

# A review of greenhouse gas reduction aspirations and their legislation across selected countries and regions

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## Introduction to Case Studies

ClimateXChange has commissioned Climate Futures to undertake research for the Scottish Government on countries aspiring to leadership on tackling climate change, and how they are dealing with the challenges of meeting ambitious climate goals. This paper explores relevant national Climate Change and Energy strategies, plans and policies in some European countries (EU and non-EU), Mexico and two US states. These were chosen on account of their progressive aspirations.

The research focused on national greenhouse gas (GHG) targets, sectoral targets, legislation and the strength of law to enforce delivery, the role of carbon trading and offsetting and the achievability of targets.

The EU-28 bloc has set GHG targets, which give context for member state targets. Five EU countries were considered: Denmark, France, Germany, The Netherlands and Sweden. A non-EU, European country, Norway, was also considered, as was Mexico, which has set stretching GHG targets. California and New York State in the US were also included for interest as progressive regions.

## Starting point and overall ambition

Countries have differing starting points for their decarbonisation journeys, which sometimes inform their targets and approach, and often their success. For example, Sweden has a long history of environmental protection and strong public support. With a very high proportion of renewables in its energy portfolio, the average GHG emissions per capita for Swedish citizens, was 4.6 tCO<sub>2</sub> (in 2013)<sup>i</sup>, due to a low carbon electricity grid mix. The country has recently legislated (June 2017) for a goal of phasing out all greenhouse gas (GHG) emissions by 2045<sup>ii</sup>. With its nuclear electricity sector, France has a similarly low average footprint per capita. Denmark uses a high proportion of fossil fuels for energy (oil and natural gas), and average GHG emissions per capita are almost 50% higher. Despite this, Denmark has set more stretching targets than the EU bloc, of 40% GHG reduction by 2020<sup>iii</sup>. Germany has adopted the same overall objective despite a far higher per capita figure (9.2 tCO<sub>2</sub>) and absolute GHG emissions<sup>iv</sup>. The Netherlands has a high dependence on fossil fuel energy, and has set relatively modest short-term targets, yet very stretching targets for 2050, which will require a wholesale rebuilding of energy infrastructure<sup>v</sup>. The difference in starting points and ambition is recognised in the ECs Effort Sharing Regulation and split by EU country, which sets binding national GHG targets for each of the 28 Member States, to deliver a 30% reduction across the bloc by 2030 (from a 2005 baseline)<sup>vi</sup>.

Ominously, however, the EC has set its overall 40% target conditional on other developed countries (outside the EU) making comparable efforts, which could undermine European action.

Norway has relatively low absolute country footprint, yet it has committed to an aim of 40% GHG reduction by 2030 and has even pledged to the non-statutory aim of becoming carbon neutral - via an accelerated programme of emissions cuts and carbon trading to offset emissions - should others show similar commitment<sup>vii</sup>. California<sup>viii</sup> and New York State<sup>ix</sup> have ambitions of a 40% overall GHG reduction from 1990 levels by 2030.

Conversely, Mexico has further to travel on the development path and this is reflected in the low per capita emissions, which presents an opportunity to leapfrog brown power and adopt clean technology. It has the ambition to reduce emissions by 30% by 2020 compared to 'business-as-usual', or 22% below 2013 baseline in 2030 (yet equivalent to an increase of emissions by 56% above 1990 levels)<sup>x</sup>.

## Sectoral targets

The EU has set 2030 targets of 27% reduction in energy use and 27% share of renewable energy. Aviation emissions are included but those from the maritime sector are not (yet). Germany is targeting buildings efficiency ambitiously through its Energiewende programme, with an ambition to reduce GHG emissions from the sector by two thirds from 1990 levels by 2030<sup>xi</sup>. Sweden is aiming for a 20% energy reduction by 2020 (2008 baseline), and The Netherlands is also aiming for a more generic 1.5% energy reduction year on year to 2020. Norway is aiming for reductions of 40% by 2030 in non-ETS sectors. In the US, California is aiming for 'double energy efficiency savings' in buildings and New York State, a 23% reduction decrease in energy consumption in buildings.

As with the overall ambition, Sweden has set the highest bar for renewable energy (from a high starting point), with a target of 50% share by 2020. France is aiming higher than the EU target for a 23% share of renewable energy by 2020, and a reduction of fossil fuel consumption by 30% by 2030 with about a third of power produced by renewables across electricity, heat and transport sectors – with a commensurate reduction in dependence on nuclear power from 75% to 50% by 2025 (Germany also wants to turn off all nuclear power stations, by 2022). The Netherlands is aiming for 40% renewables by 2030. Mexico's 'clean energy targets' (which could include co-generation with gas) are 30% by 2021 and 35% by 2024. In the US, stretching targets have been set at 50% renewable use by 2030 in both California and New York State. Future goals have been set at very ambitious levels, with Denmark aspiring to 100% renewables in the energy sector by 2050, and Germany aiming for 60%.

Transport goals are similarly varied. Sweden aims for its vehicles to be fossil fuel free by 2030, The Netherlands has set a target of 10% of its transport fuels to be 'renewable energy' by 2020, and France has set a higher target of 15% for the same year. California aspires to a 50% reduction in petroleum use in vehicles by 2030, whilst Denmark aspires to 100% renewable-powered transport fuel by 2050. Notable also is the UK's aim to ban the sale of fossil fuel driven cars by 2040, announced in July 2017.

Land Use, Land Use Change and Forestry (LULUCF) is recognised as part of the GHG mitigation effort by all countries, and flexibility in this sector is built into the EU's Effort Sharing Regulation for all the EU case study countries. Significantly, California has been running a cap and trade programme for the power sector, which raises funds for LULUCF projects<sup>xii</sup>.

## Taxes, trading and offsetting

Denmark has imposed carbon taxes since 1992 on fossil fuel industries. France also imposes a tax of 22 EUR / tonne CO<sub>2</sub> on certain industries, and, under its Plan Climat, aspires to more carbon pricing (and also aligning diesel and petrol taxes)<sup>xiii</sup>.

Historically, developed countries (Annex I under Kyoto Protocol) have had the opportunity to trade through Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanisms, and EU-bloc countries have been issued allowances for the most polluting industries under the Emissions Trading Scheme (ETS) – which is due to be reformed.

The Netherlands is expecting to rely on trading to meet some of its targets through trading, and is expected to raise its own contribution to climate finance from EUR 200m (USD 310.5m) in 2013 to EUR 1.2bn (USD 1.86bn) by 2020<sup>xiv</sup>.

Norway expects to use 'the EU emissions trading market and international cooperation' to meet its targets, and Sweden expects to meet up to 15% of its commitments this way. Some countries have 'flexibility' for using ETS credits to meet their commitments, under the Effort Sharing Regulation.

Many countries have been engaged in voluntary support of offset projects, including Denmark (for REDD+ forestry conservation) and The Netherlands. Mexican projects have been the recipients of some voluntary offset funds, and the country has also established a pilot cap and trade scheme for the power sector in anticipation of a full roll out in 2018. California's cap and trade scheme is successfully generating reductions and funds for land-based projects.

## Legislative approaches

A range of approaches to climate change policy, have been used which reflect the political and cultural realities. Nationally Determined Contributions (NDCs) give each country's commitments to the Paris Agreement. Ratification of the EU's 2030 framework for climate and energy policies by each member state commits them to this European programme, with the Effort Sharing Regulation allocating effort. Closer to home, legally binding emissions reduction targets have been set in Germany under *Energiewende*, which, along with associated policies, also includes policies for renewable energy, buildings and transport. France's Plan Climat is expected to pass in autumn 2017. Meanwhile, its *Grenelle* legislation, backed up by Finance law (2014), delivers the carbon tax instrument<sup>xv</sup>. Denmark's Energy Agreement (2012), Climate Change Act (2014) and Energy Renovation Strategy of Buildings (2014) commit it to GHG targets and some policy measures to deliver them. The Netherlands' Environmental Management Act was created to simplify legislation, integrating 26 different laws and regulations. Passing of The Climate Act is dependent on political will of the ruling coalition. Sweden's 2017 climate policy framework is a binding law obliging future governments to set tougher goals to cut fossil fuel use every four years (from January 2018). Its current approach is to use market-based initiatives that cut across different sectors, integrating climate mitigation via price signals across industries. Mexico's The General Law on Climate Change, signed in 2012, was the first climate law in a developing country. Its 2nd Special Programme on Climate Change (2014) includes mitigation measures to 2018 – committing to the 30% 2020 target and 2050 50% target, and making them binding at the national level - subject to international support. The Energy Transition Law (2015) includes clean energy targets for 2018, 2021 and 2024. California has passed its ambitions into legislation through the Global Warming Solutions Act (assembly bill 32)<sup>xvi</sup>, and New York's has used a State Energy Plan<sup>xvii</sup>. Both these states, 10 further states and 187 cities, collectively called the United States Climate Alliance, have committed to meet their proportional share of the Paris Agreement commitments, despite President Trump's recent pledge to pull the US out of the Agreement<sup>xviii</sup>.

## Achievability of targets

It is of course too early to judge how successful many of these aims and aspirations will be. There is no doubt, however, that many of these countries are struggling to deliver the necessary reductions in emissions. In Germany, the Berlin-based policy institute Agora Energiewende commented: "the speed and scope of the Energiewende are exceptional". Energy emissions fell by around 21% between 1990 and 2015. Households reduced emissions by 35% in the same period, industry reduced emissions by 36%, transport emissions fell by only 2%, agriculture by 16% and waste, 71%. However, the Energiewende Monitoring Report of December 2016 warned that the country would probably miss its 2020 emission targets and other crucial Energiewende goals. In early 2017, it lowered emissions by only 27.6%, leaving a requirement to reduce emissions by 40m tCO<sub>2</sub>e per year<sup>xix</sup>.

In the Netherlands, a succession of policies for heat include an Energy Agenda, a collaborative agreement between 47 stakeholder groups (government, industry, third sector and trade unions), setting out a vision for the energy system to 2050 - although implementation mechanisms are incomplete. Political parties campaigning in the recent Dutch general election said they would support a new Climate Act setting out legally binding targets to 2050 – but this is yet to be passed following the recent election. Swedish Public support is strong for environmental policy. The climate goal was

initially proposed by the socialist and green parties and backed by a coalition of 7 of the 8 parties across the political spectrum. In neighbouring country, Norway, GHGs are projected to stabilise (at ~52 Mt) up to 2030, and the target will be missed. It is recognised at a senior government level (Climate and Energy Minister, Vidar Helgesen) that more policy change is required, including a decreasing dependence on oil and gas.

In California, existing policies will increase renewable-based electricity use to 33 percent by 2020, with costs, even without subsidies, approaching levels competitive with new natural gas plants. The appetite for action appears undiminished despite the impasse at national level.

The Mexican situation is more nuanced, with a target to reduce GHG emissions by 22% below a 2013 baseline by 2030 - yet this is equivalent to an increase of emissions by 56% above 1990 levels. However, currently implemented policies are projected to result in emissions levels above its 2020 and 2030 targets indicating more action is required to meet goals.

### Common themes for success (summary from the ClimateXChange European Climate Change Policy Case Studies, March 2017)xx

Cross-party political consensus is important to the setting of high ambition on tackling climate change, and ensuring that future governments report on how they'll meet their goals and have credible climate policy. Evidenced in Sweden, Norway and Denmark. The Netherlands, despite great intentions, is dependent on the post election consensus;

Consistency and stability are important to securing buy-in from key relevant stakeholders and ensuring that policies are successful over the long-term. This includes industry stakeholders. For example, the Swedish CO<sub>2</sub> and fossil fuel taxation has been stable, despite changing governments. The German federal government's aim to make the building stock 'climate neutral' by 2050 is built on a wide range of policies and programmes, dating back to 1976.

Consultation: has been important in many instances. For example, in France, climate policies have been subject to broad based consultation including experts, public bodies, NGOs and non-state stakeholders. Heat policy in the Netherlands has been developed through collaborative processes with stakeholders and public consultation.

Public support: has emerged from the research as being important to the acceptance of climate change and energy policies. In Norway, environmental policies have been presented to the public as not inherently conflicting with economic growth, which ensured that they were met with broad approval. Surveys in Germany show a high degree of concern about climate change and high levels of support for the *Energiewende*.

### Summary

The number of case studies produced was limited, hence this information is not a comprehensive view. It is nevertheless useful in giving a sense of the direction other countries and states are taking, and how they are dealing with the challenges of meeting ambitious climate goals. Further work would be required to undertake additional analysis of policies from additional countries and different sectors.

#### Key findings:

- Ambitious targets are being set by a range of countries across Europe (in and out of EU), and elsewhere. These include overall and sectoral GHG targets. States and regions are also raising the bar;
- Targets vary according to starting point, political situation and culture;
- The influence of international agreements and blocs, including the Paris Agreement and EU, have been critical to stimulating action. Despite this, countries and regions outside blocs (Norway and Mexico) have set and are meeting stretching targets, and regions (such as US states) are retained their commitments despite national policy vacuums;

- Many targets are proving difficult to meet. This shouldn't deter from high ambition. As the economic, business and social benefits become increasingly apparent, countries and regions which embark on decarbonisation pathways will save money in the long term, deliver a more resilient society to their citizens and show businesses the policy certainty they need to make long term investments in low and zero-carbon infrastructure;
- A number of countries have stated the intention to trade international credits to meet their targets and have the legal flexibility to do so;
- However, of concern, the EU has stated that meeting targets is dependent on the continued action of others.

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<sup>i</sup> <http://data.worldbank.org/>

<sup>ii</sup> <http://www.government.se/articles/2017/06/the-climate-policy-framework/>

<sup>iii</sup> <https://www.theclimategroup.org/news/denmark-pledges-40-carbon-reduction-2020-creates-climate-council>

<sup>iv</sup> <https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets>

<sup>v</sup> Ministerie van Economische Zaken (2016) Energieagenda <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/07/ea> (in Dutch)

<sup>vi</sup> [http://europa.eu/rapid/press-release\\_MEMO-16-2499\\_en.htm](http://europa.eu/rapid/press-release_MEMO-16-2499_en.htm)

<sup>vii</sup> <http://climateactiontracker.org/countries/norway.html>

<sup>viii</sup> <http://climatechange.ca.gov/>

<sup>ix</sup> <http://www.dec.ny.gov/energy/99223.html>

<sup>x</sup> <http://climateactiontracker.org/countries/mexico.html>

<sup>xi</sup> Federal Ministry of Economics and Technology (BMWi); Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (28 September 2010). Energy concept for an environmentally sound, reliable and affordable energy supply (PDF). Berlin, Germany: Federal Ministry of Economics and Technology (BMWi).

<sup>xii</sup> <https://www.arb.ca.gov/cc/capandtrade/capandtrade.htm>

<sup>xiii</sup> <https://www.ecologique-solidaire.gouv.fr/sites/default/files/2017.07.06%20-%20Plan%20Climat.pdf>

<sup>xiv</sup> <http://www.lse.ac.uk/GranthamInstitute/legislation/countries/netherlands/>

<sup>xv</sup> [http://www.measures-odyssee-mure.eu/public/mure\\_pdf/transport/FRA28.PDF](http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/FRA28.PDF)

<sup>xvi</sup> <https://www.arb.ca.gov/cc/ab32/ab32.htm>

<sup>xvii</sup> <https://energyplan.ny.gov/>

<sup>xviii</sup> <https://www.ft.com/content/27c5bad2-4895-11e7-919a-1e14ce4af89b>

<sup>xix</sup> <https://www.ft.com/content/7f2f199a-0a5f-11e7-97d1-5e720a26771b>

<sup>xx</sup> <http://www.climatechange.org.uk/reducing-emissions/eu-climate-change-case-studies/>