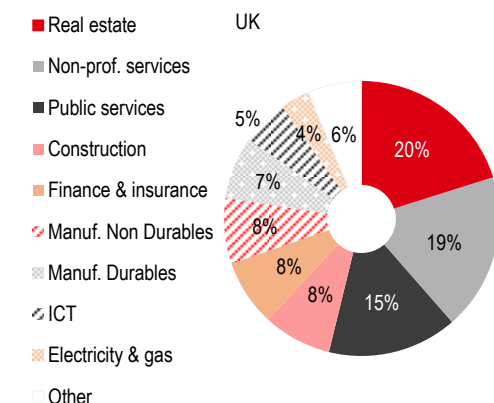
The UK economy is heavily service based, with the manufacturing component of the economy having declined to just a small share of GDP. The future of the UK economy's make-up will depend a lot on the outcome of Brexit negotiations in our view, with the future of the UK's (albeit small) manufacturing sector most at risk. Real estate, finance and basic services account for a majority of total output, meaning that growth is likely to be less carbon intensive. Our forecasts for UK trend growth are around 1.5% over the next decade, but of course much will depend on the future relationship with the EU and the final degree of freedom of movement of people. We think the UK's demographic picture could turn very quickly with a much lower migration rate, posing risks to those already subdued growth projections.

### Climate opportunities in the water sector

The UK falls within the top 20 for climate opportunities, with relatively higher revenue exposure to the water sector. The UK's emissions reduction policy is fairly strong, contributing to its 11<sup>th</sup> place ranking on policy outlook, as shown on the climate political economy radar.

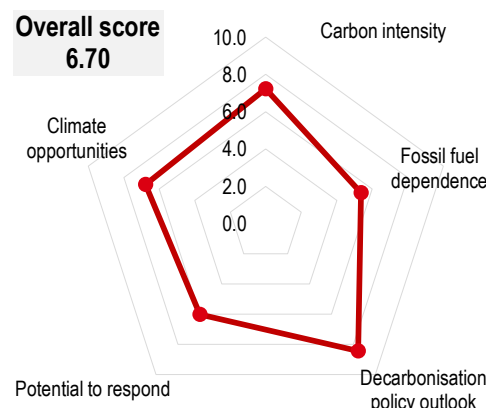
The UK's relatively lower potential (compared to other members of the C-7) to respond ranking (22<sup>nd</sup> of 67 economies) prohibits a higher ranking within the C-7. Nevertheless, the country still performs well on many of these sub-indicators, particularly corruption and rule of law.

### Real estate and financial and basic services key to UK economy



Source: World Bank

### Climate political economy radar



Source: HSBC

### Policy ambition

The UK's long-term target is to reduce emissions by at least 80% (vs 1990 levels) by 2050. In order to achieve this, it will require a cross-sector push and policies, which the country has increasingly focussed on of late. This includes a pledge for no coal power generation by 2025, and a ban on all petrol and diesel vehicles by 2040.

### National policies for low carbon transition

<b>Emissions pledges</b>	Reduce GHGs by at least 40% by 2030 from 1990 level (Paris). NDC also includes GHG targets of 20% reduction by 2020 (Kyoto) and 80-95% by 2050 (long term strategy) compared to 1990 level
<b>National policies</b>	
Targets	<ul style="list-style-type: none"> <li>- Reduce its GHG emissions by at least 80% by 2050 below its 1990 level</li> <li>- Reduce GHG emissions by 57% over 2028-2032 vs. 1990 level (according to 5th Carbon Budget)</li> <li>- Phase out the use of coal to produce electricity by 2025</li> </ul>
EV incentives and policy support	Planning to ban petrol and diesel vehicles by 2040
Market Mechanism	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030) – the scheme works through 'cap and trade', aimed at reducing emission by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation.

Source: HSBC



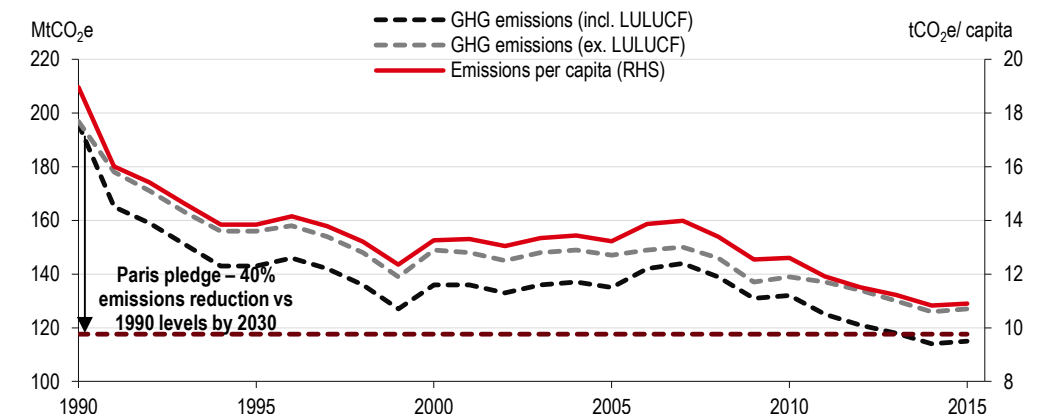
## EM - 1. Czech Republic (13 overall)

- ♦ Falling emissions following economic reform and a move away from heavy industry
- ♦ Policy focus on the power mix will be important in achieving further reductions – the country remains a relatively heavy coal user
- ♦ The auto sector is key for the economy, which looks set to grow strongly

**Economic change a key factor behind emissions trajectory**

Emissions in the Czech Republic have been falling, along with the European average. In the early 1990s when the country underwent economic reform, there was a move out of heavy industry, rapidly accelerating emissions declines. As the economy developed and transportation grew – with more private car ownership and increased road freight – emissions progress slowed as oil consumption picked up, growing 39.5% since 1993. The 2008 global economic slowdown can partly explain the more rapid emissions declines over the more recent years.

### Czech downward emissions trend continues

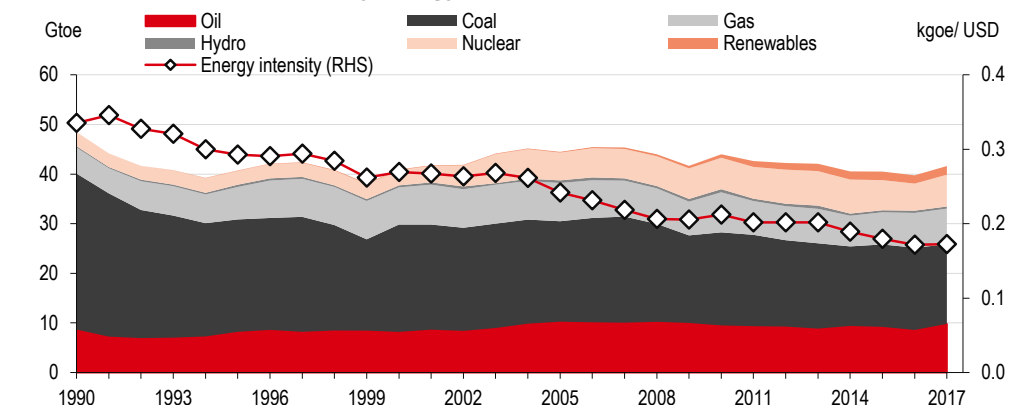


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

**Intensity improves, but absolute fossils use is stickier**

Energy intensity has been steadily declining in the country, under the National Action Plan for energy efficiency. This plan spans transportation, end use of energy and energy supply. The country remains heavily reliant on fossil fuels, and coal in particular. Of the 'clean' energy technologies, nuclear is the most widespread, with extremely low levels of hydro and renewables in the country.

### Still lots of coal... (total primary energy mix)



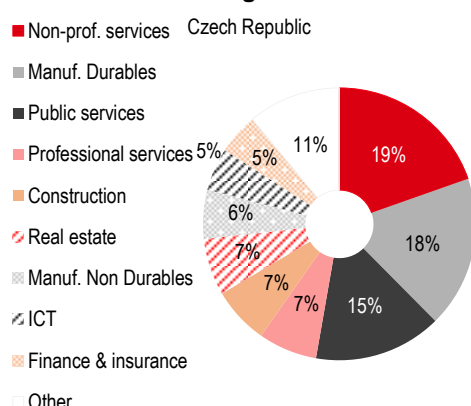
Source: BP Statistical Review, World Bank

Despite a move out of heavy industry following economic reform, industry still makes up 37% of the economy. Much of this is in the auto sector, with the Czech Republic following the trend of its CEE neighbours by providing a lower-cost manufacturing hub for many European industrials. The economy faces similar challenges and opportunities to these same neighbours – an ageing population putting a cap on overall growth rates but a well-educated workforce, low labour costs and stable governments. This combination leads us to look for growth in the region of 3% per year over the medium term.

### Czech performs well on emissions reduction policy

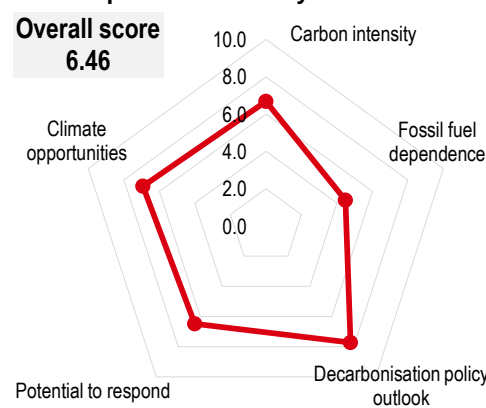
The Czech Republic is the best performing EM economy on the theme of decarbonisation policy outlook; thanks to a relatively strong emissions reduction policy score.

### Much of manufacturing is the auto sector



Source: OECD STAN database. Note: Shows breakdown of output in the economy. Latest data

### Climate political economy radar



Source: HSBC

### Focus on transport

The Czech Republic's national climate policy targets a "gradual reduction by 80%" of emissions from industry by 2050. The transport sector will also need to phase out emissions to achieve this, in our view, being one of the highest contributors to overall national emissions. Plans for this include electrification of railways and encourage a shift in freight transportation from road to rail. The Climate Action Tracker organisation finds the Czech Republic to be one of the leading EU countries in terms of high shares of public transport, which is extremely emissions efficient.

### National policies for low carbon transition

<b>Paris pledge</b>	Reduce GHGs by at least 20% by 2020, 40% by 2030 and 80-95% by 2050 compared to 1990 level
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>-Targets GHG emissions reduction of 30% by 2030 vs. 2005 level</li> <li>- Targets 20.8% share of renewables in gross final energy consumption by 2030</li> <li>-Long term: pursue the indicative level of 70 MtCO<sub>2</sub>e of emissions in 2040</li> <li>-Long term: pursue the indicative level of 39 MtCO<sub>2</sub>e of emissions in 2050</li> </ul>
<b>EV incentives and policy support</b>	EU Commission has approved Euro 45mn Czech support scheme for refuelling and recharging stations for low emission vehicles
<b>Market Mechanism</b>	2030 Framework for EU ETS: Comprising of Phase 4 (2021-2030)- The scheme through 'cap and trade' aims at reducing emissions by 43% compared to 2005 by 2030 across different sectors like electricity, manufacturing and aviation

Source: HSBC



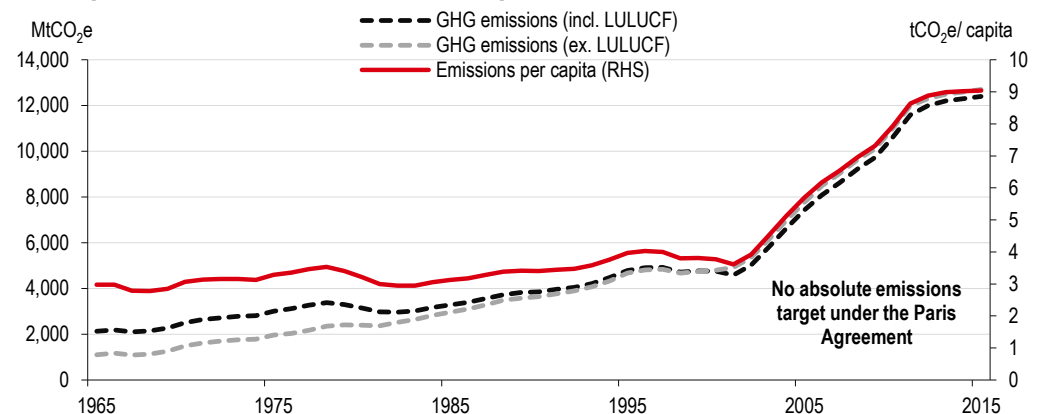
## EM - 2. China (14 overall)

- ◆ Rapid increases in absolute emission levels in recent decades as fossil powered the country's economic boom
- ◆ China comes 1st on climate opportunities as clean tech becomes increasingly important for its future economic plans
- ◆ Industrial activity is being replaced with services, quickly

### Booming emissions....

Emissions in China have increased significantly since the 2000s, in line with the country's economic boom. On a per capita basis, however, emissions are lower than some of the C-7 group of countries; the US emissions per capita are 2.3 times that of China's. China has no absolute emissions target under the Paris Agreement, but has pledged to reach peak emissions around 2030.

### Nearing a peak: China's rate of emissions growth slows

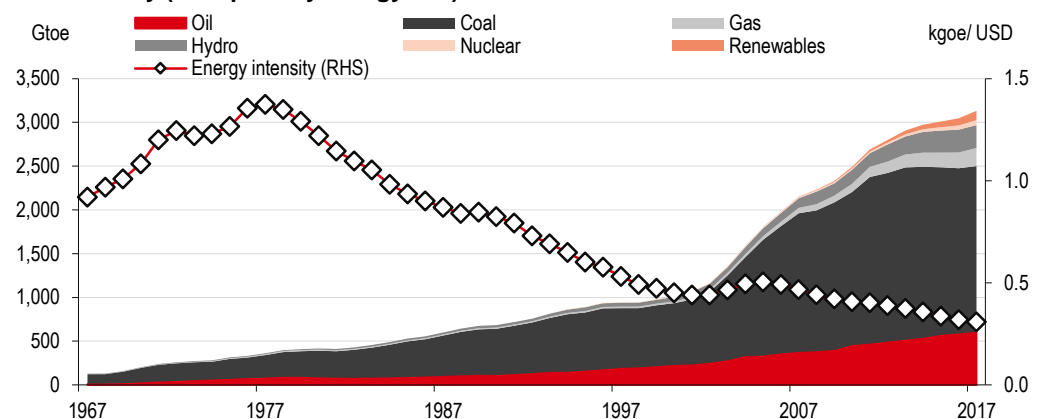


Source: PRIMAP, World Bank, Note: LULUCF = Land use and land use-change and forestry; emissions per capita includes LULUCF

### ...but progress with reducing carbon intensity of GDP is underway

China has pledged to cut its carbon intensity of GDP by 60-65% by 2030 (vs 2005 levels) and this transition is underway. The most significant share of the economy's energy mix is coal. There has been a recent growth in the use of renewables and nuclear, but this is at the same time as growth of coal use in the energy mix.

### Coal country (total primary energy mix)



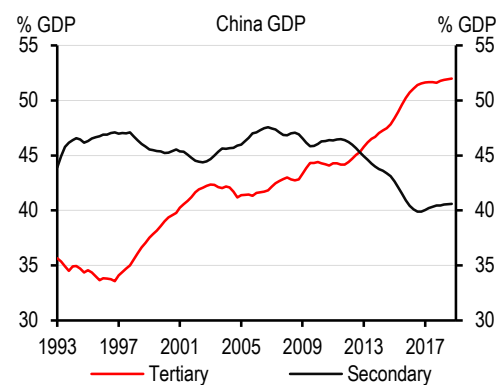
Source: BP Statistical Review, World Bank

### 1<sup>st</sup> place for climate opportunities

China should become the world's largest economy within the next decade. The economy has moved very quickly away from industry and into services over the past decade, with much of the current pace of ~6.5% growth coming through in this sector. That will have clear implications for the energy demands of the country, but also make the overall pace of growth less dependent on global demand for manufactured products. So although Chinese growth may slow over the coming few years, the pace of growth is more sustainable and domestically generated.

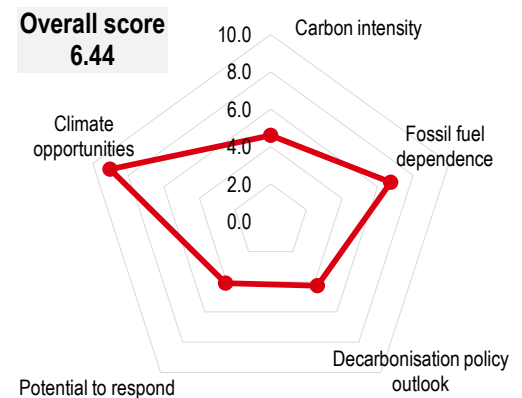
China's high ranking as an EM state is, for a large part, due to its excellent scoring on climate opportunities, ranking 1<sup>st</sup> of all 67 countries in the sample. Companies have particular exposure to the following climate sectors: clean power and buildings and transport efficiency. China also performs well in terms of economic diversification, having decreased the share of fossil revenue in the economy over the decade from 2007 to 2017 by 3%.

#### China's GDP has shifted a lot



Source: World Bank. Note: Tertiary activity is mostly services, Secondary is mostly industrial.

#### Climate political economy radar



Source: HSBC

### China's 'green' agenda

With think an absolute emissions target is more appropriate for tackling climate change, particularly given the exponential growth of the economy. However, policies relating to specific sectors, such as the transport sector, are positive signs for the transition. We published on China's advance of the 'green' agenda, environmental policies that we believe will also be positive for China's growth story.

#### National policies for low carbon transition

<b>Paris pledge</b>	Pledged peak emissions around 2030 and cut to 2030 carbon intensity of GDP by 60-65% (vs 2005)
<b>National policies</b>	
Targets	- Solar and wind targets of 110 GW and 210 GW respectively by 2020 - 18% Energy consumption reduction per unit GDP by 2020
EV incentives and policy support	Targets to achieve 2 million annual sales by 2020 and at least 20% by volume and sales by 2025
Market Mechanism	Launched emissions trading in 2017 and is expected to be fully fledged in the 2020s. It aims to cover more than 5Gt of annual emissions.

Source: HSBC



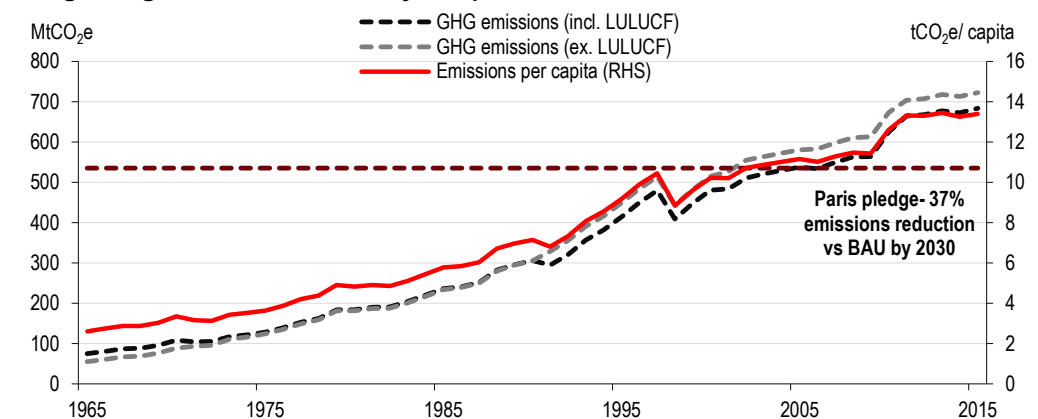
## EM - 3. Korea (15 overall)

- ◆ Emissions continue to rise....making it harder for Korea to meet its Paris pledge but the country is well placed on its potential to respond
- ◆ Coal, oil and gas take the largest shares in the primary energy mix, but the export driven economy is strong on climate opportunities
- ◆ The economy will be weighed down by an ageing population, but robotisation of production is key

### A plateau?

Korea's emissions have been increasing steadily over time, though this is levelling off. We think further efforts will need to be made to meet the country's Paris Agreement pledge of a 37% reduction in emissions vs BAU by 2030.

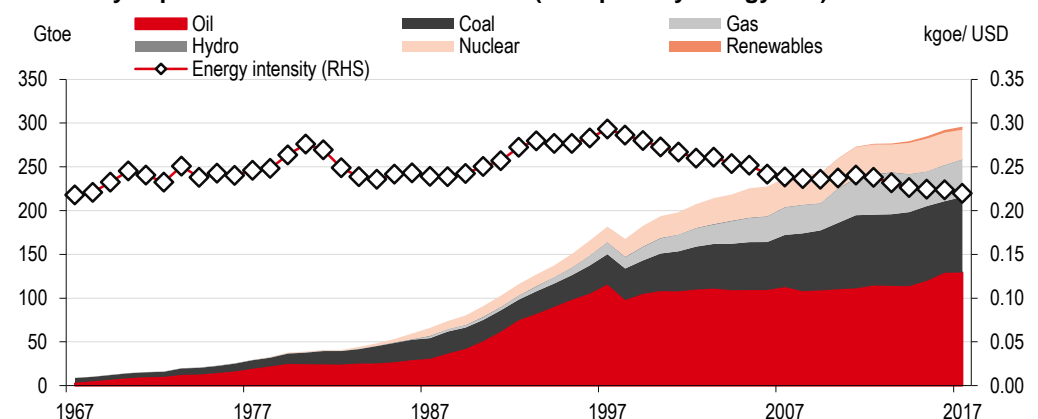
### Still growing – Korea's emissions yet to peak



### Fossil dominance

While energy intensity has been falling steadily over the past two decades, the economy remains heavily reliant on fossil fuels; coal, oil and gas make up 87% of the primary energy mix. Nuclear is the next largest share; Korea uses this domestically and also exports some of their nuclear power. The country is continuing to build out capacity here. Renewables take a very small share of the energy mix.

### Efficiency improves but fossils still dominate (total primary energy mix)



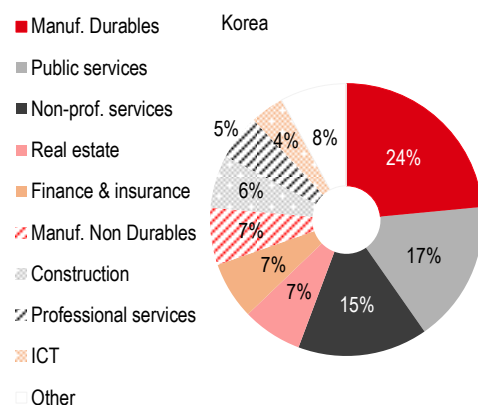


Industry accounts for a fairly large share of Korea's economy – as one of the biggest producers of both semiconductors and vehicles in the world. The economy faces many headwinds to growth – most notably the rapid slowdown in working-age population growth that is currently ongoing, but overall activity growth is likely to be supported by continued automation and robotics developments (Korea has the most robots per worker of any country in the world). On a per-capita basis, growth should remain robust, owing to a well-educated workforce and the high-tech nature of the economy.

Climate opportunities are strong, as is Korea's potential to respond

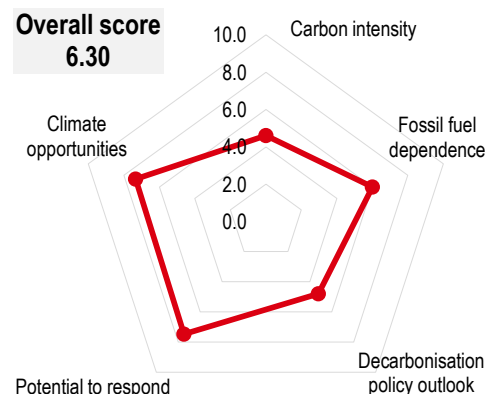
Unsurprisingly in an innovative economy, Korea's green opportunity ranking is strong, given domestic company exposure to clean power (including nuclear) and buildings efficiency. Korea also performs well on the potential to respond indicators, given its extremely high enrolment in tertiary education, low levels of inequality and sovereign wealth fund. In fact, Korea is the highest ranking EM state on potential to respond indicators of all countries in the sample.

### Korea remains a manufacturing country



Source: OECD STAN database. Note: Shows breakdown of output in the economy. Latest data

### Climate political economy radar



Source: HSBC

In the summer of 2018, Korea announced a plan to aim for a peak in national emissions with 2020. Currently, Korea's greenhouse gas emissions are on the rise. Despite this, Climate Action Tracker describes national targets and policy projections as still way off the Paris Agreement target level. The government has announced new plans, which involve a de-coupling between economic growth and greenhouse gas reduction *after* 2020.

More renewables are the plan

Korea's 2017 '15-year plan for electricity supply and demand' aims to increase the share of renewables. At the end of the 15 year plan, there will still be a reliance on coal - it could account for up to 30% of the power generation mix – but this is lower than the current level.

### National policies for low carbon transition

<b>Paris pledge</b>	Reduce emissions by 37% wrt BAU (850.6 MtCO <sub>2</sub> ) by 2030
<b>National policies</b>	
<b>Targets</b>	<ul style="list-style-type: none"> <li>- Share of renewable energy in primary energy of 20% by 2030</li> <li>- 13% reduction in energy demand by 2035</li> <li>- Zero Energy buildings for all new buildings by 2025</li> <li>- Increase share of green goods exports in the major industries from 10% (2009) to 22% (2020) and environmentally friendly products up to 18% by 2020</li> </ul>
<b>EV incentives and policy support</b>	Target one million by 2020
<b>Market Mechanism</b>	Currently in phase two (2018-2020): 97% free allowance and 3% auctioned.

Source: HSBC

# Appendix

## HSBC Climate Solutions Database

The **HSBC Climate Solutions Framework** identifies and defines climate solutions across four climate sectors and 21 climate themes and **HSBC Climate Solutions Database** is the outcome of applying the HSBC Climate Solutions Framework on the universe of global stocks. The framework defines four climate sectors, as per the figure below. For more information about our Climate Solutions Database, please contact the Research Direct team at [research.direct@hsbc.com](mailto:research.direct@hsbc.com)

## HSBC Climate Solutions Framework



Source: HSBC  
HSBC Climate Solutions Framework is an evolving tool-kit for screening global companies that offer solutions to offset and overcome the effects of climate change and currently comprising four climate sectors and 21 climate themes

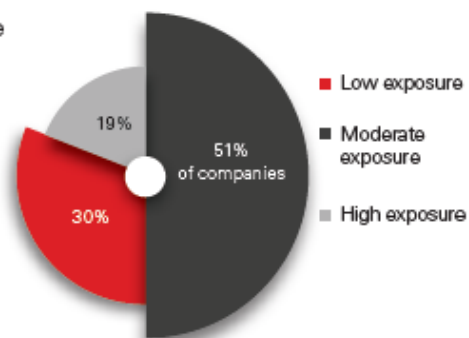
After a detailed climate revenue mapping, companies in the HSBC Climate Solutions Database are assigned with an HSBC climate factor based on their climate revenues as percentage of total revenues. The chart on the following page shows a breakdown per levels of revenue. Around half of companies in the Databases fall into the middle band of 25-50% revenue exposure. Companies are also assigned one climate sector and theme based on their largest exposure to those climate sectors and themes.

### HSBC Climate Factor (CF)

Breakdown of HSBC Climate Solutions Database by climate exposure factor

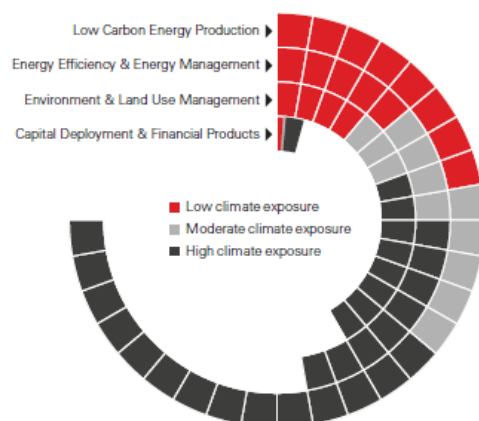
- ▶ **Low exposure**  
(10% < climate revenue < 25%)
- ▶ **Moderate exposure**  
(25% < climate revenue < 50%)
- ▶ **High exposure**  
(climate revenue > 50%)

Source: HSBC



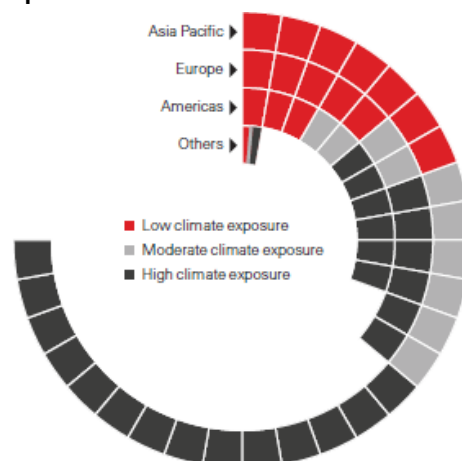
The left hand chart breaks down the companies in the Database per sector, with the highest level of revenues associated with low-carbon energy production. The right hand chart gives a geographic breakdown. There are notably more companies drawing revenues in the Asia-Pacific region, with Europe and North America are similar levels to each other.

### Sector breakdown by climate revenue exposure



Source: HSBC

### Regional breakdown by climate revenue exposure



Source: HSBC

# Notes

# Notes

# Disclosure appendix

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