Environment & Climate Regulation

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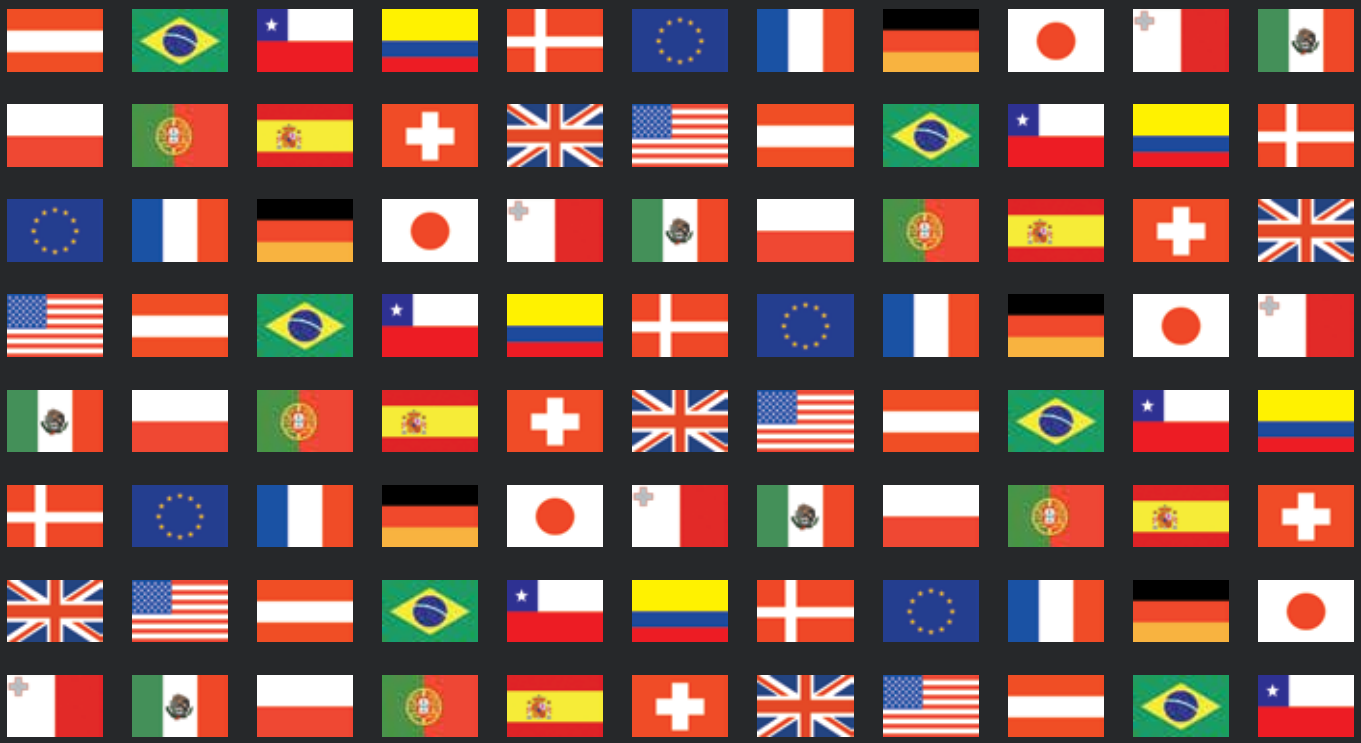

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GETTING THE DEAL THROUGH

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Environment & Climate Regulation 2016

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United States

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Main climate regulations, policies and authorities

1 International agreements

Do any international agreements or regulations on climate matters apply in your country?

The United States has increased its focus on both domestic and international climate change regulation. On 11 November 2014, the US struck a bilateral agreement with China under which both nations will seek to significantly reduce greenhouse gas (GHG) emissions. Under the agreement, the US pledged to reduce GHG emissions to 26–28 per cent below 2005 levels by 2025. The US also intends to participate in international negotiations to achieve a binding agreement on climate change at the United Nations Climate Change Conference (COP21), to be held in Paris in December 2015. On 31 March 2015, the US announced its commitment to reduce GHG emissions to 26–28 per cent below 2005 levels by 2025 as the basis for its 'Intended Nationally Determined Contribution' at COP21. That commitment is not yet binding but will provide a starting point for US negotiations at COP21.

The US previously ratified the United Nations (UN) Framework Convention on Climate Change on 15 October 1992, which became effective on 21 March 1994. The US signed the Kyoto Protocol on 11 December 1998, but it does not apply to the US as the US Congress did not ratify it.

2 International regulations and national regulatory policies

How are the regulatory policies of your country affected by international regulations on climate matters?

The US lacks a comprehensive policy to regulate GHG emissions at the national level. In the absence of a national change programme, US regulatory agencies have taken numerous sector-based actions to reduce GHG emissions and often look to international standards and data when designing domestic GHG programmes. For example, the US Environmental Protection Agency (EPA) often cites GHG emissions data and climate change research created by the UN's Intergovernmental Panel on Climate Change (IPCC). Similarly, EPA and the Federal Aviation Administration (FAA) traditionally have worked with the International Civil Aviation Organization (ICAO) to establish aircraft emissions standards. EPA currently is in the midst of a multi-year rulemaking process to align US GHG emissions standards for aircraft with those created by ICAO.

3 Main national regulatory policies

Outline recent government policy on climate matters.

Federal developments

Despite several promising attempts, the US Congress has failed to enact comprehensive climate change legislation. In the absence of legislation, President Obama has acted to reduce GHG emissions by using pre-existing regulatory authority, primarily under the federal Clean Air Act (CAA). On 25 June 2013, President Obama released his Climate Action Plan (CAP), which sets forth various goals for achieving domestic GHG reductions. While the CAP has no legal effect itself, it serves as a roadmap for the Obama Administration's climate change initiatives. The centrepiece of these initiatives, the Clean Power Plan, is discussed below. The Climate Action Plan also outlines current US strategy for deploying renewable energy, increasing energy efficiency, and spurring international action on climate change.

Federal climate change regulation

A series of regulatory actions and related court decisions has created a regulatory framework under which EPA regulates GHG emissions from various sectors. In 2007, the Supreme Court issued its seminal opinion in *Massachusetts v EPA*, finding that GHGs met the definition of 'air pollutant' under the CAA. The Court further held that EPA had authority to regulate GHG emissions from new motor vehicles, and was obligated to do so if the Agency determined that motor vehicle GHG emissions endangered public health and welfare. In 2009 EPA issued its 'Endangerment Finding,' determining that the six primary GHGs recognised by the UN reasonably may be anticipated to endanger public health and welfare. Concurrently, EPA determined that GHG emissions from motor vehicles contribute to pollution that endangers public health and welfare.

Transportation sector

The Endangerment Finding triggered a series of GHG regulatory efforts, beginning with EPA's 2010 issuance of GHG emission and fuel economy standards for new light-duty vehicles and engines starting with Model Year 2012 (the Tailpipe Rule). In September 2011, in coordination with the National Highway Traffic Safety Administration (NHTSA), EPA established fuel economy standards for light-duty cars and trucks in model years 2012–2016 (first phase) and 2017–2025 (second phase). Together, these standards are projected to result in an average industry fleet-wide level of 163 grams/mile of carbon dioxide (CO_2) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg).

In September 2011, EPA and NHTSA, in collaboration with the California Air Resources Board (CARB), also established GHG emissions and fuel economy standards for medium- and heavy-duty trucks. Phase one of this programme covers vehicles built for the 2014 to 2018 model years and is estimated to reduce CO_2 emissions by about 270 million metric tons (MMT) over the life of those vehicles. A proposal for Phase 2 of this program is currently pending. Phase 2 would begin in the model year 2021 (model year 2018 for truck trailers) and culminate in standards for model year 2027. EPA estimates that these standards could reduce GHG emissions by about 1 billion MMT.

Electric power sector

When the Tailpipe Rule took effect in January 2011, GHGs became a 'regulated pollutant' under the CAA. Accordingly, EPA undertook various rulemaking processes to incorporate GHG emissions into programmes applicable to stationary sources, which include the Title V operating permit programme and the Prevention of Significant Deterioration (PSD) programme. These permitting programmes are discussed further in question 10.

In the wake of *Massachusetts v EPA*, a coalition of states and environmental groups sued EPA to compel the agency to issue performance standards for GHG emissions from fossil fuel-fired power plants. In 2010, EPA agreed to propose and finalised two separate New Source Performance Standards (NSPSs) for CO_2 emissions, one for existing electric generating units (EGUs), and another for new, modified and reconstructed EGUs. EPA issued initial proposals for new sources in 2012 and 2013. However, in conjunction with the CAP, President Obama instructed EPA to re-propose new source GHG standards and to issue GHG performance standards for existing power plants. In August 2015, this process culminated with the issuance of the Clean Power Plan (CPP), which establishes the GHG NSPS for existing power plants, and the GHG NSPS for new, modified and reconstructed EGUs.

Existing EGUs – the Clean Power Plan

The CPP is the most significant US action on climate change at the national level to date. Relying on section 111(d) of the CAA, the CPP establishes GHG emissions standards for existing fossil fuel-fired power plants. These emissions standards are based on the Best System of Emission Reduction (BSER) as determined by EPA. Under the CPP, EPA has defined BSER as consisting of three 'building blocks':

- improving operating efficiency at affected power plants;
- substituting generation from lower-emitting EGUs for generation from higher-emitting EGUs; and
- increasing renewable energy generating capacity to displace power generated by fossil fuel-fired power plants.

These building blocks are applied to each state's unique energy mix to calculate a state-specific GHG emissions rate target. To encourage and enable cap-and-trade programmes as a compliance mechanism, EPA also issued statewide mass-based standards that are extrapolated from the rate-based standards and reflect baseline generation in each state.

States must develop State Implementation Plans (SIPs) to achieve their respective GHG emission reduction goals at either the individual power plant level or on a statewide basis. States have considerable flexibility to design compliance measures, which may include cap-and-trade programmes, renewable power programmes, individual plant emissions limitations, energy efficiency measures, and other mechanisms to reduce overall GHG emissions from the power sector. States are permitted to propose plans that allow for interstate trading without formally entering into multi-state plans, which reduces the logistical barriers for states that generally wish to participate in trading but do not want to develop or participate in a formal multi-state plan.

States must submit final plans to EPA by 6 September 2016, although they may request a two-year extension to 6 September 2018. Under the CAA, EPA has one year from the date of submission to approve or reject state plans. In theory, this means that the latest date for CPP SIP approval is 6 September 2019. States that fail to submit an approvable plan are subject to a federal implementation plan issued by EPA, which, as currently proposed, would require those states to participate in a GHG emissions trading programme. States must begin implementing their plans in 2022, must meet the interim target based on their average emissions over 2023–2029, and must achieve their final targets by 2030. The CPP also contains three interim GHG emissions goals, benchmarked for the periods of 2022–2024, 2025–2027 and 2028–2029.

Extensive litigation is expected over the validity and scope of the CPP. Within hours of release, various industry groups and numerous states announced that they would bring legal challenges to the CPP. (In September 2015, the US Court of Appeals for the District of Columbia (DC Circuit) denied the first of these challenges to the CPP, a request by a dozen states and an industry coalition for an emergency writ to stay implementation of the rule.) Opponents of the CPP argue that EPA lacks authority to regulate existing power plant CO_2 emissions under relevant CAA provisions, and that even if EPA could regulate such emissions, it has overreached by defining BSER too broadly. It is widely expected that various environmental groups and states will also enter the fray to defend the CPP, and many observers expect that the US Supreme Court will eventually determine the fate of the regulation. But at present, states must proceed with developing and implementing their plans.

New, modified and reconstructed EGUs

Concurrent with its release of the CPP, EPA released a final rule to limit GHG emissions from new, modified, and reconstructed EGUs. EPA's final rule for new EGUs not only serves as a stand-alone regulation, but also provides the legal underpinning for issuance of the CPP. Under EPA's interpretation of the CAA, a 111(b) rule for EGUs is necessary to trigger the authority to issue the 111(d) rule.

EPA's final NSPS rule limits GHG emissions from new, modified, and reconstructed EGUs. The new-source rule is also based on the concept of BSER, and establishes separate GHG performance standards for coal- and natural gas-fired power plants. New coal-fired EGUs must emit no more than 1,400lbs CO_2/megawatt hour (MWh), while almost all new natural gas-fired EGUs must emit no more than 1,000lbs CO_2/MWh. The coal-fired EGU standard will almost certainly require the use of at least partial carbon capture and storage (CCS) technology, since even the most advanced type of coal plants achieve a CO_2 emission rate of around 1,700–1,800lbs/MWh. The standard applicable to natural gas-fired power plants is achievable using advanced natural gas combined cycle (NGCC) technology. EPA forecasts that its new-source standards will have limited cost and GHG impacts through 2022, given the low price of natural gas and limited interest in constructing new coal-fired power plants in the US.

Biomass

In 2011, EPA published a final rule that deferred GHG permitting requirements for biomass-fired and other biogenic sources until 21 July 2014 (Deferral Rule). This rule had the effect of temporarily exempting these sources from GHG permitting under the PSD and Title V programmes. However, on 12 July 2013, the DC Circuit Court vacated the Deferral Rule, which removed the temporary exemption and subjected biomass facilities to GHG permitting. While the court held that EPA had not adequately justified its decision to exempt biomass emissions temporarily, it left open the possibility that EPA could permanently exempt biomass from GHG permitting if EPA could identify proper CAA authority to do so. Biomass industries and energy producers have asked EPA to create such a permanent exemption; in the interim, biomass issues are being handled individually during the Title V and PSD permitting processes.

EPA also is in the midst of a process to evaluate the impact of biogenic CO_2 emissions from stationary sources. In November 2014, EPA released its 'Revised Framework for Assessing Biogenic CO_2 Emissions from Stationary Sources', which incorporates information from the scientific community and other stakeholders. EPA plans to continue refining this assessment through a second round of peer review with the Science Advisory Board (SAB).

The CPP did little to clarify the role of biomass. The CPP generally provides that states may rely on 'qualifying biomass' to meet their state goals, but that such use will require demonstrations by the state that the biomass feedstocks contribute to net reductions in CO_2 emissions. EPA did not provide robust standards for assessing biomass emissions and instead left it to the states to assess the CO_2 emissions benefits of different biomass feedstocks. The CPP also references sustainable forestry and agriculture as tools for reducing dependence on fossil fuels, but does not incorporate a specific role for biomass in state implementation plans. As a result, the precise role of biomass in the US remains uncertain, at least until EPA develops a broader biomass rule or a comprehensive biogenic CO_2 emissions accounting mechanism.

Oil and gas sector

In 2012, EPA promulgated New Source Performance Standards for the Crude Oil and Natural Gas Production source category that regulate volatile organic compound emissions from gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels and leaking components at natural gas processing plants, and sulphur dioxide emissions from natural gas processing plants. EPA revised these standards in 2013, 2014 and early 2015. EPA also enacted revisions to the National Emission Standards for Hazardous Air Pollutants for Oil and Natural Gas Production Facilities. While not directly regulating GHGs, EPA predicted that these regulations would result in significant climate co-benefits due to anticipated methane reductions.

In the spring of 2014, President Obama released a 'Strategy to Reduce Methane Emissions' that identified key sources of methane emissions (landfills, coal mines, agriculture, and the oil and gas sector) and set forth a plan to reduce GHG emissions from those sources. In January 2015, the Obama Administration announced a new goal to cut methane emissions from the oil and gas sector by 40 per cent to 45 per cent over the next decade. On 27 August 2015, EPA issued a proposal that would create NSPS for methane. The rules apply NSPS requirements to hydraulically fractured oil well completions, fugitive emissions from well sites and compressor stations, and pneumatic pumps. The proposed rule also would add methane standards for hydraulically fractured gas well completions and equipment leaks at natural gas processing plants. EPA plans to issue final methane standards in 2016.

Energy efficiency

To date, national-level energy efficiency policies have relied more on voluntary and cooperative measures than legislative mandates, though there are a few exceptions. On 30 April 2015, President Obama signed a bill designed to improve building efficiency standards. Reflecting more modest aspirations than previously proposed energy efficiency bills, this recent legislation may nonetheless indicate a growing bipartisan consensus on energy efficiency. Despite the lack of significant national mandates,

energy efficiency has gained significant traction in the US as a mechanism for avoiding increased energy consumption and reducing GHG emissions.

President Obama has undertaken a series of executive actions designed to raise awareness and increase energy efficiency in the US. For example, the Office of Energy Efficiency and Renewable Energy (EERE) supports research into energy-saving technologies for deployment across the residential, manufacturing and building sectors. In addition, the US Department of Energy (DOE) runs the Federal Energy Management Program, which focuses on reducing energy consumption and increasing the proportion of renewable energy utilised at federal agencies. The DOE also runs a 'Better Buildings' programme, with a goal of increasing building energy efficiency by 20 per cent over the next decade across the commercial, public, industrial, and residential sectors. This cooperative programme focuses on outreach, knowledge transfer, and market-driven energy efficiency solutions. On 30 August 2012, President Obama signed an executive Order on 'Accelerating Investment in Industrial Energy Efficiency', which focuses on increasing combined heat and power (CHP) systems, establishing a national goal of creating 40 gigawatts of new CHP capacity by 2020. Through these and other programmes, the federal government creates incentives and provides support for energy efficiency and related technologies.

Many US states also are pursuing energy efficiency strategies. Twenty-four states have enacted Energy Efficiency Resource Standards (EERS) or other binding energy savings targets. Several other states have non-binding programmes, or aspirational programmes with very low efficiency targets. State programmes take a variety of approaches, but often mandate or incentivise demand-side energy efficiency programmes run by state and local electric utility companies. EERS vary widely, but generally target incremental energy efficiency gains of 0.5 to 2.5 per cent annually. EERS and other similar programmes are driving significant investment in energy efficiency technologies, software and services in many US states.

Regional climate change programmes

The Regional Greenhouse Gas Initiative (RGGI) encompasses the eastern states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont. Collectively, RGGI states account for about 20 per cent of the US gross domestic product. RGGI was the first market-based GHG reduction scheme in the US and operates a cap-and-trade programme covering the power sector. RGGI lowered its GHG emissions cap beginning in 2014, to 91 million short tons, with annual follow-on decreases of 2.5 per cent from 2015 to 2020. Membership in RGGI is voluntary and subject to change. New Jersey withdrew from RGGI in 2011, while Pennsylvania's current governor supports joining RGGI. As states seek mechanisms for complying with the CPP, additional states may consider joining RGGI. RGGI and related issues are discussed further in questions 12 to 15.

The Western Climate Initiative (WCI) launched in 2007, but after many years of work by certain states in the US and provinces in Canada it has yet to develop into a functioning programme and appears unlikely to do so. It did lead to the development of WCI, Inc, a non-profit corporation that provides administrative and technical services to the GHG emission allowance trading schemes of California and Quebec.

State climate change programmes

California's Global Warming Solutions Act, also known as AB 32, was signed into law on 27 September 2006. AB 32 established a mandate to reduce GHG emissions to 1990 levels by 2020 and granted broad authority to CARB to develop and implement a broad strategy to achieve that goal. That strategy is set forth in CARB's Scoping Plan, which summarises the state's diverse set of GHG emission reduction programmes (several of which are administered by state agencies other than CARB). These include programmes in nearly every sector of the economy, including energy (eg, regional balancing markets, efficiency), transportation (eg, zero emission vehicles, low carbon fuel standard, high-speed rail system), agriculture (eg, methane capture standard), water (eg, conservation programmes), waste management (eg, eliminate disposal of organic material at landfills), and natural lands (eg, forest carbon plan). In CARB's 2014 updated Scoping Plan, the 2020 cap on annual GHG emissions was set at 431 million short tons, which CARB calculates as an emission reduction goal of 78 million short tons below predicted 2020 'business as usual' emissions (509 million short tons).

Although it accounts for only about 30 per cent of the emission reductions under the Scoping Plan (23 of the 78 million), the central feature is a multi-sector cap-and-trade GHG emissions programme, which was first implemented in 2013. The programme creates the second-largest carbon market in the world, after the European Union's, and covers 85 per cent of all GHG emissions in California. The programme began with the power and industrial sectors, and in 2015 expanded to cover transportation and heating fuels. (See below.) AB 32 mandates GHG emission reductions by 2020 only. Executive orders establish further GHG emission reduction goals of 40 per cent below the 1990 level by 2030 and 80 per cent below that level by 2080. A bill to codify these goals in a statute narrowly failed to pass in 2015 but will likely come up again in 2016. In 2015 the state did adopt the Clean Energy and Pollution Reduction Act, also known as SB 350, which establishes statewide goals for 2030 of 50 per cent electricity generation from renewable resources (ie, a renewable portfolio standard of 50 per cent) and doubling energy efficiency in electricity and natural gas usage (in effect, a 'green buildings' initiative). A third goal of a 50 per cent reduction in petroleum use was removed from the bill and not adopted.

Following California's lead, Massachusetts and Connecticut also have enacted GHG emission reduction legislation. The Massachusetts Global Warming Solutions Act, enacted in 2008, targets a reduction in statewide GHG emissions of 25 per cent from 1990 levels by 2020, and an 80 per cent reduction from 1990 levels by 2050. The legislation is not self-implementing, but instead creates a framework for reducing GHG emissions from various sectors, such as electricity, transportation and buildings. Somewhat less ambitious, Connecticut's Global Warming Solutions Act, also adopted in 2008, targets a reduction of statewide GHG emissions of 10 per cent from 1990 levels by 2020, with an 80 per cent reduction from 2001 levels required by 2050. These laws are driving increased action in Massachusetts and Connecticut in a variety of areas, including a focus on renewable energy development, energy efficiency, and reduction of fossil fuel use. Other states have implemented less ambitious programmes aimed at reducing GHG emissions, primarily related to the power sector. For example, Oregon, Montana, Washington, New York, Illinois and Minnesota all have enacted some form of requirements related to GHG emissions from new electric generating facilities.

4 Main national legislation

Identify the main national laws and regulations on climate matters.

As discussed in question 3, the US lacks any national climate change legislation. See question 3 for a discussion of US regulatory activities. See question 19 for a discussion of renewable energy policies and programmes.

5 National regulatory authorities

Identify the national regulatory authorities responsible for climate regulation and its implementation and administration. Outline their areas of competence.

EPA is the primary national regulatory authority with responsibility for climate regulation. EPA's authority includes promulgation and enforcement of CAA standards for GHG emissions for both mobile and stationary sources; GHG reporting programmes; adaptation to a changing climate; and protection of drinking water aquifers under the federal Safe Drinking Water Act with regard to CCS underground injection technologies.

The National Environmental Policy Act (NEPA) requires federal agencies to consider potential environmental impacts associated with major federal actions that may significantly affect the environment. The Council on Environmental Quality (CEQ) is charged with ensuring federal agencies comply with NEPA. On 18 February 2010, CEQ issued Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions to help federal agencies address climate change impacts under NEPA. Although the comment period closed in May 2010, CEQ has not finalised the guidance. Nonetheless, several federal agencies have developed internal guidance to facilitate analysis of climate change under NEPA. In practice, most federal agencies now consider climate change during the NEPA process.

In July 2015, the US Government Interagency Working Group on the Social Cost of Carbon revised the social cost of carbon (SCC) estimates to reflect updates to the underlying models. As an example, using 2015 emissions and a 3 per cent discount factor, the SCC is US$36. The SCC, which was designed for federal agencies to utilise in cost-benefit analyses of regulatory actions that impact cumulative global emissions, sets the incremental cost to society of each metric ton of CO_2 emitted and varies

by emissions year and assumed discount rate. This SCC has been widely criticised by industry as having been increased without appropriate public process or analysis.

General national climate matters

6 National emissions and limits

What are the main sources of emissions of greenhouse gases (GHG) (or other regulated emissions) in your country and the quantities of emissions from those sources? Describe any limitation or reduction obligations. Do they apply to private parties in your country?

The most recent comprehensive GHG emissions data for the US is EPA's 2015 'Inventory of US Greenhouse Gas Emissions and Sinks', which covers the period from 1990 through 2013. Mandatory GHG reporting began in 2011 for certain industries and in 2012 for others. As a result, EPA's 2015 report includes robust GHG emissions data from various sectors of the US economy. EPA estimates that its inventory now covers about 85 to 90 per cent of US GHG emissions. According to EPA's 2015 report, total US GHG emissions were 6,673.0MMT of CO_2 equivalent (CO_2e) in 2013. Leading sector-based emissions (in MMT CO_2e) are as follows: electricity generation, 2,039.8; transportation, 1,718.4; industrial, 817.3; residential, 329.6; commercial, 220.7. Other sectors were less significant. While CO_2 emissions are the largest source of total GHG emissions in the US, in 2013 methane emissions across various sectors accounted for 636.3MMT CO_2e, nitrous oxide accounted for 355.2MMT CO_2e, and hydrofluorocarbons accounted for 163.0MMT CO_2e. Other types of GHG emissions were less significant.

In 2013, the US experienced a 2 per cent increase in GHG emissions from 2012, primarily due to an increase in the carbon intensity of electricity generation. In addition, a cold winter across much of the US led to an increase in residential and commercial heating, while an increase in industrial production led to an increase in industrial sector emissions. The US remains a large contributor to global GHG emissions. Globally, EPA estimates that 32,310MMT CO_2 were added to the atmosphere through fossil fuel combustion in 2012, with the US contributing about 16 per cent.

GHG emissions standards apply to private commercial entities to the extent that entity is subject to regulation by the relevant national or state authority. See question 3 for a discussion of GHG emission limitations.

7 National GHG emission projects

Describe any major GHG emission reduction projects implemented or to be implemented in your country. Describe any similar projects in other countries involving the participation of government authorities or private parties from your country.

At the federal level, GHG emission reductions are primarily driven by CAA regulation, which does not currently contemplate emissions reduction projects or carbon offsets as compliance mechanisms. See question 3 for a discussion of GHG regulations, permitting requirements, and related GHG emission reductions. RGGI and California's AB 32 both establish a system for GHG emission reductions. Carbon offsets are one component of complying with California's GHG reduction scheme, and are generated through several approved methodologies. See questions 3 and 12 to 15 for a broader discussion of RGGI and California's programme. See question 19 for a discussion of renewable energy policies.

Domestic climate sector

8 Domestic climate sector

Describe the main commercial aspects of the climate sector in your country, including any related government policies.

Commercial climate business in the US is fragmented, largely due to the lack of comprehensive national climate change regulation. The CPP, discussed in question 3, may help to consolidate and increase the commercial climate sector. At present, the main drivers of the US climate sector are emissions credit trading under RGGI; emissions credit and offset trading under California's AB 32; and biofuel requirements and related credit trading. Emissions trading and commercial aspects of RGGI and California's AB 32 are discussed in questions 3 and 12 to 15; biofuels are discussed in question 24. See question 19 for a discussion of the renewable power sector.

General GHG emissions regulation

9 Regulation of emissions

Do any obligations for GHG emission limitation, reduction or removal apply to your country and private parties in your country? If so, describe the main obligations.

Various national, regional and state programmes exist in the US to regulate GHG emissions. See question 3 for a comprehensive discussion of US GHG emissions regulations.

10 GHG emission permits or approvals

Are there any requirements for obtaining GHG emission permits or approvals? If so, describe the main requirements.

Certain stationary sources are required to obtain Title V operating permits and PSD permits for GHG emissions. These CAA programmes are overseen and enforced by EPA. Under the CAA's 'cooperative federalism' approach, most states manage GHG permitting in conjunction with any applicable state laws or programmes. Typically, any applicable NSPS GHG emissions limits (such as those imposed by the CPP or new source NSPS programme) will be incorporated into a facility's Title V operating permit.

The CAA's permitting thresholds of 100 or 250 short tons per year are so low that, when applied to GHGs, that they would sweep hundreds of thousands of very small sources into the GHG permitting programme. Recognising that this result would be contrary to Congressional intent and unnecessarily burdensome, EPA issued a 'Tailoring Rule' in 2010 that attempted to rationalise permitting thresholds in the GHG context by setting the PSD and Title V applicability thresholds at 100,000 short tons per year for new and existing sources. Various groups challenged the Tailoring Rule and on 23 June 2014 the Supreme Court partially vacated the rule, holding that EPA had exceeded its statutory authority in adjusting the permitting thresholds for GHG purposes. As a result of this decision, stationary sources are now subject to GHG permitting requirements only if they would have been subject to CAA permitting requirements 'anyway', based on emissions of other pollutants. These 'anyway' sources account for the vast majority of stationary source GHG emissions in the US. EPA and state air agencies are adjusting their GHG permitting programmes to comply with the Court's decision. The current permitting threshold for GHG 'anyway' sources under Title V and PSD permitting is 75,000 short tons of CO_2e per year for new and existing sources, and for modifications resulting in a net GHG emissions increase equal to or greater than 75,000 short tons per year. EPA is continuing to develop its GHG permitting programme and strengthen the underlying legal basis.

When obtaining permits under the PSD programme, including new source review (NSR) permits, sources must evaluate available emissions reductions options to determine the 'best available control technology' (BACT) for that facility. BACT determinations are made on a case-by-case basis considering energy, environmental, and economic impacts, and other costs. Over time, technological advancements increase the degree of attainable emissions reductions. EPA has issued guidance as to relevant BACT considerations for various industry sectors and maintains a database of BACT determinations for GHG emissions and other pollutants.

11 Oversight of GHG emissions

How are GHG emissions monitored, reported and verified?

EPA's mandatory Greenhouse Gas Reporting Rule requires reporting of GHG data and other relevant information for facilities in 41 source categories. Among other sectors, the GHG reporting programme applies to power plants, petroleum and natural gas systems, refineries, and the chemicals, waste, metals, minerals, and pulp and paper industries. In general, the rule covers US sources that emit 25,000 short tons or more CO_2e per year. Data is submitted electronically and EPA has processes for identifying potential errors and verifying data. EPA compiles reported GHG to create its annual GHG inventory for the US. Compliance for covered sources is mandatory, and administrative, civil or criminal penalties may apply for violations.

Several states also have implemented GHG reporting rules, and the reporting thresholds differ by state. For example, Massachusetts' GHG

reporting rule is triggered for any facility that emits more than 5,000 short tons of CO_2e per year. California's regulation requires GHG reporting for certain industrial facilities, fuel suppliers, and electricity importers that emit 10,000 short tons of CO_2e per year. (Entities that emit more than 25,000 short tons of CO_2e per year are also covered by the state's cap-and-trade programme.) Entities must comply with both federal and state GHG reporting requirements, if applicable.

GHG emission allowances (or similar emission instruments)

12 Regime

Is there an GHG emission allowance regime (or similar regime) in your country? How does it operate?

There is no GHG allowance regime at the federal level. RGGI and California operate cap-and-trade programmes with associated emissions allowance regimes.

RGGI is limited to the power sector and uses an allowance system for compliance; electric power generators subject to RGGI are required to hold CO_2 allowances equal to the amount of CO_2 they emit in a given compliance year. Each RGGI state issues allowances in an amount defined by each state's applicable law or regulation implementing RGGI. Collectively, these allowances comprise the annual RGGI cap. For several years, the RGGI cap existed at a level that exceeded demand. Following a programme review in 2012, RGGI lowered its cap to 91 million short tons for 2014, with an annual reduction of approximately 2.5 per cent until it reaches approximately 91 million short tons in 2020. Other mechanisms are in place to account for surplus allowances issued from 2009 to 2013. The RGGI 2015 cap is 88.7 million short tons, and the RGGI 2015 adjusted cap is 66.8 million short tons. The adjusted cap of 66.8 million reflects the total the number of CO_2 allowances allocated by RGGI in 2015. One unique feature of RGGI is that allowances are distributed primarily through quarterly auctions. After the cap adjustments took place, the average auction clearing price increased for RGGI allowances increased markedly, from US$2.92 in 2013 to US$4.72 in 2014. Through the end of 2014, RGGI had conducted 26 successful allowance auctions, selling 729 million allowances for US$1.9 billion. RGGI also utilises a cost containment reserve system to allocate and auction additional allowances when needed to limit price volatility.

California's cap-and-trade programme is administered by CARB as a central feature of its GHG emission reduction plan under AB 32. Under this programme, which began in 2013, CARB sets an annual cap on GHGs and issues a limited number of emission allowances, each of which authorises its holder to emit one MT CO_2e. The number of available allowances is limited by the cap, and declines by approximately 3 per cent each year. In 2013, when the programme was limited to the power and large industrial sectors, the cap was set at 162.8MMT; in 2015, with the addition of transportation and heating fuels, the cap was set at 394.5MMT; in 2020 the cap will be ratcheted down to 334.2MMT. Entities that emit 25,000MT CO_2e annually are obliged to surrender a certain number of compliance instruments to CARB each year, consistent with each entity's reported emissions. Compliance instruments consist primarily of allowances, which can be purchased from CARB at quarterly auctions. In addition, up to 8 per cent of a covered entity's obligation can be met with CARB-certified offsets. Both allowances and offsets also may be bought and sold on the secondary market, subject to certain restrictions.

CARB exercises broad oversight over this market, much as the federal Securities and Exchange Commission supervises markets for financial instruments in the United States. Covered entities are required to disclose substantial information to CARB, including information about corporate ownership and affiliates, directors and officers, high-level employees, and legal and market-strategy advisers.

California's cap-and-trade programme has survived several litigation challenges to date, though one significant case challenging the auction programme as an illegal tax is still pending before an intermediate appellate court. A decision is anticipated some time in 2016.

In 2014, California's cap-and-trade programme is linked with that of the Canadian province of Quebec, meaning that allowances issued by either jurisdiction may be used by entities in both. California conducted eight quarterly allowance auctions before linking with Quebec and the two jurisdictions have held four joint quarterly auctions since the first one in November 2014. The Canadian province of Ontario began developing a cap-and-trade programme in 2015 and it is anticipated that it will link with California in 2016. Other states in the US could develop cap-and-trade programmes in response to the CPP, and if so they also may link with the California-Quebec programme.

13 Registration

Are there any GHG emission allowance registries in your country? How are they administered?

There is no GHG allowance regime at the federal level. The registry for RGGI allowances is called the 'CO_2 Allowance Tracking System' (RGGI-COATS). Each RGGI allowance has a unique serial number, and is registered in RGGI-COATS, which then tracks initial ownership, transfer and retirement of allowances. California and other linked jurisdictions utilise the Compliance Instrument Tracking System Service (CITSS) as an allowance registry. CITSS tracks the issuance, initial ownership, transfer and retirement of allowances and offsets.

14 Obtaining, possessing and using GHG emission allowances

What are the requirements for obtaining GHG emission allowances? How are allowances held, cancelled, surrendered and transferred? Can rights in favour of third parties (eg, a pledge) be created on allowances?

There is no GHG allowance regime at the federal level. See questions 12 and 13 for a description of state and regional emissions allowances.

Trading of GHG emission allowances (or similar emission instruments)

15 Emission allowances trading

What GHG emission trading systems or schemes are applied in your country?

There is no national GHG allowance regime or national-level emission trading system.

Any qualified party can participate in RGGI allowance auctions; auction rules limit the number of allowances that associated entities may purchase in a single auction to 25 per cent of the total allowances offered for auction. RGGI allowances also are traded on a secondary market, along with associated futures and options contracts. The RGGI-COATS registry facilitates this market by providing for allowance transfers.

California (jointly with Quebec since 2014) conducts quarterly auctions of GHG emission allowances. Both entities that are covered by California's cap-and-trade programme as well as others that opt into the programme can participate in the auctions. In addition, a certain number of allowances are allocated directly by CARB to certain entities (principally in-state manufacturers and electric utilities), with free allocation decreasing over time. Since California's initial auction, allowance prices have stabilised somewhat and trading volume has increased. There is a robust secondary market for California carbon allowances and offsets. Options and futures are also traded in the secondary marketplace, with 2015 prices in the range of US$11 to US$13 per allowance. Given California's aggressive GHG reduction goals, many market observers have projected significant price increases in the years ahead.

CARB's cap-and-trade programme also includes numerous features intended to provide flexibility to regulated entities and to prevent excessive volatility. In addition to offsets, these include floor and ceiling prices for the allowance auctions, a cost containment reserve, and banking and borrowing provisions.

16 Trading agreements

Are any standard agreements on GHG emissions trading used in your country? If so, describe their main features and provisions.

In October 2013, the International Emissions Trading Association released a trade agreement template for California allowances and offsets. Its provisions address offset invalidation, holding limits and buyer liability provisions. As of September 2015, there is no standard RGGI emissions trading agreement.

Sectoral regulation

17 Energy production, use and efficiency

Give details of (non-renewable) energy production and consumption in your country. Describe any regulations on GHG emissions. Describe any obligations on the state and private persons for minimising energy use and improving efficiency. Describe the main features of any scheme for registration of energy savings and for trade of related accounting units or credits.

The US Energy Information Administration (EIA) compiles data and statistics on renewable and non-renewable energy production in the US; more information is available at www.eia.gov. See question 3 for a discussion of emissions regulations and energy efficiency.

Crude oil
In 2014, the US produced 3,180,813 thousand barrels of crude oil, imported 2,677,911 thousand barrels of crude oil and 229,168 barrels of finished petroleum products, and consumed 6,947,717 thousand barrels of crude oil and petroleum products.

Natural gas
In 2014, there were 31,895,427 million cubic feet of gross withdrawals of natural gas in the US, and the US consumed 26,818,618 million cubic feet of natural gas.

Coal
In 2013, the US produced 983,963 thousand short tons of coal and exported 117,659 thousand short tons. In 2013, total US coal consumption was about 924,442 thousand short tons of coal, divided among the following sectors:
- electric power: 857,962;
- commercial and institutional: 1,951;
- coke plants: 21,474; and
- other industrial: 43,055.

Nuclear
In 2014, the US produced 4,891,332lbs of uranium concentrate (U_3O_8) and nuclear power plants generated 767,067 thousand MWh of electricity.

In 2010, the DOE announced a series of loan guarantees to support construction of two advanced nuclear reactors at the Alvin W Vogtle Electric Generating Plant in Georgia; the final US$1.8 billion loan closed on 24 June 2015. Significantly, the Vogtle project is the first new nuclear power plant to be licensed and begin construction in the US in over three decades.

Emissions
According to EPA, total US anthropogenic GHG emissions in the US in 2013 were 6,742.2MMT CO_2e, representing a 1.8 per cent increase from 2012. See question 6 for additional GHG emissions information. See question 11 for a discussion of EPA's GHG reporting programme.

18 Other sectors

Describe, in general terms, any regulation on GHG emissions in connection with other sectors.

Climate regulation in the US has focused primarily on the power and transportation sectors, although certain industrial sectors are subject to GHG reporting and permitting requirements. Permitting requirements may also apply to stationary sources in other source categories including, among others:
- large industrial/commercial/institutional boilers;
- pulp and paper;
- cement;
- iron and steel industry;
- refineries;
- nitric acid plants; and
- landfills.

See section 3 for a discussion of applicable regulations; see section 10 for a discussion of related GHG permitting requirements. California's climate change programme is economy-wide; see section 3 for a further discussion of AB 32.

In July 2015, EPA released a proposed rule related to GHG emissions from aircraft. The rule proposes to find that GHG emissions from certain classes of aircraft engines, including those used by most large commercial aircraft, contribute to the air pollution that causes climate change and endangers public health and welfare. EPA is not currently proposing aircraft engine GHG emission standards, but is working to align any eventual standards with those issued by ICAO.

Renewable energy and carbon capture

19 Renewable energy consumption, policy and general regulation

Give details of the production and consumption of renewable energy in your country. What is the policy on renewable energy? Describe any obligations on the state and private parties for renewable energy production or use. Describe the main provisions of any scheme for registration of renewable energy production and use and for trade of related accounting units or credits.

The US does not have a comprehensive national policy on renewable energy production or use. Instead, a patchwork of federal and state programmes and incentives drive the renewable power sector in the US.

Twenty-nine states, plus Washington, DC, have enacted binding renewable portfolio standards (RPS). Several other states have non-binding RPS programmes. State RPS programmes operate by setting renewable energy targets for each year and requiring electric utility companies to achieve that level of renewable power. As a result, RPS programs are the primary drivers for renewable energy investment in the US and are spurring significant investment in renewable energy infrastructure in many states. Renewable energy targets vary widely by state, but typically are in the range of 10 to 25 per cent. A few states, such as California and Hawaii, have much higher targets; in September 2015 California increased its RPS goal to 50 per cent by 2030. About 16 states also have separate targets for solar energy, often referred to as a 'solar carveout'.

RPS compliance is usually managed through a system of tradeable renewable energy credits (RECs), with one REC representing one MWh of renewable power. In general, RECs are registered by state agencies and are tradeable instruments. Most state programmes require compliance through use of RECs or renewable power generated in-state, with limited exceptions, and eligible renewable resources and definitions can vary widely by state. This results in fragmented REC markets with prices varying widely by state and resource type. According to the DOE's Green Power Network, REC prices range from about US$1 (in Texas and Washington, DC) to about US$50 (in Massachusetts and several other states). Solar RECs (SRECs) range from about US$50 to a high of nearly US$500.

In addition to mandatory RPS programmes, 'green power' programmes allow US energy consumers (typically residential and commercial) to purchase renewable or 'green' power from their utility company or independent power supplier. Energy suppliers purchase RECs on the voluntary market to meet green power demand. There were over 5.4 million green power customers in 2013, accounting for over 62 million MWh. Voluntary REC supply is dominated by wind, though solar is increasing its market share. Prices for voluntary RECs hover around US$1/MWh, significantly lower than most RECs purchased for compliance purposes.

Forty-four states plus Washington, DC have implemented net metering programmes, which allow grid-connected customers with renewable energy systems installed on their property to offset their electrical usage and sell excess electricity to their utility. Several states have also implemented feed-in-tariff programmes that provide a higher price to consumers generating certain types of renewable energy (typically solar). Net metering and feed-in-tariff programmes have aided the expansion of residential and commercial solar projects in the US.

At the federal level, the DOE's loan guarantee programme backs investment in renewable power, energy efficiency and commercial climate technologies. Loans backed by the DOE have supported investment in solar, wind, geothermal, nuclear and energy storage technologies, among others. In 2013, the DOE announced the availability of US$8 billion in loan guarantees for advanced energy projects that substantially reduce GHGs and other air pollution. More recently, in 2014, the DOE announced availability of US$4 billion in loan guarantees available for innovative renewable energy and energy efficiency projects in the US that reduce GHG emissions. On 23 June 2015, the DOE released a 'Supplement to Loan Guarantee Solicitation Announcement' that clarifies the scope of eligible projects.

Two federal tax credits also provide financial support for renewable energy facilities. The production tax credit (PTC) provides a tax credit for each kilowatt-hour (kWh) produced by eligible renewable power facilities. For eligible wind, geothermal, and 'closed-loop' bioenergy projects, the PTC provides a 2.3 cent per kWh incentive for the first 10 years of the facility's operation. The PTC also provides a lower tax credit of 1.1 cents per kWh for certain other eligible facilities, such as 'open loop' biomass (which utilise farm and forest wastes rather than dedicated energy crops), efficiency upgrades and capacity additions at existing hydroelectric facilities, landfill gas and municipal solid waste energy projects. Combined with state RPS programmes, the PTC has been a major driver of wind power development in the United States: between 2007 and 2014, US wind capacity nearly quadrupled. However, the PTC expired on 31 December 2014 and projects that were not under construction prior to 1 January 2015 are not eligible for the PTC. The wind energy sector, trade groups and non-governmental organisations currently are lobbying the US Congress to renew the PTC. In the meantime, uncertainty over the future of the PTC has created significant headwinds for growth and investment in the wind energy sector. The business energy investment tax credit (ITC) was significantly expanded in 2008. The ITC currently provides tax credits for capital investments in solar energy facilities (30 per cent of expenditures), fuel cells (30 per cent of expenditures), small wind turbines (30 per cent of expenditures), geothermal systems (10 per cent of expenditures), microturbines (10 per cent of expenditures) and CHP (10 per cent of expenditures). Credits are available for eligible energy systems placed in service on or before 31 December 2016, although some credits have caps or other restrictions. President Obama's 2015 budget proposed to modify and permanently extend both the PTC and the ITC, although both have faced republican opposition in Congress. More information on DOE's loan guarantee programme, the PTC and the ITC is available at www.energy.gov.

The federal government also is working to facilitate renewable power generation on public lands through a variety of programmes that are designed to streamline permitting and leasing. These programmes include, but are not limited to:

- The solar energy programme established by the Department of the Interior (DOI) and the Bureau of Land Management (BLM) facilitates approval and development of solar energy generation and transmission facilities on BLM-administered lands in six western states.
- The DOI's Renewable Energy Coordination Offices in four western states (Arizona California, Nevada and Wyoming) and smaller renewable energy teams in five other states (Colorado, Idaho, New Mexico, Oregon and Utah) expedite processing of applications for new renewable energy projects on public lands.
- The Bureau of Ocean Energy Management (BOEM) is working to identify and lease offshore wind energy areas for commercial wind energy development. On 31 July 2013, BOEM auctioned a wind energy area off the coasts of Rhode Island and Massachusetts, the first competitive lease sale in the US for an offshore wind project.
- President Obama issued a memorandum on 7 June 2013 that directs federal agencies to review and likely expand existing energy transmission corridors. The memorandum seeks to reduce overall regulatory burden by creating a framework for collaboration between agencies.

As a result of these and other measures, along with declining prices for renewable technologies, the US renewable power sector is expanding rapidly. In 2014, the US produced 539,809 thousand MWh of renewable power, as follows:

- conventional hydroelectric: 258,749 thousand MWh;
- wind: 181,791 thousand MWh;
- geothermal: 16,628 thousand MWh;
- woody biomass: 43,050 thousand MWh;
- other biomass: 21,269 thousand MWh; and
- solar: 18,321 thousand MWh.

20 Wind energy

Describe, in general terms, any regulation of wind energy.

Wind energy projects are subject to a range of federal, state and local environmental, land use and natural resources laws and regulations. Access to transmission also remains a significant constraint for many wind projects, since wind energy resources in the US are not always located near demand. Developing new or expanded transmission lines can increase the complexity of the above regulatory requirements. A utility-scale wind facility and related transmission facilities may require approvals under the following laws, depending on the scope and impact of the project:

- the National Environmental Policy Act;
- the Federal Lands Policy and Management Act;
- the Clean Water Act;
- the Clean Air Act;
- the Coastal Zone Management Act;
- the National Historic Preservation Act;
- the Endangered Species Act;
- the Bald and Golden Eagle Protection Act;
- the Migratory Bird Treaty Act;
- the Marine Mammals Protection Act;
- requirements imposed by the FAA and the Federal Communication Commission (FCC) pertaining to lighting, aircraft safety, signal interference, and other matters; and
- various state and local siting, land use and environmental laws and regulations.

For projects located on federal land (notably in the West), federal land management agencies such as BLM or the United States Forest Service may act as the primary permitting authority. In some states, one or more state agencies may have permitting authority. In other cases, the primary permitting authority for a wind facility is the local planning commission, zoning board, city council or county board. Offshore wind projects also must coordinate with the US Coast Guard during construction and to address any navigational hazards.

Renewable energy projects have seen significant litigation over environmental impacts and other issues. Litigation may involve local issues, such as noise, siting and site-specific impacts, or may implicate broader state or national policies. With respect to wind energy, impacts on birds are a frequent focus of litigation. For example, in 2013, the US Fish and Wildlife Service (FWS) issued a rule that provided for programmatic permits of 30 years in duration under the Bald and Golden Eagle Protection Act, allowing 'take' of bald or golden eagles incident to otherwise lawful activities. Under the Bald and Golden Eagle Protection Act, 'take' means, among other things, to wound, kill, molest or disturb protected birds. Wind turbines have the potential to take bald eagles and other birds by direct action (ie, death or injury due to a collision) or indirect action (ie, disturbing nesting, migration, or other behaviour). Environmentalists challenged the FWS rule, and on 11 August 2015, the US District Court for the Northern District of California issued an order invalidating the 30-year rule. As a result, for now, 30-year incidental take permits are no longer available to wind energy and other projects under the Eagle Act. Similar litigation has taken place under the Endangered Species Act and other laws.

Subsidies and incentive programmes for wind energy are discussed in question 19.

21 Solar energy

Describe, in general terms, any regulation of solar energy.

Large, utility-scale solar power projects face many of the same regulatory challenges that arise in the context of wind energy development. Depending on the size, location and technology, large solar energy projects may implicate a wide range of federal, state and local laws and be subject to litigation. Smaller commercial or residential solar systems, such as those commonly installed on rooftops, typically do not require major regulatory approvals. These projects must nonetheless comply with local building, zoning, land use and development regulations, and obtain any required permits. In some states, additional authorisation may be required for interconnection to the grid. Further authorisation may be required for feed-in tariff or net metering eligibility, or to qualify under a state's RPS programme. Subsidies and incentive programmes for solar energy are discussed in question 19.

22 Hydropower, geothermal, wave and tidal energy

Describe, in general terms, any regulation of hydropower, geothermal, wave or tidal energy.

The Federal Energy Regulatory Commission (FERC) issues licences for construction of new hydropower projects. During the permitting process, FERC and the applicant must assure compliance with the National Environmental Policy Act. In many cases, permittees also must obtain authorisations under various state and federal laws, including but not limited to the Clean Water Act, the Endangered Species Act, and other laws.

In some states, additional authorisation may be required for hydropower resources to qualify for RPS or net metering programmes.

The first commercial, grid-connected tidal energy project in the US was deployed off the coast of Eastport, Maine in July 2012. Several other wave and tidal energy projects are in developmental stages. FERC and the US Army Corps of Engineers may be involved in the permitting process for these hydrokinetic technologies, depending on location. Projects may implicate a range of laws, including but not limited to: the National Environmental Policy Act; the Clean Water Act; the Coastal Zone Management Act; the Endangered Species Act; the Marine Mammals Protection Act; and various other federal, state and local laws. The Energy Policy Act of 2005 authorised BOEM to issue leases, easements and rights of way to allow for renewable energy development on the Outer Continental Shelf, including those for wave, tidal and other hydrokinetic projects. Because these projects may cause navigational hazards, coordination with the US Coast Guard is often required.

Geothermal projects are regulated by a mix of federal and state agencies, with requirements varying by state and whether the project is located on state, federal or private land. The Geothermal Steam Act of 1970 requires the DOI to establish rules and regulations for the leasing of geothermal resources on lands managed by federal agencies. These regulations are issued by the Bureau of Land Management. Existing EPA Underground Injection Control Regulations under the federal Safe Drinking Water Act define Class V injection wells to include injection wells associated with the recovery of geothermal energy.

23 Waste-to-energy

Describe, in general terms, any regulation of production of energy based on waste.

The US has 86 waste-to-energy facilities that combust municipal solid waste. No new waste-to-energy plants have been built in the US since 1995, but some plants have expanded. Collectively, these 86 facilities have the capacity to produce 2,720 megawatts of power per year. As combustion units, waste-to-energy systems are subject to regulatory requirements that are similar to fossil-fuel fired power plants. In some cases, those requirements may be even more stringent. The CAA imposes numerous requirements on waste-to-energy facilities, which also must comply with the Clean Water Act, the Resource Conservation and Recovery Act, and other federal, state and local laws. Permitting actions, facility expansions and new projects may implicate many of the laws listed in question 20.

24 Biofuels

Describe, in general terms, any regulation of biofuels.

In 2007, EPA established a national renewable fuel standard programme that requires transportation fuel refiners to displace certain amounts of gasoline and diesel with renewable fuels such as cellulosic biofuel, biomass-based diesel and advanced biofuel. The programme established the annual renewable fuel standards, responsibilities of refiners and other fuel producers, a trading system, compliance mechanisms, and record-keeping and reporting requirements.

EPA has recently scaled back biofuel requirements to account for declining gasoline use and technical limitations related to ethanol blending and biofuel production. In June 2015, EPA published a proposed rule setting a 2016 total renewable fuel requirement of 17.4 billion gallons, which is well below the Clean Air Act's required minimum of 22.25 billion gallons. In the proposal EPA stated that it proposed the lower level under the Clean Air Act's cellulosic waiver authority and general waiver authority to address substantial limitations in the supply of cellulosic biofuel, insufficient supply of other advanced biofuels, and constraints on the supply of ethanol blends to the vehicles that can use them.

Some individual states have implemented their own regulations, such as acquisition or fuel use standards, taxes, fuel production or quality regulations, and air quality or emissions regulations. For example, California is in the process of implementing its Low Carbon Fuel Standard (LCFS). By 2020, the LCFS mandates a 10 per cent reduction in the carbon intensity of transportation fuels that are sold, supplied or offered for sale in California. Beginning 1 January 2011, transportation fuel producers and importers had to meet specified average carbon intensity requirements for fuel in each calendar year. Carbon intensity reductions are based on reformulated gasoline mixed with 10 per cent corn-derived ethanol and low-sulphur diesel fuel. In 2015, CARB proposed rules for the re-adoption of the LCFS to accelerate the carbon reduction schedule, implement cost containment provisions and expand enforcement provisions.

As a result of federal and state biofuels programmes, the US is the world's largest producer of biofuels.

25 Carbon capture and storage

Describe, in general terms, any policy on and regulation of carbon capture and storage.

Carbon capture storage (CCS) is a process by which CO_2 from a stationary source is captured, transported and permanently stored, typically in underground injection wells. CCS has a substantial potential to reduce GHG emissions from industrial sources, but has not been widely demonstrated on a commercial scale.

Several large CCS demonstration projects in the US are currently moving through the entitlement or financing process. These projects are largely supported by resources allocated by the American Recovery and Reinvestment Act of 2009, as well as a variety of federal and state incentives, including tax credits and loan guarantees.

CCS regulatory framework

The federal Safe Drinking Water Act requires an injection well permit for the long-term storage or geologic sequestration of CO_2. Class VI injection well permits require the use of materials compatible with geological sequestration and impose certain financial responsibility requirements. Class VI wells must also comply with certain Monitoring, Reporting, and Verification (MRV) requirements as part of EPA's GHG Mandatory Reporting Rule programme. At present, no states have been delegated Class VI permitting authority by EPA.

Class II injection well permits have authorised enhanced oil recovery (EOR) activities for many years, as discussed below. Some CCS projects may rely upon Class II injection wells for both EOR and sequestration purposes, provided drinking supplies are not adversely impacted. Most states have permitting authority over Class II wells based on delegation from EPA. Use of a Class II well does not require EPA approval of an MRV programme, although facilities may choose to opt into EPA's MRV program.

On 1 December 2010, EPA published its final rule concerning an expansion of its GHG reporting rule to include facilities that inject and store CO_2 for geologic sequestration or enhanced oil and gas recovery. CCS has also begun to play an important role as a control technology for GHG regulations for power plants. The CPP includes stringent CO_2 emissions standards for new coal-fired power plants that will likely require the use of CCS.

In January 2014, the EPA issued a final rule excluding CO_2 streams in CCS projects from classification as a hazardous substance under the Resource Conservation and Recovery Act, provided that the streams are injected into Class VI wells and not mixed or co-injected with any hazardous wastes. CCS projects are potentially affected by several other regulatory programmes. For instance, NEPA and state equivalents may present regulatory hurdles by requiring environmental review of project impacts. State and local agencies may also impose permitting requirements on CCS projects.

Co-benefits of CO_2 – enhanced oil recovery

EOR has been used successfully since the early 1970s to recover additional oil from existing sources. The DOE estimates that EOR may allow the extraction of 30 to 60 per cent of a reservoir's original oil compared with 20 to 40 per cent extracted by primary and secondary recovery. The EIA estimates that domestic use of CO_2 for EOR can produce over 4 billion additional barrels of oil between 2011 and 2035. DOE estimates that CO_2 EOR, over 30 years, for the US could potentially spur US$10 trillion in economic development, create 2.5 million jobs, and drive a 30 to 40 per cent reduction in imported oil.

CCS has long been touted as a potentially critical means for reducing GHG emissions from carbon-intense industrial sources. In October 2014, Canada began operating the first commercial scale coal-fired power plant fitted with CCS technology. A portion of the CO_2 captured by the plant will be pumped underground and sold to oil companies for use in priming oil fields. The Canadian plant received US$240 million Canadian in subsidies from the Canadian federal government. However, high costs, complex

regulatory schemes and decreasing governmental incentives have hindered the widespread development of CCS projects. In the future, deriving multiple revenue streams from the CO_2 associated with CCS projects, particularly using captured CO_2 for EOR, may help spur CCS development.

Climate matters in transactions

26 Climate matters in M&A transactions

What are the main climate matters and regulations to consider in M&A transactions and other transactions?

Entities must consider a range of climate issues when undertaking M&A transactions. Risks generally fall into three categories: regulatory, economic, and operational risk related to climate change impacts. Some matters also present M&A opportunities, such as incentives related to renewable energy. Matters to consider include:

- GHG reporting and permitting obligations for certain sectors;
- EPA regulation of GHG emissions and related costs for higher-emitting industries;
- regulatory uncertainty resulting from a lack of a comprehensive national climate change programme;
- regulatory costs associated with assuring compliance with a plethora of federal, state and local climate change, energy efficiency and renewable energy programmes;
- litigation exposure to claims based upon alleged climate impact of corporate operations or of climate changes on corporate operations;
- direct and indirect effects of higher energy costs;
- financial disclosure and compliance obligations under Securities and Exchange Commission rules and state laws;
- adherence to Equator Principles, if applicable, which include requirements for climate impacts;
- impacts to coastlines, ports and other infrastructure related to increased storm intensity and sea level rise;
- impacts to natural resources and commodities related to climate change, such as water supplies, fisheries, forestry products and crops;
- global economic and security risks related to potentially destabilising impacts of climate change in certain region; and
- market opportunities related to renewable power, REC and offset trading, GHG mitigation and energy efficiency.

Update and trends

While the federal CPP is the most high-profile development in United States climate change regulation, the federal programme relies heavily on states to develop and implement their own GHG mitigation strategies. These state-level policymaking processes will build political and institutional momentum, and will likely yield at least some substantive, subnational GHG reductions policies even if the CPP is defeated in whole or part by litigation, or modified by subsequent administrations.

Independently of the CPP, there are signs that political support for state and regional GHG regulation is growing. California has recently announced more aggressive long-term goals for its programme. Washington State Governor Inslee also has proposed an aggressive, economy-wide cap-and-trade programme that could one day be linked with the California programme. In the north-east, RGGI has adopted more aggressive goals for its cap-and-trade programme, and Pennsylvania has expressed interest in joining. Dealmakers should follow developments related to the federal CPP, but should also monitor state activities for the next generation of climate change regulation. It is widely anticipated that these state and regional programmes will continue to drive economic activity in energy efficiency, renewable power, energy storage, transmission, emissions trading, and other related markets.

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