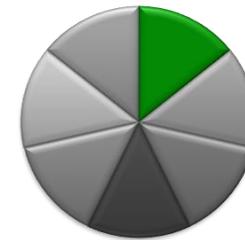


Environmental Evidence Base: Air Quality



- **Air quality**
- Biodiversity
- Geodiversity
- Landscape
- Land use
- Soils
- Water

ofgem

- Introduction:
 - A systematic review has been undertaken to characterise the impacts of the GB regulated energy system (primarily transmission and distribution) on the natural environment
 - There are seven issues that are seen to be important to address: Air quality, Biodiversity, Geodiversity, Landscape, Land use, Soils, and Water.
- Purpose of the evidence bases:
 - The intended use of the evidence bases is: to inform development of regulatory policy proposals, support internal/external advocacy, and support internal implementation of Ofgem’s strategic and sustainability assessment framework
 - This evidence base describes: the current state of air quality in GB, wider pressures on air quality in GB, and potential impacts from any pressure on air quality, factors leading to such impacts and relevant statutory legislation/regulation
 - The evidence base provides an initial ranking of the impacts and also gives more detailed consideration to those individual elements of the GB regulated energy system likely to have greatest impact on air quality and/or to arise most frequently
 - The evidence base identifies: how the significance of impacts may be affected by climate change, existing statutory legislation/regulation intended to prevent or minimise impacts, and management actions that prevent or minimise impacts and can be undertaken by a range of actors
- How to use:
 1. The environmental evidence bases should be used to identify the impacts associated with the policy/project using the matrix, ‘flag’ those that are high impact with high/medium confidence and those that are medium impact with high confidence requiring scrutiny / additional analysis.
 2. Undertake more detailed consideration of the significance of these impacts
 3. Undertake more detailed analysis of the interactions with climate change
 4. Consider potential prevention and mitigation measures
 5. Undertake additional qualitative and quantitative analysis, as required
- Case study:
 - A worked step-by-step case study has been included, considering the pressure on air quality with the most significant impacts, in order to help you use this evidence base

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The state of air quality

- Air pollution poses risks to human health, the built environment and natural ecosystems
- The principle effects of air pollution are:
 - Human health impacts of toxic substances and fine dust
 - Elevated levels of tropospheric ozone and photochemical oxidants
 - Acidification of precipitation
 - Nitrogen deposition and groundwater eutrophication
 - Bioaccumulation of persistent and toxic substances
 - Material damage to buildings and manufactured goods
 - Climate change
- A number of international agreements set air quality standards, impose emission limits, or set national or regional emission ceilings for pollutants
- In Europe, internationally-coordinated policies and actions at all levels have greatly reduced emissions :
 - Levels of acidifying pollutants have reduced, and the health of Europe's rivers and lakes has improved but levels of atmospheric nitrogen compounds still threaten sensitive habitats and species.
 - Similarly, levels of some air pollutants still pose health risks – reducing fine particulate air pollution could have the same impact on life expectancy in England and Wales as eliminating passive smoking or road traffic accidents.
- The UK's Air Quality Strategy and associated legislation addresses international agreements and EU legislation. The agreements are dynamic, are reviewed periodically and amended when opportunity or need arises
- Some actions associated with the National Grid vision may potentially impact on the UK's ability to comply with EU legislation, either already in place or planned

The state of air quality (2)

- Guiding principles are that agreements should be evidence-based and address all substances and their impacts in integrated manner. Two relevant, current themes of development are: coordination of climate change and air pollution policies; and known health problems

Wider pressures on air quality

- The GB regulated energy system contributes to wider pressures on air quality.
- Although emissions arise from almost all economic and societal activities, key sources are:
 - Energy production and use
 - Transport
 - Agriculture
- Where existing air quality is poor (e.g. urban areas) there may be no or less ‘headroom’ for additional emissions, particularly for continuous, year-long operation. For example, occasional or short-term emissions in a rural environment have less impact on compliance with annual air quality limits than a near-continuous operation, such as a gas compression station

References

- Miller, B.J. and Hurley, G.F. (2006) Comparing estimated risks for air pollution with risks for other health effects, IOM. Available at http://www.iom-world.org/pubs/IOM_TM0601.pdf
- International, European and national standards for air quality. Available at <https://www.gov.uk/government/policies/protecting-and-enhancing-our-urban-and-natural-environment-to-improve-public-health-and-wellbeing/supporting-pages/international-european-and-national-standards-for-air-quality>

Potential impacts on air quality

- The following slides:
 - Identify and broadly categorise potential impacts arising from any pressure on air quality
 - Identify factors that lead to such impacts
 - Highlight relevant statutory legislation or regulation intended to prevent or minimise such impacts
- This information is then used specifically to consider impacts on air quality arising from individual elements of the GB regulated energy system

For more information on roles and responsibilities of regulators for air quality, please refer to Annex 1.

For more information on relevant legislation, please refer to Annex 2

Potential impacts on air quality (2)

Groups of pollutants (from EC Regulation 166/2006 establishing E-PRTR)	Description of pollutant group	Substances of relevance to the GB regulated energy system – <i>those least likely to be of concern are shown in italics</i>
Greenhouse gases	Gaseous constituents of the atmosphere, both natural and anthropogenic, that tend to trap heat radiating from the Earth's surface, causing warming in the lower atmosphere, which is considered to lead to climate change.	methane (CH ₄), carbon dioxide (CO ₂). <i>hydro-fluorocarbons (HFCs), nitrous oxide (N₂O), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆)</i>
Other gases	Gaseous or vapour phase substances that are regulated because of their influence (directly or indirectly) on air quality and/or because their adverse impacts arise from having been emitted to and transported by air.	carbon monoxide (CO), ammonia (NH ₃), non-methane volatile organic compounds (NMVOC), nitrogen oxides (NO _x /NO ₂), sulphur oxides (SO _x /SO ₂). <i>hydrochlorofluorocarbons (HCFCs), chlorofluorocarbons (CFCs), halons, chlorine and inorganic compounds (as HCl), fluorine and inorganic compounds (as HF), hydrogen cyanide (HCN).</i>
Heavy metals	Chemical elements, which are generally natural constituents of the Earth's crust that are considered to be associated with contamination and potential toxicity or eco-toxicity.	mercury <i>arsenic, cadmium, chromium, copper, nickel, lead, zinc, and their compounds.</i>
Inorganic substances	Predominantly solid-phase substances that are regulated because of their adverse influence (directly or indirectly) on air quality and/or because their impacts arise from having been emitted to and transported by air.	Fine particulate material (such as PM ₁₀). <i>Total nitrogen, total phosphorus, chlorides, asbestos, cyanides, and fluorides.</i>
Chlorinated organic substances	Based on organic compounds (i.e. carbon-containing) with one or more chlorine atoms. They are important in the chemical industry and are also formed in nature in large quantities.	<i>Probably not relevant to the current or future GB regulated energy system.</i>
Other organic substances	Substances containing carbon atoms not covered by other pollutant groups.	<i>Probably not relevant to the current or future GB regulated energy system.</i>
Pesticides	Various substances.	<i>Probably not relevant to the current or future GB regulated energy system.</i>
Pollutant Release and Transfer Register (PRTR)	Various substances.	Black carbon, PM _{2.5}

Potential impacts on air quality (3)

Impact	Factor	Relevant Legislation
Transboundary	<p>Discharges to air that have an impact potential beyond UK national boundaries. Transboundary pollution can have adverse effects on human health and welfare, ecosystems, and on the built environment and materials, most importantly, via:</p> <ul style="list-style-type: none"> • Increased acidity of precipitation, predominantly nitrogen oxides (NOx) and sulphur oxides (SOx) • Eutrophication (an increase in nutrients) of non-marine surface waters, usually by compounds containing nitrogen, e.g. ammonia (NH₃) and NOx • Photochemical pollution, and associated increased tropospheric ozone and photochemical oxidants (smog) levels, predominantly NOx and non-methane volatile organic compounds (NMVOC) • Deposition of chemicals that are toxic, genotoxic, mutagenic etc. and which bioaccumulate, predominantly Hg • Greenhouse gases; substances that have the potential to exacerbate global warming and which would contribute to climate change, predominantly methane (CH₄) in this instance and fluorine-gases, such as sulphur hexafluoride (SF₆) • Fine particulate material (PM₁₀ and PM_{2.5}). <p>Stratospheric ozone depleting substances are a less relevant to the regulated UK energy system</p>	<ul style="list-style-type: none"> •UNFCCC, The United Nations Framework Convention on Climate Change (1992) •UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters •The Kiev Protocol (2003) •UNECE 1979 Geneva Convention •1998 Aarhus Protocol •1994 Oslo Protocol •1991 Geneva Protocol •1988 Sofia Protocol •1985 Helsinki Protocol •1999 Gothenburg Protocol •The Kyoto Protocol (1998)

Potential impacts on air quality (4)

Impact	Factor	Relevant Legislation
National/EU	Discharges to air that have potential impacts within UK national boundaries, including any of the transboundary impacts. This definition excludes greenhouse gases and gaseous substances with a low photochemical reactivity.	<ul style="list-style-type: none"> •National Emission Ceilings Directive •Large Combustion Plant Directive •Sulphur Content Directive •Non-road mobile machinery directive •Ambient air quality directive Fourth Daughter Directive •Water Framework Directive •POPs Regulation •Waste Framework Directive •Waste Incineration Directive •EU Emission Trading Scheme Directive •Integrated Pollution Prevention and Control •Industrial Emissions Directive •Fluorinated Greenhouse Gases Regulation
Local	<p>Discharges to air that have potential to create impacts close to the point of emission within UK national boundaries. Such emissions can impact on human health and welfare, ecosystems, and materials via:</p> <ul style="list-style-type: none"> • Emissions from vehicles and non-road mobile machinery • Some discharges from stacks and chimneys • Some discharges from fuel, storage, use and combustion appliances • Ozone from electrical networks and switchgear. 	<ul style="list-style-type: none"> •Environmental Permitting Regulations (England & Wales) •Pollution Prevention and Control Regulations •The Air Quality Standards Regulations •Greenhouse Gas Emission Trading Scheme Regulations •The Fluorinated Greenhouse Gases Regulations •The Environmental Protection •The Solvent Emissions Regulations •The Sulphur Content of Liquid Fuels Regulations •Clean Air Act

Instructions

- **Case Study:**
 - The steps are illustrated using a ‘real-life’ case study.
 - This considers the pressure “New port infrastructure – gas reception facilities and LNG import”
 - Steps 2 to 5 have been applied to this case study. For general use, you will need to tailor these steps to your own policy/project
- **Step 1: Initial rankings of impacts**
 - This step applies to all policies/projects
 - The matrices illustrate the severity of each pressure on the various impacts and so can be used to highlight areas for additional scrutiny
- **Step 2: Significance of rankings**
 - In this step you develop a matrix specific to your given policy/project
 - This allows you to consider the significance of the identified impacts
- **Step 3: Interactions with climate change**
 - Another case-specific matrix is developed here analysing the interactions with climate change
- **Step 4: Preventing or minimising the impacts**
 - A final case-specific matrix is developed in order to consider potential prevention and mitigation measures
- **Step 5: Qualitative/quantitative analysis**
 - Within your policy/project development, you should undertake further analysis of the relevant impacts and mitigation measures

Step 1: Initial rankings of impacts

- Having identified and broadly categorised potential impacts arising from any pressure on air quality, the following tables provide an expert initial ranking of each of the individual elements of the GB regulated energy system:
 - Independent of other energy system-environment interactions
 - At the likely scale of an individual pressure (e.g. an individual transmission line or sub-station)
 - Irrespective of existing statutory legislation and regulation, and
 - Irrespective of potential timing
- Cumulative effects are considered in the same way in relation to each individual element of the GB regulated energy system
- The matrices should be used to ‘flag up’ significant impacts. This will allow you to conduct further investigation on those significant impacts, for which we have a high degree of confidence in the evidence available

- Impact is defined as:

	High: national, permanent, irreversible
	Medium: regional, semi-permanent, difficult to reverse
	Low: local, temporary, reversible

- Confidence in evidence of such impacts is defined as:

H	High: robust evidence, high agreement
M	Medium: medium evidence, medium agreement
L	Low: limited evidence, low agreement

Initial ranking of impacts on air quality (electricity transmission)

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Driver: Electricity transmission	Impact								
Issue: Air quality	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative
Pressures									
New transmission lines – Overhead	M	M	M	M	H	M	N/A	L	M
New transmission lines – underground	M	M	M	M	H	M	N/A	L	M
New distribution lines	M	M	M	M	H	M	N/A	L	M
New substations	M	M	M	M	H	M	N/A	L	M
New marine interconnection	M	M	M	M	H	M	N/A	L	M
Marine interconnection – land base connection	M	M	M	M	H	M	N/A	L	M
Marine sub-sea lines	M	M	M	M	H	M	N/A	L	M
Marine sub-stations	M	M	M	M	H	M	N/A	L	M
Series compensation installations	M	M	M	M	H	M	N/A	L	M
Electricity storage – hydro	H	H	H	H	H	M	N/A	L	H
Electricity storage – compressed air	H	H	H	H	H	M	N/A	L	H
Electricity storage – batteries	M	H	H	H	H	M	N/A	L	M
Electricity storage – cryogenic systems	L	H	H	H	H	M	N/A	L	M
Smart grids	H	H	H	H	H	M	N/A	L	H

Initial ranking of impacts on air quality (gas transmission)

Context

Impacts

Analysis

Annex

Driver: Gas transmission	Impact								
Issue: Air quality	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative
Pressures									
New gas transmission network	M	H	H	H	H	M	N/A	L	M
New compressors	M	M	H	H	H	M	N/A	L	M
New distribution network	M	M	M	M	M	M	N/A	L	M
New port infrastructure – gas reception facilities*	M	M	L	H	H	M	N/A	L	M
New port infrastructure – LNG import*	M	M	M	H	H	M	N/A	L	M
Marine interconnection	M	H	M	H	H	M	N/A	L	M
Biogas upgrading for injection to grid	L	L	L	M	H	M	N/A	L	L
Gas storage – underground storage in caverns or gas and oil fields.	L	M	M	M	H	M	N/A	L	M
Gas storage – above ground connection	M	M	M	H	H	M	N/A	L	M
CCGT – district heating	M	M	M	H	H	M	N/A	L	M
Biomethane injection to grid	L	M	M	M	H	M	N/A	L	M
Shale gas – connection to grid	M	M	L	M	H	M	N/A	L	M

* These are the pressures that are considered in the case study

Initial ranking of impacts on air quality (carbon capture and storage)

Driver: CCS	Impact								
Issue: Air quality	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative
Pressures									
Redeployment of gas pipelines for CO ₂	M	M	H	H	H	M	N/A	L	M
New CO ₂ pipelines	M	H	H	H	H	M	N/A	L	M
CCS process	L	M	M	M	M	M	N/A	L	M

Case study – Grain LNG import terminal

Context

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The pressures with the most significant impacts, identified in the previous matrix are:

- New port infrastructure – gas reception facilities
- New port infrastructure – LNG import

The case study hence considers an example of those pressures.

Grain LNG is National Grid's Liquefied Natural Gas (LNG) import terminal at the Isle of Grain, near London. Originally built in the late 1970's to liquefy Natural Gas from the North Sea it was converted and commissioned in 2005 as an LNG importation facility. The terminal has the capacity to receive and process up to 3.3 million tonnes of LNG per annum, equivalent to 13 million cubic metres of gas per day.

Grain LNG is committed to reducing emissions of greenhouse gases by 80% and commissioned a ground-breaking CHP/Heatpipe solution to utilise heat from an adjacent E.ON power station. The solution is estimated to reduce carbon dioxide emissions by up to 300,000 tonnes per year, as it warms the LNG supplying the national gas system, thereby saving fuel.

The Environment Agency and the local authority were involved in the project.



Grain LNG

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Further information can be found at:

<http://www.nationalgrid.com/uk/GrainLNG/environment>

Step 2: Significance of rankings

- Now you will need to undertake further analysis, which is illustrated here utilising the case study on the previous slide
- The following tables go on to provide more detailed consideration of the significance of impacts from those individual elements of the GB regulated energy system initially ranked highest and/or that are likely to arise most frequently
- To do this you use a case-specific matrix. An example is shown on the next slide.
 - This allows you to see which impacts should be given priority in your analysis
 - In this case, greenhouse gases, other gases, heavy metals and cumulative effects are the main impacts to be considered
- Ranking of magnitude is based on extent, duration, reversibility and frequency of impact
- Confidence in the evidence is defined in the same way as for the initial ranking

- A combined ranking of the significance of impacts is based on magnitude x confidence:

Magnitude	High			
	Medium			
	Low			
		Low	Medium	High
		Confidence		

- Significance:

	High
	Medium
	Low

Significance of impacts on air quality

Issue: Air Quality	Impact								
Pressure: New port infrastructure – gas reception facilities and LNG import	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative effects
Positive or negative	+	+	+(N/A for LNG import)	+	N/A	+	N/A	+	+
Extent	National	Local, Regional, National	National	Local, Regional, National	N/A	Local, Regional, National	N/A	National	Local, National
Duration	Permanent	Permanent	Permanent	Permanent	N/A	Permanent	N/A	Permanent	Permanent
Reversibility	Difficult to reverse	Reversible	Difficult to reverse	Difficult to reverse	N/A	Difficult to reverse	N/A	Difficult to reverse	Difficult to reverse
Frequency	Operation (some construction)	Operation (some construction)	Operation	Operation (some construction)	N/A	Operation (some construction)	N/A	Operation (some construction)	Operation
Magnitude	Medium	Medium	Medium (Low if LNG import)	Low	N/A	Low	N/A	Medium	Medium
Confidence	Medium	Medium	low	High	High	High	High	Medium	Medium
Significance	Medium	Medium	Medium (Low if LNG import)	Low	Low	Low	N/A	Low	Medium

Step 3: Interactions with climate change

- Having provided more detailed consideration of the significance of impacts from those individual elements of the GB regulated energy system initially ranked highest and/or that are likely to arise most frequently, the evidence base goes on to review their potential interactions with climate change.
- This is done through developing another case-specific matrix
 - This allows you to see how the impacts of your policy/project relate to climate change and whether they are going to be amplified, remain neutral or reduce with climate change
 - In the case that is being considered here, it is shown in the matrix on the next slide that climate change is unlikely to amplify the air quality impacts
- The following tables identify how the significance of impacts may change as a result of:
 - Direct impacts of climate change on air quality
 - Climate change adaptation actions identified by key energy infrastructure providers under the Climate Change Act 2008 adaptation reporting power

Interactions with climate change

Issue: Air Quality	Impact								
Pressure: New port infrastructure - gas reception facilities and New port infrastructure - LNG import	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative effects
Significance	Medium	Medium	Medium (Low if LNG import)	Low	Low	Low	N/A	Low	Medium
Climate change	=	=	N/A	N/A	N/A	N/A	N/A	=	=

References

1. Northern Gas Networks (2011) Climate Change Adaptation Report. Available at <http://archive.defra.gov.uk/environment/climate/documents/adapt-reports/05gas-transport/northern-gas-networks.pdf>
2. National Grid Gas (2010) Climate Change Adaptation Report. Available at <http://archive.defra.gov.uk/environment/climate/documents/adapt-reports/05gas-transport/national-grid-gas.pdf>

Step 4: Preventing or minimising the impacts

- Finally, the evidence base considers prevention of impacts from those individual elements of the GB regulated energy system initially ranked highest and/or that are likely to arise most frequently, and whose significance and interactions with climate change have been reviewed
- The following tables identify:
 - Relevant existing legislation or regulation
 - Management actions that prevent or minimise impacts and can be undertaken by a range of actors
- The prevention and mitigation measures should be considered in any analysis undertaken in your policy/project development

Preventing or minimising the impacts

Context

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Issue: Air Quality	Impact								
Pressure: New port infrastructure - gas reception facilities and LNG import	Greenhouse gases	Other gases	Heavy metals	Inorganic substances	Chlorinated organic substances	Other organic substances	Pesticides	Non-Pollutant Release and Transfer Register	Cumulative effects
Significance	Medium	Medium	Medium (Low if LNG import)	Low	Low	Low	N/A	Low	Medium
Climate change	=	=	N/A	N/A	N/A	N/A	N/A	=	=
Legislation & regulation – numbers referenced in Annex 3	1,2,3,4,6	1, 2, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16	5, 6, 8, 10, 11, 13, 14, 16	5, 6, 8, 9, 10, 11, 13, 14, 15	5, 6, 8,10, 13	5, 6, 8,10, 13	N/A	5, 6, 8,10, 11, 13, 15	N/A
Management	<i>Details provided in the next slide</i>								

Preventing or minimising the impacts (2)

Pressure: New port infrastructure – gas reception facilities and LNG import (continued)

Management

- Impacts on air quality from a gas-refining installation are controlled through implementation of an Integrated Pollution Prevention and Control operating permit issued under the Environmental Permitting Regulations (England & Wales).
- The permit sets out the legal requirements under Directive 2010/75/EU on Industrial Emissions (IED).
- Relevant activities are defined in Annex I of the IED which includes gas refining and combustion processes in the Energy Industries.
- A permitted installation will potentially include refining activity, refining + combustion activity, combustion activity and gasification activity (and directly associated activities).
- Similar regulations apply in Scotland and Northern Ireland.
- The operator is required to employ best available techniques (BAT; published at <http://eippcb.jrc.es/reference/>) to avoid or minimise impacts on the environment, including air quality).
- LNG re-gasification is not a GB regulated activity under the IED but regulated activities (e.g. combustion activities such as heaters, and gas turbines) are often present at the LNG terminal.

Step 5: Qualitative/Quantitative Analysis

- After using the matrices to identify relevant impacts for your policy/project, identifying their significance, considering their interactions with climate change and potential prevention and mitigation measures, you should undertake further analysis to feed into any Impact Assessment being developed
- The analysis can be either qualitative or quantitative (if available)
- For the case study we are considering, further analysis should be given to the following impacts:
 - Greenhouse gases
 - Other gases
 - Heavy metals
 - Cumulative effects

- Individual elements of the GB regulated energy system likely to have the greatest impact on air quality and/or to arise most frequently are:
 - New port infrastructure – gas reception facilities
 - Small generators (including gas turbines >50 MWth) used to reinforce/support electricity supply
 - New transmission lines underground
 - Construction in an urban environment, where focused in a limited area over a long period
- Their most significant potential impacts relate to:
 - Greenhouse gases
 - Gaseous air quality pollutants, such as carbon monoxide, ammonia, non-methane volatile organic compounds, nitrogen oxides and sulphur oxides
 - Heavy metals
 - Cumulative effects
- Climate change is unlikely to amplify the air quality impacts
- Existing statutory legislation or regulation preventing or minimising such impacts includes:
 - EC Industrial Emissions Directive, Air Quality Framework Directive and Fourth Daughter Directive, Non-road Mobile Machinery Directive, and Environmental Impact Assessment Directive
 - UK implementing legislation
- Management actions to prevent or minimise impacts that can be undertaken by a range of actors can be identified as follows:
 - Best Available Techniques reference documents for oil and gas refining, large combustion plant, available from the European IPPC bureau at <http://eippcb.jrc.es/reference/>
 - UK Sector guidance for gas refining and large combustion plant, available from the Environment Agency for England & Wales at <http://www.environment-agency.gov.uk/business/sectors/default.aspx>
 - GLA and London Council's Best Practice Guidance on the control of dust and emissions from construction and demolition, available at http://www.london.gov.uk/thelondonplan/guides/bpg/bpg_04.jsp
 - Institute of Environmental Management & Assessment guidance for adoption of an Environmental Management System (EMAS, ISO 14001), available at <http://ems.iema.net/downloads>

Annexes

Annex 1: Roles and responsibilities of regulators for air quality

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- Relevant regulators
 - Planning authorities
 - Environment Agency (EA)
 - DoE Northern Ireland (DoE NI)
 - Scottish Environment Protection Agency (SEPA)
 - Natural Resources Wales (NRW)
 - Local authorities
- Broad level and nature of their responsibilities
 - EA, DoE NI, SEPA, NRW – Implementation of Industrial Emissions Directive
 - Local authorities – Responsible for smaller combustion installations (SEPA in Scotland), air quality management and Clean Air Act (smoke control).

Annex 2: Relevant legislation references

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Transboundary:

- [UNFCCC, The United Nations Framework Convention on Climate Change \(1992\)](#)
One of three Conventions from the Rio Earth Summit, it recognised climate change as an issue, set goals to stabilise greenhouse gas (GHG) concentrations and to develop the science/evidence base. Developed countries need to reduce GHG emissions to 1990 levels
- [The Kyoto Protocol \(1998\)](#) set binding emission reduction targets and mechanisms to achieve reductions
- [UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters \(Aarhus Convention\)](#), which sets requirements for public participation on decision-making and places obligations on public authorities to improve government accountability, transparency and responsiveness
- [The Kiev Protocol \(2003\)](#) on Pollutant Release and Transfer Registers, which aims to enhance public access to pollutant release information.
- [UNECE 1979 Geneva Convention on Long-range Transboundary Air Pollution \(the LRTAP Convention\)](#), which seeks to reduce and prevent air pollution. Parties develop policies and strategies to combat the discharge of air pollutants through exchanges of information, consultation, research and monitoring.

Relevant legislation references

- Protocols associated with the [LRTAP Convention](#) are:
 - The 1985 Helsinki Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes, which requires parties to reduce emissions of sulphur compounds, mainly from power stations
 - The 1988 Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, which requires parties to reduce nitrogen oxide (NO_x) emissions and to assess mechanisms/needs for reducing impacts on sensitive areas
 - The 1991 Geneva Protocol on the Control of Emissions of Volatile Organic Compounds (VOC) or their Transboundary Fluxes, which specifies controls on VOC, a major air pollutant responsible for the formation of ground level ozone
 - The 1994 Oslo Protocol on Further Reduction of Sulphur Emissions, which requires further emission reductions and effects-based reductions
 - The 1998 Aarhus Protocol on Heavy Metals, which requires reduction in emissions of cadmium, lead and mercury including management of use of mercury in certain products
 - The 1998 Aarhus Protocol on Persistent Organic Pollutants (POPs), intended to eliminate discharges or emissions of POPs, including bans on use of certain pesticides and controls on dioxin emissions from incineration
 - The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, which sets national emission ceilings for NO_x, sulphur dioxide (SO₂), non-methane volatile organic compounds (NMVOC) and ammonia (NH₃); currently being revised to include particulate.

Relevant legislation references

National/EU:

- [NEC, National Emission Ceilings Directive 2001/81/EC](#) of 23 October 2001, which implements the CLRTAP Gothenburg protocol on emission ceilings in the EU
- [Directive 2001/80/EC, the Large Combustion Plant Directive](#), which requires reduction of nitrogen oxide (NO_x) and sulphur dioxide (SO₂) emissions from large combustion plant (>50 MWth input) and sets minimum requirements for emissions. Now incorporated within Directive 2010/75/EU on Industrial Emissions.
- [Directive 1999/32/EC on Sulphur Content of Certain Liquid Fuels \(SCoLF\)](#) and subsequent instruments, which control sulphur content in gas oil, fuel oil and marine oil fuels
- [Directives 97/68/EC and 2004/26/EC on non-road mobile machinery](#), which covers emission performance of engines used in non-road vehicles
- [Directive 2008/50/EC on ambient air quality and cleaner air for Europe](#), which consolidates most existing air quality legislation on pollutants such as nitrogen dioxide (NO₂) and SO₂ and sets new requirements for PM_{2.5}
- [Directive 2004/107/EC \(Fourth Daughter Directive\)](#), which relates to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air
- [Directive 1999/13/EC VOC](#), controls organic solvent emissions from certain processes, which is now incorporated within Directive 2010/75/EU on Industrial Emissions
- [Directive 2000/60/EC - The Water Framework Directive \(WFD\)](#) (WFD), which requires management of river/water body management including releases to water
- [POPs Regulation, Regulation EC 850/2004 of the European Parliament on persistent organic pollutants \(POPs\)](#), and amending Directive 79/117/EC, which implements the CLRTAP POPs protocol and the Stockholm Convention on POPs

Relevant legislation references

National/EU:

- [Waste Framework Directive, \(Directive 2008/98/EC\)](#), which sets a general framework for waste management and defines waste management definitions
- [Waste Incineration Directive 2000/76/EC](#) , which sets minimum requirements for emissions and operation of incineration plant. Now incorporated within Directive 2010/75/EU on Industrial Emissions
- [EU Emission Trading Scheme Directive 2003/87/EC](#) as amended by 2009/29/EC, 2008/101/EC and 2004/101/EC , which aims to create a market mechanism to reduce GHG emissions
- [Directive 2008/1/EC on Integrated Pollution Prevention and Control \(IPPC\)](#), which sets minimum requirements for the permitting process for defined industrial activities (including gas refining and combustion) and requires best available techniques to be used in management of installations; now incorporated within Directive 2010/75/EU on Industrial Emissions
- [Directive 2010/75/EU on Industrial Emissions](#), which consolidates IPPC, SED, WID, LCPD and Titanium Dioxide Directives and extends IPPC to include some additional activities; it is potentially relevant if the combustion installation threshold is reduced in future
- [Fluorinated Greenhouse Gases Regulation \(F-Gases Regulation\), Regulation \(EC\) No 842/2006](#), which controls Montreal protocol gases (ozone-depleting substances) that also have significant global warming potential – hydro-fluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Local:

- Environmental Permitting Regulations, Pollution Prevention and Control Regulations, The Air Quality Standards Regulations, Greenhouse Gas Emission Trading Scheme Regulations, The Fluorinated Greenhouse Gases Regulations, The Environmental Protection (Controls on Ozone-Depleting Substances) Regulations, The Solvent Emissions Regulations, The Sulphur Content of Liquid Fuels Regulations and Clean Air Act
<http://www.legislation.gov.uk/>

Annex 3: Preventing or minimising the impacts

Context

Impacts

Analysis

Annex

Pressure: New port infrastructure – gas reception facilities and LNG import

Legislation and regulation (*reference numbers relate to those listed in Step 4*)

Ref. no.	Region	Reference
1	MEA*	UNFCCC , and Kyoto protocol
2	EU	Commission Decisions implementing UNFCCC and Kyoto Protocol 94/69/EC , 2002/358/EC , 2006/944/EC and 2010/778/EU
3	EU	Directive 2003/87/EC establishing a GHG Emission trading scheme (EU ETS) and Subsequent Directives 2004/101/EC , 2008/101/EC and 2009/29/EC
4	UK	The Greenhouse Gas Emissions Trading Scheme Regulations 2012 : 2012 No. 3038 also 2005 No. 2903 and 2009 No.3130 .
5	MEA	UN CLRTAP and associated protocols
6	MEA	UNECE Aarhus Convention and 2003 PRTR Protocol (Kiev Protocol on Pollutant Release and Transfer Registers)
7	MEA	The UN Convention for protection of the ozone layer and associated Montreal Protocol on ozone-depleting substances (unlikely to be relevant to activity)
8	EU	Directive 2010/75/EU on Industrial Emissions (supersedes several Directives on industrial regulation including on integrated pollution prevention and control and large combustion plant including IPPC, LCPD).
9	EU	Directives on non-road mobile machinery and amendments
10	EU	Regulation No 166/2006 to establish a European pollutant Release and Transfer Register
11	EU	Air quality directives and Commission Decisions.
12	EU	Directive 2001/81/EC on National Emission Ceilings for SO₂, NO_x, VOC and NH₃ (NECD currently under review).
13	UK	Environmental Permitting Regulations (2010) for England & Wales and amendments (IED amendment is 2013 No. 390) – other regulations apply in Scotland and Northern Ireland.
14	UK	Non-road mobile machinery emissions regulations , guidance and amendments .
15	UK	EU Directives on air quality are implemented by the Air Quality Standards Regulations 2010 – other regulations apply in Scotland and Northern Ireland.
16	UK	NEC Regulations 2002.

*MEA is a Multilateral Environmental Agreement

Ofgem is the Office of Gas and Electricity Markets.

Our priority is to protect and to make a positive difference for all energy consumers. We work to promote value for money, security of supply and sustainability for present and future generations. We do this through the supervision and development of markets, regulation and the delivery of government schemes.

We work effectively with, but independently of, government, the energy industry and other stakeholders. We do so within a legal framework determined by the UK government and the European Union.