

## Cities' air quality efforts ranked

Zurich topped a new ranking list of European cities based on efforts to improve air quality.

► Page 3

## France: 100% renewables as cheap as 50% nuclear

A new report shows that renewables can entirely cover French electricity needs by 2050 instead of a mix of nuclear, renewables and fossil fuels.

► Page 6

## Danish farming futures

Becoming independent of fossil fuels by investing fully in the new bio economy, or reintroducing wolves and the European bison, these are two visions explored in a new report about the future of Danish farming.

► Page 8

## Ship scrubbers questioned

The ecological risks to the marine environment of using sulphur scrubbers are ignored, while the economic benefits have been overestimated, says German environmental organisation NABU.

► Page 12

## New draft EU coal limits weaker than in China

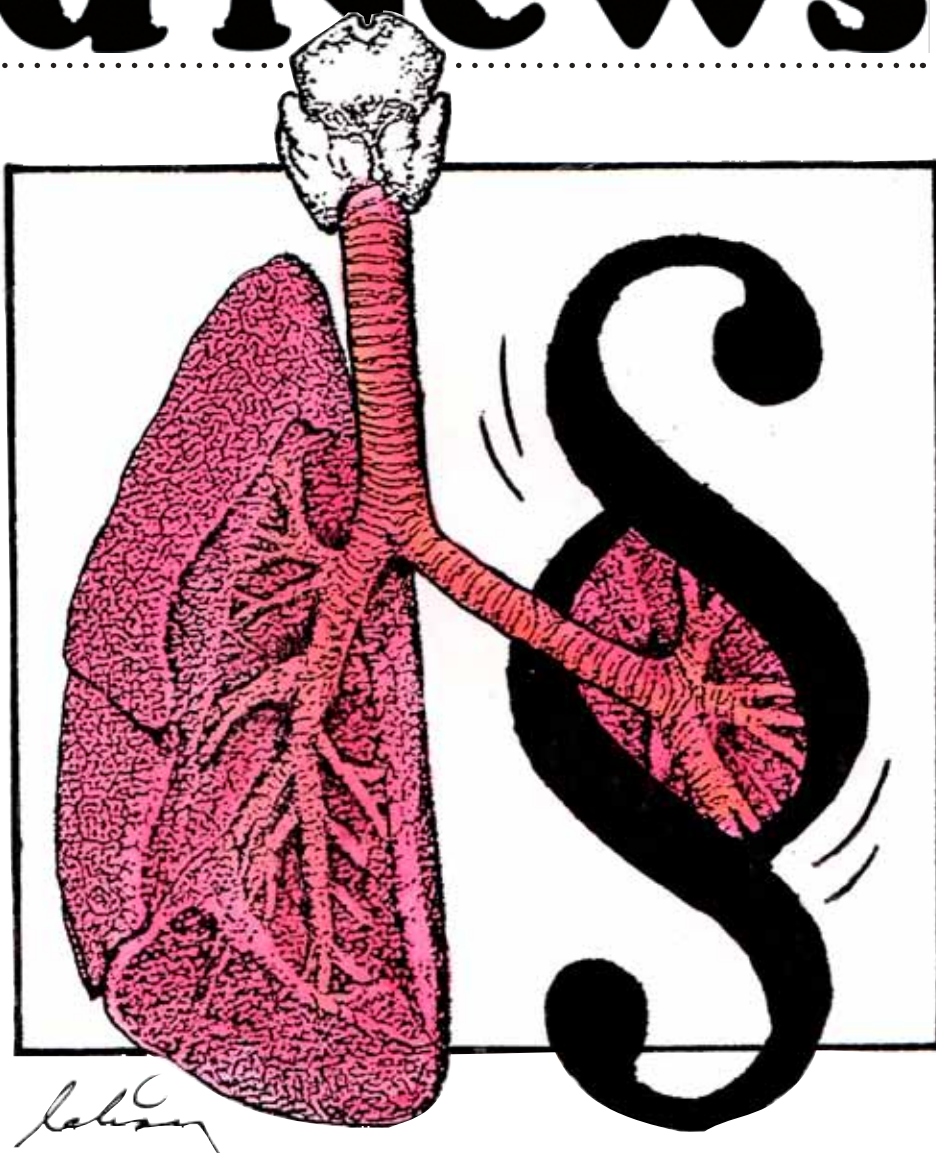
The EU is currently in the process of defining new emission limits for coal-fired power stations, but the draft new standards are in many cases weaker than existing national standards in China, Japan and the United States.

► Page 16

## Sweden without gas

Natural gas is not a necessary part of the fuel mix. Most of Sweden, including Stockholm, has no natural gas.

► Page 20



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# Higher ambitions needed for NEC

**National emission reduction commitments for 2030 should ensure achievement of the World Health Organization's recommended air quality levels.**

A coalition of environmental groups has summarised their main concerns about the proposed revision of the EU's National Emissions Ceilings (NEC) directive, and provided inputs to the ongoing decision-making process in the European Parliament and the Council.

Every year, over 400,000 Europeans die prematurely because of air pollution. Poor

air quality also makes Europeans sick and significantly reduces their quality of life, in particular in cities. Increased illness, hospital admissions, extra medication and millions of lost working days are very costly for the European Union – the health-related costs of air pollution

# Acid News

A newsletter from the Air Pollution & Climate Secretariat, the primary aim of which is to provide information on air pollution and its effects on health and the environment.

Anyone interested in these matters is invited to contact the Secretariat. All requests for information or material will be dealt with to the best of our ability. Acid News is available free of charge.

In order to fulfil the purpose of Acid News, we need information from everywhere, so if you have read or heard about something that might be of general interest, please write or send a copy to:

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## The Air Pollution and Climate Secretariat

The Secretariat has a board consisting of one representative from each of the following organisations: Friends of the Earth Sweden, Nature and Youth Sweden, the Swedish Society for Nature Conservation, and the World Wide Fund for Nature (WWF) Sweden.

The essential aim of the Secretariat is to promote awareness of the problems associated with air pollution and climate change, and thus, in part as a result of public pressure, to bring about the needed reductions in the emissions of air pollutants and greenhouse gases. The aim is to have those emissions eventually brought down to levels that man and the environment can tolerate without suffering damage.

In furtherance of these aims, the Secretariat:

- \* Keeps up observation of political trends and scientific developments.
- \* Acts as an information centre, primarily for European environmentalist organisations, but also for the media, authorities, and researchers.
- \* Produces information material.
- \* Supports environmentalist bodies in other countries in their work towards common ends.
- \* Participates in the lobbying and campaigning activities of European environmentalist organisations concerning European policy relating to air quality and climate change, as well as in meetings of the Convention on Long-range Transboundary Air Pollution and the UN Framework Convention on Climate Change.

# Editorial

**The proposed revision** of the National Emission Ceilings (NEC) Directive is currently being debated in the Council and in the European Parliament. While there is wide agreement on the urgency of additional action to cut air pollution, there are differing views among member states on how much and how quickly their emissions should come down.

In its annual air quality report from November last year, the European Environment Agency (EEA) estimated that current levels of air pollution are responsible for 447,000 premature deaths in the EU every year, as well as allergies and respiratory and cardiovascular diseases which result in extra medication, hospitalisations and millions of lost working days.

Moreover, air pollution damages nature and biodiversity, with the deposition of acidifying and eutrophying pollutants and the concentrations of ground-level ozone still exceeding the tolerance limits of sensitive ecosystems over millions of hectares of land in Europe. Agricultural crops and forest productivity are also hit by air pollution, as are building materials and cultural monuments.

The health impacts alone carry enormous costs to society – estimated to amount to between €330 and €940 billion/yr. This means that even a purely economic cost-benefit approach motivates a very significant stepping up of action to tackle air pollution, since the health benefits alone outweigh by far the additional costs for emissions control.

Because the health impacts are relatively easy to value, much of the political debate on establishing a “suitable” level of ambition for future emission reduction targets tends to focus on economics. And much too often member states focus primarily on the perceived costs, while at the same time largely ignoring the benefits.

However, clean air and water, healthy people, forests and heathlands, and a rich



AirClim

flora and fauna are necessary for a high quality of life, and must not be overlooked by policy makers, whether or not they are valued in monetary terms.

The gravity of the air pollution situation calls for a new NEC directive that establishes a very high level of ambition. It is certainly not acceptable that even after 2030, air pollution will still cause a quarter of a million premature deaths, and that

millions of hectares of valuable ecosystems will still be exposed to excessive pollutant levels, as would be the case under the Commission's proposed new NEC directive.

Applying new and improved emission control techniques must

be part of the solution, and that's why EU source-sector legislation must be regularly updated and strengthened.

Minimising the use of fossil fuels is key to resolving both climate change and air pollution, as it cuts emissions of carbon dioxide as well as those of sulphur dioxide, nitrogen oxides, fine particulate matter and mercury. Better energy efficiency, increased use of less-polluting or non-polluting renewable energy sources, and behavioural change (e.g. reducing car usage and meat consumption) are examples of measures that will benefit both air quality and the climate.

The EU's new climate and energy policy for 2030 – which was not accounted for in the Commission's proposed new NEC directive – opens the way for more ambitious clean air targets, as was demonstrated by the Parliament's impact assessment study.

But we all know that to avoid dangerous climate change, we need much tougher climate and energy targets, and this will help to achieve even stricter air pollution targets. At the same time, the significant short-term co-benefits for health and nature from the resulting air pollution reductions should help to motivate a much higher level of ambition for climate policy.

Christer Ågren

**‘Minimising the use of fossil fuels is key to resolving both climate change and air pollution’**



# Cities' air quality efforts ranked

Zurich topped a new ranking list of European cities based on efforts to improve air quality. It was followed by Copenhagen, Vienna and Stockholm. At the bottom of the list came Luxembourg and Lisbon.

The Swiss city of Zurich emerged as the winner of the second 'Sootfree Cities' ranking list that graded the efforts to improve air quality of 23 major European cities. In 2011, the last time the ranking was published by the European Environmental Bureau (EEB) and Friends of the Earth Germany (BUND), the winner was Berlin (see AN3/2011). It slipped to fifth place this year.

The ranking concentrated on measures put in place in cities over the past five years and looked at air quality plans for the next five years to take into account changes that were already in the pipeline.

The list of categories evaluated included:

- Air pollution reductions;
- How comprehensive low emission zones & bans for heavy polluters are;
- How clean public procurement for transport is;
- How comprehensive the strategy for non-road mobile machinery is;
- What type of economic incentives are used;
- How successful the city is at managing road traffic and other transport modes;
- How comprehensive the city has been at promoting public transport;
- How successful the city is at promoting walking and cycling;
- Whether it provides attractive and comprehensive information to citizens about air quality.

In Zurich and Copenhagen the number of cars has been substantially reduced and there are restrictions on highly polluting vehicles such as diesel cars, trucks and construction machinery. At the same time, cleaner forms of transport, such as public transport, cycling and walking have been greatly expanded.

Arne Fellermann, Transport Policy Officer at BUND, commented: "Our ranking shows that cities across Europe have been actively fighting air pollution because of the EU's air quality standards. Although 90 per cent of Europeans living



In Zurich the number of cars has been substantially reduced.

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in cities today are still breathing unhealthy air, Copenhagen, Stockholm, Vienna or Berlin have either met, or are due to meet, the EU limit values within the next two years. Zurich has already progressed well beyond the EU's norms."

**None of the 23** cities reached grade A, which is awarded for cities that score at least 90 per cent of the maximum number of points. A total of six cities failed with an F grade, namely: Dublin, Glasgow, Madrid, Rome, Lisbon and Luxembourg.

It was pointed out that cities' efforts to fight air pollution are hampered by inadequate action at EU level to fight air pollution, and that effective EU rules that reflect the emissions of road vehicles under real driving conditions are urgently needed. The EU should also strengthen emission standards for construction machinery (so-called non-road mobile machinery), and tighten the overall air pollution emission limits in 2020, 2025 and 2030 under the National Emission Ceilings (NEC) Directive. The latter would cut the amount of pollution each member state is allowed to emit and reduce long-distance pollution, which cities are helpless to deal with.

Member states' environment ministers will discuss the NEC Directive in June. In July, a proposal to revise the NEC Direc-

tive will be voted on in the Environment Committee of the European Parliament, followed by a plenary vote scheduled for September.

Louise Duprez, Senior Policy Officer for Air Pollution at the EEB, said: "Cities can do a lot to improve air quality, but they are left exposed to some pollution they can't control. This includes pollution coming from outside the city, like emissions from agriculture or industry. The EU must be more ambitious if it wants to prevent deadly smog episodes."

According to the European Commission, air pollution is the number one environmental cause of premature death in the EU, responsible for more than ten times the toll of road traffic accidents. In 2010 air pollution caused over 400,000 premature deaths as well as substantial avoidable sickness and suffering, including respiratory conditions and exacerbated cardiovascular problems. The annual external costs of these health impacts were estimated to range between €330 and 940 billion.

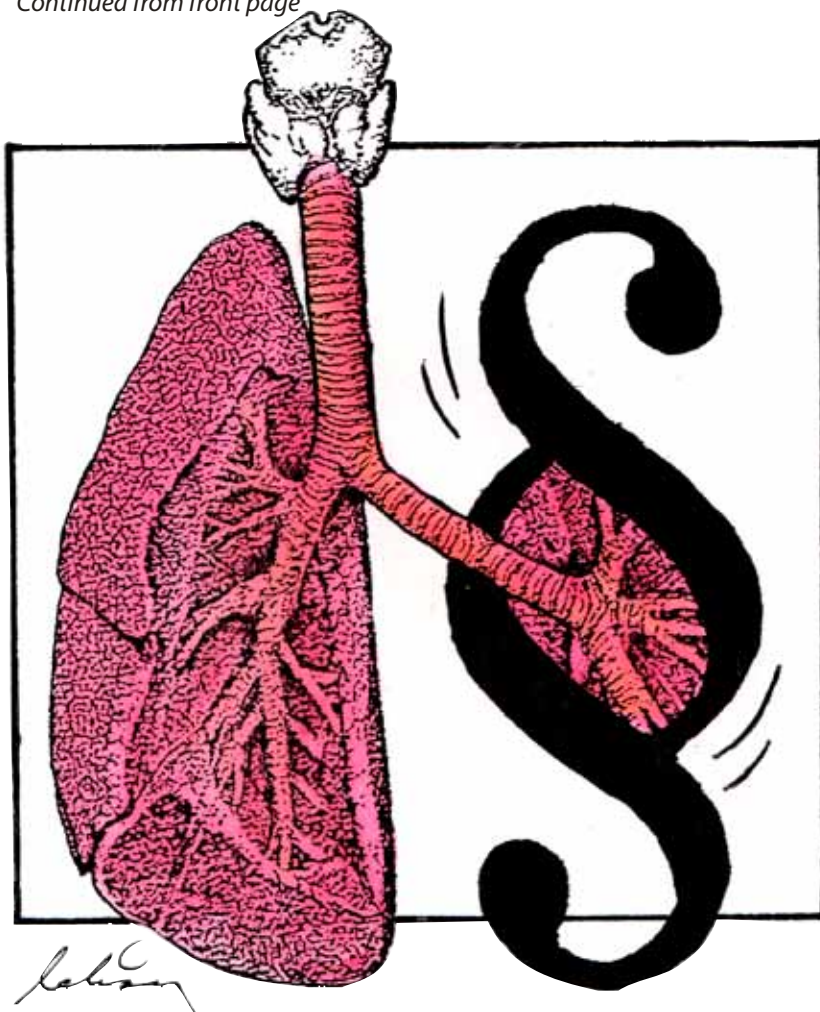
Christer Ågren

Source: EEB/BUND press release, 31 March 2015

For the full ranking, explanation of the methodology and the results for each city, visit: [www.sootfreecities.eu](http://www.sootfreecities.eu).

# Higher ambitions needed for NEC

Continued from front page



ERCs, air pollution would still cause some 260,000 premature deaths every year, i.e. more than half of today's death toll would still remain. Large areas of sensitive ecosystems would still be exposed to excessive inputs of acidifying and eutrophying air pollutants.

**The European Parliament's** Rapporteur, British Conservative MEP Julie Girling, published her draft report in late March, saying that "the NEC Directive is Europe's overarching framework piece of legislation for air quality, and without effective and implementable source legislation, member states will never meet their emission reduction targets. In other words, a further tightening of air quality standards will be redundant unless we see a clear reduction in pollution from the main sources".

Her report recommends improvements with regard to some aspects of the Commission's proposal, in particular the 2025 emission reduction commitments, which she proposes to make mandatory for four out of the six pollutants.

Environmental groups also welcomed her proposals to require member states to monitor the impacts of air pollution; to strengthen the role of both the Commission and the public in scrutinising national air pollution control programmes; to improve coherence between the NEC directive and the ambient air quality directive, as well as with source emission legislation; and to remove the proposed shipping flexibility.

It was noted with criticism, however, that she missed the opportunity to improve the proposal's ambition level for 2020, 2025 and 2030, especially considering that since the Commission published its proposal nearly one and half years ago, there are new studies and developments that further strengthen the case for more ambitious air pollution reductions.

For example, recent adjustments to national emission inventories and projections by member states show more optimistic developments in air pollutant emissions in comparison with the Commission's previous calculations (see AN 1/15, p 22). This means that more ambitious ERCs and higher benefits could be achieved for the same initial cost.

Moreover, the European Parliamentary Research Service's impact assessment

amounted to €330–940 billion in the year 2010 alone, which is equivalent to between 3 and 9 per cent of the EU's GDP. This includes €15 billion in direct costs from lost workdays and €4 billion from treatments of chronic bronchitis. Air pollution also causes great harm to Europe's ecosystems, crop yields, buildings and monuments.

Numerous studies have systematically demonstrated that the benefits of taking action to cut emissions of air pollutants outweigh the costs, in most cases by large margins.

**Although environmental groups** welcomed the Commission's proposal from December 2013 to revise the National Emission Ceilings (NEC) Directive, they conclude that its ambition level does not match the scale of Europe's air quality problems and the benefits at stake. Some of the main points of criticism are that:

- The targets, known as "Emission Reduction Commitments" (ERCs), set

for 2020 have been copy-pasted from the 2012 revised Gothenburg Protocol without consideration of the potential for additional health and environmental benefits for the EU of higher ambition levels. These proposed ERCs are expected to be achieved by member states, in many cases by a wide margin, just by implementing existing legislation. In some cases, the proposed ERCs would even result in higher emissions in 2020 than are allowed under the old NEC Directive dating from 2010.

- The Commission's proposal does not set legally binding reductions for 2025, thus risking the delay of urgently needed action until 2030.
- The proposed ERCs for 2030 are clearly not sufficient to achieve the World Health Organization's recommended levels of air quality, which are equivalent to the EU's long-term air quality objective as set out in the 7th Environmental Action Programme. Even after implementing the proposed 2030



report demonstrates that more ambition is possible and can be achieved at the same or lower cost (see AN 4/14, p 18–19). It shows that reduced consumption of polluting fuels under the EU's new climate and energy policy agreed by the EU Council last October would decrease the need and costs for air pollution controls and make further air quality improvements significantly cheaper.

**In light of** the significant health, environmental and economic benefits that would result from a more ambitious NEC Directive, the environmental groups call upon the European Parliament and the Council to support:

- Significantly stricter ERCs for 2025 and 2030. The ambition level should ensure the achievement of WHO's recommended air quality levels by 2030.
- Stricter ERCs for 2020, based on the most recent baseline figures and on a linear pathway towards the achievement of the 2025 and 2030 levels.
- Legally binding ERCs for 2025 for all pollutants covered by the directive.
- Legally binding ERCs for methane and mercury for all three target years, 2020, 2025 and 2030. (Mercury is left out of the Commission's proposal despite being a toxic and highly transboundary pollutant causing great damage to health and ecosystems.)
- The rejection of flexibilities such as adjustment of emission inventories and offsetting of emissions between land and sea.

On 15 June, environment ministers will discuss the directive in Brussels. A vote in the Parliament's environment committee is scheduled for 15 July, with a plenary vote in September.

Christer Ågren

Source: "NGO recommendations on the revision of the NEC directive following the publication of the rapporteur's draft report" (13 April 2015). By the European Environmental Bureau, Transport & Environment, ClientEarth, Health and Environment Alliance and AirClim. Link: <http://www.eeb.org/index.cfm/library/recommendations-following-nec-report-publication/>

# Ozone pollution still high

**Air pollution by** ground-level ozone continued to affect many countries across Europe during summer 2014, according to a new briefing published by the European Environment Agency (EEA). Almost all reporting countries exceeded at least once the long-term objective set by EU legislation, while the stricter alert threshold was exceeded only on four occasions.

Even though the ozone levels significantly exceeded the EU standards during summer 2014, the number of exceedances was lower than in many previous years, in

line with the long-term downward trend observed over the last 25 years. Exposure to high concentrations of ground-level ozone can cause and aggravate cardiovascular and respiratory diseases and also damage vegetation such as forest trees and agricultural crops. More detailed information on ozone measurements in each country as well as background information on ozone is available in the EEA briefing.

Source: EEA press release, 6 May 2015.

# Serious flaws in new MCP directive

**On 6 May** the European Parliament's environment committee voted on the introduction of new air pollution limits for medium-size combustion plants (MCP).

The proposed new directive is part of the Commission's Clean Air Policy Package from December 2013, and will cover installations that burn fuel and have a thermal input of between 1 and 50 megawatts (MW). These are mostly boilers, heaters, engines and turbines used for electricity generation, residential heating and cooling, and heating and steam for industrial processes. The Commission has estimated that around 142,000 installations in the EU would be affected by this directive.

The Parliament's environment committee (ENVI) voted in support of maintaining the emission limit values originally proposed by the Commission, but these are far from challenging and nowhere near what is already technically feasible. The European Environmental Bureau (EEB) noted that in some cases, the MCP emission limits are

as much as eight times higher than the existing Dutch standards for similar-sized combustion plants. On the other hand, the Parliament wants to move some of the compliance deadlines forward and to introduce energy efficiency requirements.

"This is a source of pollution which, until now, has been regulated in some EU countries but not in others, so it is important that the EU addresses it. Yet providing time extensions and exemptions for combustion plants in sectors, like the oil industry or district heating plants, is shameful. Citizens are probably left wondering what the objective behind the directive actually is: limiting air pollution or reducing the impact it will have on industry?" said Louise Duprez, of the EEB.

Source: EEB press release, 6 May 2015.



Limits are as much as eight times higher than the existing Dutch standards

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# UN climate chief says there is “no space” for new coal

**On 7 May** Christina Figueres, the UN climate chief, met with representatives from seven Australian governments to encourage the states and territories to assist the federal government to help deliver a strong global deal at the UN COP21 negotiations in Paris at the end of the year.

She told them that there is “no space” for new coal

development and highlighted the benefits of ambitious clean energy

Asked about the country’s reported lack of enthusiasm for ambitious carbon emissions reductions, Figueres said: “like the oceans, there are ebbs and flows about everything. We welcome that the federal government is turning in its national target by July and I’m con-

fident it will encompass what the states and territories are doing,” she said. “I’m confident we will be pleasantly surprised.”

Australia’s federal government has begun consulting over emission reduction targets beyond 2020, which will be the main focus of the COP21 climate meeting.

Source: Climate Action/ UNEP press release 7 May 2015 [http://www.climateactionprogramme.org/news/un\\_climate\\_chief\\_says\\_there\\_is\\_no\\_space\\_for\\_new\\_coal](http://www.climateactionprogramme.org/news/un_climate_chief_says_there_is_no_space_for_new_coal)



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Clear message from Figueres.

## France: 100% renewables as cheap as 50% nuclear

The findings of a new report show that renewables can entirely cover French electricity needs by 2050 instead of a mix of nuclear, renewables and fossil fuels, which currently is the government plan.

**A report by** the French Environment and Energy Agency (Ademe), aided by the General Directorate for Energy and Climate, has concluded that supplying the nation’s electricity demand with renewables by 2050 would cost about the same as the plan currently favoured by the president and the Ministry of Ecology, Sustainable Development and Energy, which is to meet France’s power needs with 50 per cent nuclear, 40 per cent renewables and 10 per cent fossil fuels by 2050.

The potential for electricity generation from renewables in France by 2050 (1,268 TWh a year) is triple the nation’s projected electricity demand over that period (422 TWh). Reaching this goal would require demand management that lowers consumption by 14 per cent, despite a projected population increase of six million. A diversity of sources would be required to achieve a 100 per cent renewable electricity mix. The study projects a mix of 63 per cent offshore and

onshore wind, 17 per cent solar, 13 per cent hydro, and 7 per cent thermal energy (including geothermal). The regions with the best renewable development potential are Aquitaine, Brittany, Midi-Pyrénées, the

Pays de la Loire, Provence-Alpes-Côte d’Azur, and Rhône-Alpes. The report assumes that pre-tax consumer electricity costs will rise about 30 per cent by mid-century.

Between 2019 and 2025, almost half of France’s 58 nuclear reactors will reach the 40-year lifespan for which they were designed. They will then need to apply for a licence extension, which requires upgrading to new technology, or will have to be decommissioned. Both options are costly.

Source: <http://www.mediapart.fr/journal/france/080415/energie-le-rapport-cache-sur-une-france-100-renouvelable>

[http://www.lemonde.fr/planete/article/2015/04/09/une-france-avec-100-d-electricite-renouvelable-pas-plus-couteux-que-le-nucleaire\\_4613278\\_3244.html](http://www.lemonde.fr/planete/article/2015/04/09/une-france-avec-100-d-electricite-renouvelable-pas-plus-couteux-que-le-nucleaire_4613278_3244.html)

[http://www.go100percent.org/cms/index.php?id=45&tx\\_ttnews%5Btt\\_news%5D=395&cHash=c49d899dffe50003b28e67bc8ffa6655](http://www.go100percent.org/cms/index.php?id=45&tx_ttnews%5Btt_news%5D=395&cHash=c49d899dffe50003b28e67bc8ffa6655)



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Ready to take over, when nuclear retires.

# Biogas solutions for methane abatement

Four Nordic projects for anaerobic digestion of manure show the potential for this methane abatement technique under varying conditions.

**The Nordic Council** of Ministers has published a report entitled “Nordic initiatives to abate methane emissions – A catalogue of best practices”. Five of the fourteen case studies are in the farming sector. Four of them are biogas projects (see table).

Måbjerg Bioenergy plant in Denmark is one of the largest biogas facilities in the world. More than 140 suppliers provide the plant with manure slurry. Some of it is transported by pipeline, but most of the slurry gets there by road. The biogas plant provides one heating plant and one central heating plant with gas that meets the heating needs of 5,000 homes and supplies 12,000–12,500 homes with electricity.

Lövsta is a medium-scale biogas plant run by the Swedish University of Agricultural Sciences. It is fed with a manure mix from cattle, pig and poultry, as well as potatoes from a local farm and waste flour from a mill. The biogas it produces is used for electricity production and heating.

The cost of methane abatement is basically the same for Lövsta and Måbjerg, although the scale of production differs by a factor of ten.

The third plant, Brålanda, is actually a network of several plants connected to a network and a single refining facility. The capacity is quite similar to Lövsta. The



Måbjerg biogas plant in Denmark.

JENS BACH/MAABJERG BIOENERGY

refining of biogas allows it to be used as a vehicle fuel. The methane abatement cost is only slightly higher than for the previous two plants.

Most biogas plants that digest manure are designed for processing slurry (liquid manure). However in Sweden and in many other European countries, solid manure systems are still common in farming. Sötåsen is a full-scale trial plant for digesting solid horse manure together with

cattle slurry. The results showed that the plant was more efficient than when run on cattle slurry alone. Using straw as a bedding material gave a higher methane yield, but sawdust and granulated straw caused fewer technical problems in the system. The cost of methane abatement is about three times as high as for the other, larger, biogas projects in the report, but still less than half that of some similar-sized slurry only projects.

These four case studies show that there is potential for producing biogas from manure under varying conditions, when it comes to scale, substrate and topography.

Kajsa Lindqvist

Table: Comparison of the four projects.

	Måbjerg, Denmark	Lövsta, Sweden	Brålanda, Sweden	Sötåsen, Sweden
Features	One of the largest biogas facilities in the world	Medium-scale and efficient	Small-scale plants connected to a system	Small-scale production from solid horse manure
Biogas production	18 million Nm <sup>3</sup> /year	1,800,000 Nm <sup>3</sup> /year	1,700,000 Nm <sup>3</sup> /year	124 Nm <sup>3</sup> /day
Methane abatement cost	€ 5,217/ton CH <sub>4</sub>	€ 5,085/ton CH <sub>4</sub>	€ 6,250/ton CH <sub>4</sub>	€ 17,300/ton CH <sub>4</sub>
Use of biogas	Heating and electricity	Heating and electricity	Vehicle fuel, heating	Heating and electricity

Read about other methane abatement techniques in the full report: “Nordic initiatives to abate methane emissions – A catalogue of best practices”: <http://www.diva-portal.org/smash/get/diva2:764201/FULLTEXT01.pdf>





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# Danish farming futures

Becoming independent from fossil fuels by investing fully in the new bio economy, or reintroducing wolves and the European bison, these are two visions explored in a new report about the future of Danish farming.

**The Danish Ecological** Council has drawn up four future agricultural scenarios for Denmark that explore four different aspects of sustainable farming. This can be seen as an attempt to visualise the difficulty of taking into account all aspects of sustainability at the same time. In the study they defined five areas for sustainability:

- biodiversity,
- aquatic environment,
- soil fertility,
- climate,
- business economy and employment

The four scenarios focus on different approaches to increase the level of sustainability within these areas.

The “green growth” scenario aims to minimise pollution and the climate impact of farming while maintaining potential for economic growth in farming. This is achieved by placing most livestock in closed barns to control emissions of ammonia and greenhouse gases, combined

with eco-friendly cultivation, planting winter crops in most grain fields to reduce nutrient leakage, and growing straw and grass for biogas production.

In the “urban and rural” scenario, the main aim is to connect urban and rural areas to drive progress in rural districts and farms, and stimulate employment and healthy economies. Local food production is promoted, a significant share of all farms is organic and land that surrounds cities is adapted for recreational purposes.

In the “biobased society” scenario, the main objective is to have farmers supply feedstock for the production of renewable energy and materials in addition to food. There are five bio-refineries in Denmark that produce bioenergy, chemicals and plastic. Denmark is independent of fossil fuels, and bioenergy is an important part of the energy supply. Fields of willow, poplar and grass provide raw materials.

In the fourth scenario “a rich nature” the

main aim is to create more biodiversity and balance in nature by 2050. Areas with the highest biodiversity potential are not used any more as regular farmland. Instead they are converted into national parks, wetlands or grazed, while agriculture is intensified in other areas to keep production levels as before. Wolf, wild boar, beaver and the European bison can be found.

**Each scenario has** been assigned a particular land use profile in 2030 and 2050 (table 1). For comparison there is also a business as usual scenario (BAU). In all four scenarios the share of agricultural land is lower compared to BAU. The reduced areas of agricultural land are made possible by abolishing the current export of grain and using this land for other purposes. The share of arable land is highest in the “urban rural” scenario, since low-input agriculture is introduced and it will require larger



Table 1: Area use in 2050 for the different scenarios. Note that energy crops are included in the category permanent grassland.

Area in thousand hectares	Baseline 2011	BAU	Green growth	Urban and rural	The biobased society	A rich nature
Agricultural land in total	2,659	2,351	2,286	2,286	2,286	2,191
Arable land	2,327	2,019	1,454	1,914	1,454	1,609
Permanent grasslands	332	332	632	372	632	582
Energy crops willow/poplars	6	6	200	0	200	0
Forest	608	608	673	673	673	768
Settlements and open nature areas	1,022	1,330	1,330	1,330	1,330	1,330
<b>Total</b>	<b>4,289</b>	<b>4,289</b>	<b>4,289</b>	<b>4,289</b>	<b>4,289</b>	<b>4,289</b>
Total agricultural area as % of DK area	62	55	53	53	53	51
Non-tilled land as % of agricultural area	13	14	36	16	36	27

Table 2: CO<sub>2</sub>e reductions (million tonnes of CO<sub>2</sub>e) compared to business as usual. For methane, only the changes caused by increased use of biogas are included.

Million tonnes of CO <sub>2</sub> e	Green growth		Urban and rural		The biobased society		A rich nature	
	2030	2050	2030	2050	2030	2050	2030	2050
Change in carbon sequestration	0.28	0.54	0.1	0.21	0.65	0.62	0.39	0.79
Change in methane emissions	(0.26)	(0.34)	(0.01)	(0.01)	(0.17)	(0.19)	(0.01)	(0.01)
Substitution of fossil fuels	4.34	6.50	0	0	8.82	7.70	1.00	1.00

areas than conventional agriculture. The share of permanent grasslands is highest in the “green growth” and the “biobased society”, where grass is grown to provide bioenergy. The share of forest increases the most in the “rich nature” scenario.

Numbers of farm animals were related to the feed supply in each scenario. By 2050 the number of animal units is expected to be unchanged in the “rich nature” scenario, while it is 5 per cent lower in the “biobased society” scenario, 10 per cent lower in the green growth scenario and 20 per cent lower in the “urban and rural” scenario. The shares of different kinds of animals are expected to be the same as today.

It is interesting to note that numbers of animals are not expected to have a crucial impact on ammonia emissions. Instead, technical measures such as cooling and acidification of slurry, air scrubbers and direct soil incorporation of manure, in combination with keeping almost all animals indoors all year round are implemented in two of the scenarios, “green growth” and “rich nature”. Only a few sheep and cows are kept outdoors to graze

permanent grasslands. These measures are expected to reduce ammonia emissions by 80 per cent in the “rich nature” scenario and by 60 per cent in the “green growth” scenario by 2050.

**The study did** not model changes in greenhouse gas emissions abroad that would follow the changes in the scenarios. Nor did it model all domestic greenhouse gas emissions. For instance all scenarios will result in reduced use of mineral fertilizers and more efficient use of manure. This would probably result in lower nitrous oxide emissions, but this was found too difficult to quantify.

However, three types of greenhouse gas emissions were quantified for the different scenarios (table 2). Increased levels of carbon sequestration were achieved in all four scenarios. In the “green growth” and “biobased society” scenarios this was mainly achieved by converting arable land to energy crops and permanent grasslands. The former is assumed to increase CO<sub>2</sub> sequestration by 1.20 tonnes/ha/year and the latter by 1.83 tonnes/ha/year. The level of carbon sequestration is the highest in

the “rich nature” scenario, where a lot of land is afforested. This is assumed to have an increased effect on carbon sequestration of 2.17 tonnes/ha/year. Increased carbon sequestration caused by changes in land use will however decrease gradually over the years until a new equilibrium is reached.

In the case of methane emissions, only the reductions that are achieved through increased use of biogas production from manure are considered. This is assumed to have an effect of 0.14 CO<sub>2</sub>e per tonne of processed manure.

Substitution of fossil fuels with biomass is the measure that has the largest effect on greenhouse gas emissions. In the “biobased society” scenario, emissions are expected to decrease by around 8 million tonnes of CO<sub>2</sub>e per year. This can be compared to the total greenhouse gas emissions in Denmark that were around 50 million tonnes CO<sub>2</sub>e in 2012.

The “biobased society” will however have the least positive effect on biodiversity and the lowest reduction in pesticides.

When it comes to employment, the authors expect that the number of people working in the agricultural sector will continue to decrease under the BAU scenario. The same trend is expected to different degrees in each of the four scenarios. There will be most agriculture-related jobs in the “biobased” society and fewest in the “rich nature” scenario. The loss of jobs is not however seen as a problem in the long run, as other sectors are expected to absorb the laid-off workforce.

When reading this report it is worth remembering that Denmark is in many ways quite an exceptional country in Europe. The share of agricultural land is very high (62 per cent) and there are few natural areas. The number of pigs per capita is probably one of the highest in the world. The use of advanced technology in agriculture is widespread. If this study was conducted in another country the outcomes as well as the priorities would most likely be quite different.

Kajsa Lindqvist

The entire report “Scenarier for fremtidens landbrug i Danmark” (in Danish) can be downloaded at: <http://fremtidenslandbrug.dk/publikationer/hovedrapport-scenarier-for-fremtidens-landbrug-i-danmark/>

And for a summary in English: <http://fremtidenslandbrug.dk/future-farming/>

# Marshall Islands calls for cuts in shipping emissions

By 2050, greenhouse gas emissions from international shipping are expected to increase by up to 250 per cent, equivalent to between 6 and 14 per cent of total global emissions.

In a submission to the International Maritime Organization (IMO), the Republic of the Marshall Islands, currently the world's third largest shipping registry, has called for the setting of a new global target for reducing greenhouse gas (GHG) emissions from international shipping, a growing sector currently left out of international climate negotiations.

Shipping currently contributes around three per cent of global GHG emissions, but the projected increase in emissions gives greatest cause for alarm. Under current policies, emissions are expected to increase by 50 to 250 per cent by 2050, which would be equivalent to between 6 and 14 per cent of total global emissions – roughly equivalent to the emissions of the entire European Union today. According to the Third IMO GHG Study, this would make it impossible to limit global warming to below 1.5 to 2 degrees.

The Marshall Islands, joined by over

100 other vulnerable nations, has long called for global warming to be limited to less than 1.5 degrees above pre-industrial levels. To achieve this goal, anthropogenic GHG emissions need to be phased down to near zero by mid-century, which will require significant emission reductions across all economic sectors.

Being host to the third largest independent shipping registry in the world – almost one in ten of the world's fleet flies its flag – vessel fees are one of the nation's few regular sources of income, together with tuna fishing licence fees and foreign aid.

For small island states, sea transport is essential for connectivity and all aspects of island life. But global emissions continue to rise, and current projections are for 3 to 4 degrees of global warming, which would produce enough sea-level rise to put the Marshall Islands and other low-lying countries and regions under water.

The effects of climate change on the island countries of the Pacific are clearly evident, and for some, their very existence is under grave threat.

It is important that the international shipping sector keeps pace with the international momentum for climate action, and is not left behind as a major polluting sector while the rest of the world economy moves down an accelerating decarbonisation pathway.

The Marshall Islands' submission to the IMO Marine Environmental Protection Committee's 68th Session in London in May makes the case that it is time for the IMO to take ambitious and decisive action consistent with emissions trajectories that can avoid dangerous climate change.

Source: Press release of Republic of the Marshall Islands, 20 April 2015

Most of the land in the Marshall Islands is no more than 1 meter above the high tide mark. As a result, the country is extremely vulnerable to rising sea levels.

ERIN MAGEE, AUSAID/FLICKR.COM/ CC BY





# Offsetting of shipping NOx cuts?

Emission control areas in the Baltic Sea and North Sea will cut NOx from shipping, but would make only a very limited contribution to member states' NOx emission reduction targets for 2030.

**The European Commission's** proposal for a revised National Emission Ceilings (NEC) Directive introduces some new flexibility provisions, one of which offers member states the possibility to offset NOx, SO<sub>2</sub> and PM<sub>2.5</sub> emission reductions achieved in the international shipping sector against emissions of the same pollutants from land-based sources in the same year.

According to the Commission, the proposal aims to promote a cost-effective achievement of the national emission reduction commitments. An additional motive may be to encourage member states to more actively engage in the establishment of more emission control areas (ECA), primarily NOx ECAs in the Baltic Sea and North Sea. Of course, an unavoidable side effect of any offsetting is that it allows higher emissions from domestic sources in those member states that opt in.

In its proposal, the Commission lists a number of conditions that must be met:

- The ship emission cuts must occur in member states' territorial waters or exclusive economic zones;
- Member states must have effective monitoring and inspection systems in place;
- Only new shipping measures (i.e. that go beyond EU standards) can be used; and
- Member states can offset at most 20 per cent of the ship emission cuts.

A new study by the Dutch Environmental Assessment Agency (PBL) and the Finnish Meteorological Institute (FMI) has calculated how the establishment of NOx ECAs in the Baltic Sea and North Sea would contribute to NOx emission reductions in 2030 that could be used by member states in offsetting, assuming that the flexibility proposal is adopted.

**It should be** noted that there is considerable uncertainty regarding ship emissions data, because emission inventories use different approaches, methodologies and

assumptions. Emissions of NOx from international shipping in the North Sea, for example, have been estimated at between 470 and 660 kilotons in 2009. Projections for 2030 result in figures of between 450 and 640 kt, coming down to 270–460 kt if it is assumed that NOx ECA standards are introduced in 2016.

Introduction of NOx ECAs in the North Sea and Baltic Sea by 2016 is estimated to result in annual ship emission reductions of 200 to 300 thousand tonnes in 2030, and would have the biggest impact for Estonia, Denmark, Sweden and the Netherlands, which could meet between 4 and 9 per cent of their NOx targets for 2030 through emission cuts in the shipping sector. For Latvia, Finland and the UK, the results were between 1 and 4 per cent, and for Belgium, Lithuania, Germany, France and Poland below 1 per cent.

The countries with the highest potential for offsetting are those having relatively small targets for NOx emission reductions under the NEC Directive proposal, in combination with relatively large ship NOx reductions within their exclusive economic zone.

According to the study, these contributions should be considered the maximum – using other emission inventories would result in lower contributions. Moreover, postponing the introduction of the NOx ECA by five years (i.e. until 2021) could cut its contribution to the targets by nearly half.

The study did not investigate potential impacts on air quality (changes in concentrations and deposition of air pollutants) of applying the offsetting scheme, nor its economic implications.

Discussions so far in the Council and the European Parliament indicate that the proposed shipping flexibility will be re-



Offsetting – more bureaucracy than real emission reductions

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moved from the revised NEC Directive. For example, the Parliament's Rapporteur, Julie Girling, has said that the proposal is "convoluted, burdensome to apply, and conflicts with the Commission's better regulation agenda" and that it discriminates against landlocked countries.

Christer Ågren

The study: The potential contribution of a nitrogen emission control area to national targets under a revised EU national emission ceiling directive (April 2015). By P. Hammingh, J-P. Jalkanen, L. Johansson & J. de Ruiter. Published jointly by Netherlands Environmental Assessment Agency (PBL) and the Finnish Meteorological Institute (FMI).

[www.pbl.nl/sites/default/files/cms/publicaties/pbl-2015-potential-contribution-of-a-neca-to-national-targets-under-revised-eu-nec-directive\\_01699.pdf](http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2015-potential-contribution-of-a-neca-to-national-targets-under-revised-eu-nec-directive_01699.pdf)

## Longannet power plant to shut next year

The giant coal-fired power station, Longannet, on the Firth of Forth in Scotland, UK, is to close by March 2016. Built in 1973 and now inefficient, Longannet is alone responsible for nearly a fifth of Scotland's total climate emissions, releasing 9.5 million tonnes of CO<sub>2</sub> in 2013. Last year, Longannet was ranked as the 21st biggest CO<sub>2</sub> polluter in the EU.

Gina Hanrahan, climate and energy policy officer at WWF Scotland, said: "While Longannet has served Scotland well for over 40 years, it is Scotland's single biggest source of climate emissions and a combination of EU air pollution rules, carbon pricing and factors such as transmission charging have made the aging plant's closure inevitable."

Source: The Guardian, 23 March 2015

## NRMM emission standard needs to be strengthened

In a recent policy briefing, the green group Transport & Environment (T&E) criticises the Commission's proposal to revise the Non-Road Mobile Machinery (NRMM) directive. According to T&E, the proposal is worryingly weak and will fail to adequately address the burden on health caused by the diesel exhaust from these machines. To improve the proposal, T&E suggests it should:

- Harmonise emission limits of NRMM engines with those for heavy-duty trucks;
- Not favour specific fuel types by allowing higher emission limits;
- Have only one date (2019) for entry into force of all engine types;
- Make sure the existing fleet also cleans up; and,
- Reform the test procedure to better reflect real-life operating conditions.

The briefing document can be downloaded at: [www.transportenvironment.org/publications/non-road-mobile-machinery-good-bad-and-dirty](http://www.transportenvironment.org/publications/non-road-mobile-machinery-good-bad-and-dirty)

# Ship scrubbers questioned

**The ecological risks to the marine environment of using sulphur scrubbers are ignored, while the economic benefits have been overestimated, says German environmental organisation NABU.**

**As from 1 January 2015**, fuel used by vessels operating within Emission Control Areas (ECA) is limited to a maximum sulphur content of 0.10 per cent, down from the previous limit of 1.0 per cent. In practice, this means moving from high-sulphur heavy fuel oil (HFO) to low-sulphur marine gas oil (MGO), or to alternative fuels such as liquefied natural gas (LNG) or methanol. However HFO is still permitted to be used if ships are equipped with exhaust gas cleaning systems, such as scrubbers, that achieve equivalent sulphur emission reductions.

So far, about 80 ships out of a world fleet of 55,000 ships have had scrubbers installed, with some 300 additional scrubber systems on order, according to a new study by the Dutch research institute CE Delft on behalf of German environmental organisation Nature and Biodiversity Conservation Union (NABU).

Currently the scrubber market is dominated by wet open-loop scrubbers, which,

unlike closed-loop and dry scrubbers, will discharge wash-water into the sea. The different types of scrubbers are described in the Box.

Although the IMO wash-water criteria are generally met, scrubbers may negatively impact on the marine environment through ocean acidification, eutrophication and accumulation of hazardous substances such as heavy metals and polycyclic aromatic hydrocarbons (PAH).

The long-term impacts of the use of open-loop scrubbers, especially in vulnerable coastal areas with a reported moderate water quality, therefore need to be investigated systematically, the study says. Moreover, it should be evaluated if scrubbers can be used in accordance with the EU's Water Framework Directive and Marine Strategy Framework Directive, which set maximum concentrations for certain hazardous pollutants, prohibit deterioration of water quality, and aim to achieve 'good environmental status' respectively.

## Four main types of scrubbers

### 1. Seawater scrubbers (open-loop)

use the natural alkalinity of seawater to neutralise the sulphur from exhaust gases. While these scrubbers have greater energy consumption compared to closed-loop systems, there is no need for chemical additives such as caustic soda.

### 2. Freshwater scrubbers (closed-loop)

use caustic soda added to freshwater in a closed system to neutralise the sulphur from exhaust gases. The circulating water is processed after the scrubber and dosed with caustic soda in order to restore the alkalinity of the wash water.

### 3. Hybrid scrubbers

can be used either as closed-loop or open-loop systems. They are generally used as open-loop systems when operating in the open sea and as closed-loop systems when operating in harbours or estuaries, where wastewater discharge is prohibited.

### 4. Dry scrubbers

do not use any liquids in the process, so there is no discharge to the sea. Instead the exhaust gases are cleaned with hydrated lime-treated granulates, producing gypsum that is used to manufacture wallboard. Dry scrubbers use less energy than wet scrubbers.







TODD DAVIS/FICKR.COM/ CC BY-SA

With open-loop scrubbers hazardous substances such as heavy metals and polycyclic aromatic hydrocarbons end up in the water instead of in the air.

## France told to act on PM<sub>10</sub> and marine fuels

The maximum daily limits for PM<sub>10</sub> are being exceeded in ten zones in France: Paris, Lyon, Grenoble, Marseille, Martinique, Rhône-Alpes-ZUR (Vallée de l'Arve), PACA-ZUR (Zone Urbaine Régionale), Nice, Toulon, Douai-Béthune-Valenciennes. This means that the country has failed to take measures that should have been in place since 2005 to protect citizens' health, and the Commission is now requesting France to take speedy and effective action to keep the period of non-compliance as short as possible.

In another reasoned opinion, the Commission is asking France to send details about how EU legislation on the sulphur content of marine fuels is being enacted in their domestic law, an obligation that should have been fulfilled by 18 June 2014.

If France fails to act within two months, the Commission may take either of these issues to the EU Court of Justice.

Source: European Commission press release, 29 April 2015. Link: [http://europa.eu/rapid/press-release\\_MEMO-15-4871\\_en.htm](http://europa.eu/rapid/press-release_MEMO-15-4871_en.htm)

## Court orders UK to act on air pollution

The UK Supreme Court has quashed the country's ineffective plans to cut illegal levels of air pollution in Britain and ordered it to deliver new plans by the end of the year. The ruling is the culmination of a five-year legal battle fought by ClientEarth for the right of British people to breathe clean air, and it means the UK Government must start work on a comprehensive plan to meet pollution limits as soon as possible. Among the measures that it must consider are low-emission zones, congestion charging and other economic incentives.

ClientEarth Lawyer Alan Andrews welcomed the "historic ruling" and noted that particular action was needed on diesel vehicles. The European Commission is taking its own separate infringement action against the UK for breaching the air quality directive.

Source: ClientEarth press release, 29 April 2015. Link: [www.clientearth.org/news/press-releases/uk-supreme-court-orders-government-to-take-immediate-action-on-air-pollution-2843](http://www.clientearth.org/news/press-releases/uk-supreme-court-orders-government-to-take-immediate-action-on-air-pollution-2843)

National governments and ports can set limits for hazardous substances or prohibit the discharge, and the study notes that Germany has prohibited scrubber wash-water discharges in inland waters, rivers and certain ports, including the Kiel Canal, and that Belgium has prohibited discharging within three nautical miles of its coast.

"Obviously nobody ever systematically investigated the impact of scrubbers on the marine environment. It is clear for everyone that simply discharging harmful substances into the ocean instead of to the air will not result in an improvement for the environment," said NABU Chief Executive Officer Leif Miller.

**In terms of** greenhouse gas emissions, it is estimated that the use of scrubbers increases energy consumption by about 1.5–3.5 per cent – seawater scrubbers increase ship fuel consumption more than freshwater scrubbers. Production of MGO for use in ECAs will increase refinery emissions of carbon dioxide, but since refineries in the EU are included under the cap of the EU's emission trading system (ETS), any such increases would have to be offset by reductions elsewhere in the system.

Regarding the business case for scrubbers, the study says that it is difficult to draw firm conclusions on the profitability of using scrubbers, as this depends on the operational profile of the ship, the price difference between HFO and MGO, and the length of time that ships sail in ECAs. The study noted that with the current low price difference, it is not easy to make a positive business case for scrubbers.

"Scrubbers must also be rejected as they allow ship owners to continue to sail on heavy fuel oil instead of investing in cleaner fuels and eco-friendly drives. Ship owners who opt for scrubbers invest a lot of money in the wrong technology. A switch to low-sulphur fuels like LNG or MGO in combination with particle filters and selective catalytic reduction (SCR) is literally the cleaner solution," said NABU transport policy officer Daniel Rieger.

Christer Ågren

Source: NABU press release 13 March 2015

The study: Scrubbers – An economic and ecological assessment (March 2015). By CE Delft, the Netherlands. Download: [www.nabu.de/downloads/150312-Scrubbers.pdf](http://www.nabu.de/downloads/150312-Scrubbers.pdf)

# Member states fail to define low-energy buildings

## Fossil fuels subsidised by \$10 million a minute

Fossil fuel companies are benefitting from global subsidies of US\$5.3 trillion a year, equivalent to \$10 million a minute every day, according to a startling new estimate by the International Monetary Fund (IMF). In per cent of GDP, global energy subsidies are estimated to increase from 5.8 per cent of global GDP in 2011 to 6.5 per cent in 2015.

The IMF describes the numbers as “shocking”. They exceed global public health spending, estimated by the WHO at US\$4.3 trillion in 2013. “It is one of the largest negative externalities ever estimated”, says Vitor Gaspar at IMF.

Most subsidies (59%) are for coal. In dollar terms, the top five subsidisers are China, United States, India, Russia, and Japan. Subsidies in the European Union are similar to those in India.

Source: The Guardian, 18 May 2015

The IMF working paper “How Large Are Global Energy Subsidies?” is available at <http://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf>

Only half of EU member states have in law defined nearly Zero-Energy Buildings (nZEB) requirements for new buildings, according to a survey by the Buildings Performance Institute Europe (BPIE). For existing buildings the result is even worse, a definition is only in place in

performance of buildings. The European Commission is then expected to review the national plans defining nZEB requirements by the end of 2015.

The BPIE points out the weakness of a directive that only has a broad definition of nZEB and leaves it up to member states to work out the details, which leaves room for varying performance.

Buildings have a crucial role to play in Europe’s energy transition and the achievement of its 2020 climate and energy targets, as they account for almost half of the EU’s total energy consumption and 36 per cent of its greenhouse gas emissions.

BPIE press release 21 April 2015: [http://bpie.eu/uploads/lib/document/attachment/127/Press\\_Release\\_BPIE\\_nZEB.pdf](http://bpie.eu/uploads/lib/document/attachment/127/Press_Release_BPIE_nZEB.pdf)

Factsheet with results from the survey: [http://bpie.eu/uploads/lib/document/attachment/127/Press\\_Release\\_BPIE\\_nZEB.pdf](http://bpie.eu/uploads/lib/document/attachment/127/Press_Release_BPIE_nZEB.pdf)



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eight of the member states. Only five of the member states have the same definition for old and new buildings.

The Energy Performance of Buildings Directive (EPBD) says that all new buildings should meet the nZEB requirement by 2020, while for public buildings the deadline is set for 2018. By June 2015, member states are required to set intermediate targets to improve the energy

# Make your voice heard on EU climate policy

The European Commission has launched two consultations concerning the future of the Effort Sharing Decision (ESD).

The Effort Sharing Decision sets greenhouse gas emission reduction targets for each member state for the sectors not covered by the EU Emissions Trading System. Its scope currently covers some 55 per cent of total greenhouse gas emissions in the EU and includes greenhouse gas emissions from sources such as CO<sub>2</sub> emissions from road transport, heating of buildings, small-scale industry and so-called non-

CO<sub>2</sub> emissions from agriculture and waste.

At the European Council meeting in October 2014, EU leaders expressed their wish to continue the ESD approach for the period 2021-2030, with the aim of reducing emissions in the non-emission trading sectors by 2030 by 30 per cent compared to 2005.

The Commission is now preparing a legislative proposal.

The first consultation is focusing on some general principles for the ESD:

- the flexibility mechanisms foreseen in the ESD to ensure overall cost efficiency,

- monitoring, reporting and compliance,
- the approach to setting the national greenhouse gas reduction targets in the ESD and
- complementary EU-wide action to achieve the reduction targets.

The second consultation deals with the issue of whether emissions from agriculture, land use, land-use change and forestry should be included in the ESD.

Both of the consultations are open for submissions by 18 June 2015.

Link to first consultation: [http://ec.europa.eu/clima/consultations/articles/0025\\_en.htm](http://ec.europa.eu/clima/consultations/articles/0025_en.htm)

Link to second consultation: [http://ec.europa.eu/clima/consultations/articles/0026\\_en.htm](http://ec.europa.eu/clima/consultations/articles/0026_en.htm)



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# New ships less fuel efficient than those built in 1990

**Ships are significantly less energy-efficient today than in 1990, calling for greater steps in regulation and binding energy efficiency standards for the shipping sector.**

**New ships built** in 2013 were on average 10 per cent less fuel-efficient than those built in 1990, according to a new study, “Historical trends in ship design efficiency”, by CE Delft. On average, those earlier ships already beat the so-called “Energy Efficiency Design Index” standard that the International Maritime Organization (IMO) has set for new ships built in 2020.

This first-ever study of the historical trend in the design efficiency of new ships, commissioned by Seas At Risk and Transport & Environment, finds that bulk carriers, tankers, and container ships built in 2013 were on average 12, 8 and 8 per cent less fuel efficient respectively than those built in 1990.

The findings are particularly valuable as they starkly contradict claims that shipping has been constantly improving its environmental performance. They also demonstrate that market forces cannot by themselves lead to more fuel-efficient ships being built and that more regulation is necessary as well as a much stricter Energy Efficiency Design Index standard. It is interesting that at a time when ships were most energy efficient the price of oil was proportionally much

cheaper than today (around \$25 vs \$100 per barrel, in today’s prices).

John Maggs, policy advisor at Seas At Risk and president of the Clean Shipping Coalition, said: “Now we know that we cannot rely on rising fuel prices, other market forces or the good intentions of industry to solve shipping’s climate problem. Instead we need a clear and ambitious target for reducing ship greenhouse gas emissions and legally binding measures to get us there.”

The IMO will review the stringency levels of its Energy Efficiency Design Index (EEDI) – the efficiency standards for new ships – during a meeting of its Marine Environmental Protection Committee (MEPC) in London in May 2015.

Information sources:

CE Delft study: [http://www.transportenvironment.org/sites/te/files/publications/CE\\_Delft\\_7E50\\_Historical\\_trends\\_in\\_ship\\_design\\_efficiency\\_DEF.pdf](http://www.transportenvironment.org/sites/te/files/publications/CE_Delft_7E50_Historical_trends_in_ship_design_efficiency_DEF.pdf)

Press release from Transport and Environment: <http://transenv.eu/1GZM5Qe>



Increasing oil prices are not enough to stimulate the development of more efficient shipping.

SERGIO RUSSO/FLICKR.COM/ CC BY-SA

## Efficiency standards for ships too easy to meet

**CE Delft has** released a study, commissioned by Brussels-based NGOs Seas at Risk and Transport & Environment, which calculated the Estimated Index Values (EIVs) of new ships built between 2009 and 2014, and concluded that the majority of container and general cargo ships built in recent years already meet the IMO’s Energy Efficiency Design Index (EEDI) standards set for 2020.

Of the ships in the study that were built in 2014, some 34 per cent of container ships and 43 per cent of general cargo ships also met the EEDI target for 2030.

The study confirms that the EEDI targets need substantial revision since the current standards fall short on reflecting best practice or the pace with which improvements in efficiency can be brought about.

The study identified a large variation in the EIV of ships of similar type and size, indicating that large additional fuel savings and associated reductions in CO<sub>2</sub> emissions would be possible if all ships were built to the best available designs and technologies.

The EIV improvements have coincided with increases in average design speed

and decreases in main engine power for a number of ship categories, which suggests an improvement in hull or propulsion efficiency. The findings also suggest that, if design speeds were kept constant, larger improvements in design efficiency would have been possible.

More information at: <http://www.maritime-executive.com/article/whos-right-about-energy-efficiency>



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# New draft EU air pollution limits weaker than in China

The EU is currently in the process of defining new emission limits for coal-fired power stations, but the draft new standards are in many cases weaker than existing national standards not only in Europe but also in China, Japan and the United States.

In early April, the European Commission's IPPC Bureau released draft conclusions on the best available techniques reference documents (BREFs), providing new draft emission standards for air pollutants from large combustion plants.

The decision-making process under the EU's Industrial Emissions Directive defines best available techniques (BAT) in BREF documents which are to be used by member states to set binding emission limit values for toxic emissions, such as sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), mercury and particulate matter (PM<sub>2.5</sub>).

The draft conclusions are to be discussed at a meeting in Seville in June

with participants from member states and stakeholders, and EU member states are expected to vote on the proposal by the end of this year, followed by formal adoption in early 2016. The new definitions of best available techniques and related emission limits must be included in updated environmental permits within four years of adoption.

As updated versions of BREF documents should be published no later than eight years after the previous version, and the latest one was published in 2006, this BREF is already two years behind schedule.

According to an analysis by Greenpeace, the new draft BREF document from the IPPC Bureau shows only marginal changes

compared to an earlier draft published in June 2013. In fact, the emission limits in the draft conclusions are much weaker than many of the emission rates of the best-performing power plants already in existence and weaker than current emission limits in China, the United States and Japan (see box).

**Moreover, information released** by Greenpeace in March exposed the takeover of the EU's so-called Seville-process by the fossil fuels industry by demonstrating that the most important body involved in drafting the new standards, the Technical Working Group (TWG), is dominated by the energy industry.



## Emission limits for coal plants

**Sulphur dioxide (SO<sub>2</sub>):** The best performing power plants in the EU emit on average 20–60 mg/m<sup>3</sup> of SO<sub>2</sub> every year. Some power plants in the United States achieve even lower annual average rates of 5–15 mg/m<sup>3</sup>. Yet the proposal recommends annual average limits of 130 mg/m<sup>3</sup> for existing plants and 75 mg/m<sup>3</sup> for new plants. There was no improvement on the June 2013 draft proposal. This means that the IPPC Bureau's proposed emission limit for SO<sub>2</sub>, which is the pollutant responsible for approximately half of the premature deaths attributed to coal-fired power plants, remains 3–5 times above levels that can be achieved with best available techniques.

**Nitrogen oxides (NOx):** The best performing plants in the EU emit on average 50–80 mg/m<sup>3</sup> every year. In China, the best performing plants achieve an annual average of 30–50 mg/m<sup>3</sup>. While the June 2013 proposal recommended 180 mg/m<sup>3</sup> for existing plants, the final proposal has only slightly lowered recommended emission limits to 150 mg/

m<sup>3</sup>. For new coal plants the limit was also marginally changed from 100 to 85 mg/m<sup>3</sup>. The IPPC Bureau's proposal would allow many EU plants to avoid the installation of selective catalytic reduction (SCR) technology, which is the most effective technology to control NOx emissions.

**Particulate matter (PM):** After retrofitting, Chinese plants can limit emissions of particulate matter to 5 mg/m<sup>3</sup> per day. The best performing Japanese plants can achieve an even better result of 4 mg/m<sup>3</sup> per day. Yet the draft proposal would allow large existing EU plants to emit 16 mg/m<sup>3</sup> per day and new plants to emit 10 mg/m<sup>3</sup> per day. These limits would allow EU plants to avoid installing the best available technologies for controlling PM, such as fabric filters.

**Mercury:** In the United States, existing hard coal plants cannot emit more than 1.5 µg/m<sup>3</sup> of mercury every year. The June 2013 draft proposal would allow EU hard coal plants to emit 6 µg/m<sup>3</sup>, which the April 2015 proposal only slightly improved to 4 µg/m<sup>3</sup>. Moreover, emission

limits for lignite, which is an even more polluting energy source than hard coal, were not improved. These limits are so lenient that an estimated 85 per cent of EU plants are already in compliance.

Greenpeace recommends the following emission limits under the EU's rules, based on what is reasonably achievable with the application of state-of-the-art technology:

	Existing plants	New plants
Sulphur dioxide (SO <sub>2</sub> )	<35 mg/m <sup>3</sup> (annual)	<20 mg/m <sup>3</sup> (annual)
Nitrogen oxides (NOx)	<50 mg/m <sup>3</sup> (annual)	<40 mg/m <sup>3</sup> (annual)
Particulate matter (PM)	<3 mg/m <sup>3</sup> (annual)	<3 mg/m <sup>3</sup> (daily)
Mercury (Hg)	<1 µg/m <sup>3</sup> (annual)	<0.5 µg/m <sup>3</sup> (annual)

Source: Greenpeace Press Briefing, 7 April 2015

On top of the 137 official seats for industry representatives on the TWG, Greenpeace found that at least 46 representatives in government delegations are in fact industry employees or lobbyists. The presence of these "government experts" represents a clear conflict of interest as they are on the payroll of the companies or interest groups representing the companies that are being regulated. The result is that industry representatives make up over half of the members of the TWG.

Greenpeace also found that even national delegations that do not include industry representatives have advocated industry positions, often using statements directly copied from industry representatives. The impact of this undue influence can be seen in the weakness of the emission limits under consideration.

Environmental groups are therefore deeply concerned that the best available air pollution control techniques are not being properly taken into account in EU decisions to set emission limits for large combustion plants, and that the protection of health and the environment is undermined.

Coal-fired power plants are the largest source of SO<sub>2</sub> and mercury emissions in Europe and one of the largest industrial sources of emissions of NOx, arsenic, lead and cadmium. According to a recent study, air pollution from the EU's coal-fired power plants caused more than 22,000 premature deaths in 2010, as well as exacerbating asthma and contributing to dangerous levels of mercury found in the blood of thousands of babies born in Europe.

**The economic cost** of the health impacts of industrial air pollution is substantial. A recent report by the European Environment Agency (EEA) estimated the financial impact of airborne emissions from industrial facilities in the EU, Norway and Switzerland to be as high as €189 billion every year. (See AN 1/2015, pp 6-7.)

According to the EEA's analysis, the annual damage costs could be cut by €19–55 billion if 1500 large combustion plants were to achieve the BAT-associated emission levels for SO<sub>2</sub> and NOx described in the 2006 BREF document.

"The draft proposal by the IPPC Bureau would allow much more pollution than

would result from the use of the best available techniques. Adopting these standards will allow enormous health impacts, including thousands of deaths, which could be prevented with existing technology," Greenpeace concluded.

Christer Ågren

Source 1: Greenpeace Press Briefing, 7 April 2015. Link: <http://www.greenpeace.org/eu-unit/en/Publications/2015/coal-pollution-limits-leave-EU-trailing-behind-China/>

Source 2: "Smoke & Mirrors – How Europe's biggest polluters became their own regulators" (March 2015). By Greenpeace. Link: <http://www.greenpeace.org/eu-unit/en/News/2015/Smoke-and-Mirrors-How-Europes-biggest-polluters-became-their-own-regulators/>

## Mass action against coal mining

On 25 April more than 6,000 people formed a human chain close to the Garzweiler coal mine in Germany's Rhineland. The message was to "to end coal and accelerate the just transition that should have begun yesterday", says Emma Bierman from 350.org in a blog post.

The action is part of a larger campaign called "Ende Gelände", with plans for a new mass action on 14–16 August in the same region.

Source: <https://ende-gelände.org/en>  
<http://350.org/humanchain/>



## Coal costs Turkey €3.6 billion a year

A new study shows that the public health costs of polluted air from existing coal-fired power plants in Turkey are up to €3.6 billion per year. A cost that will increase significantly over the next four years, if existing plans to double coal power capacity with another 80 plants are implemented.

Coal power generation makes a considerable contribution to the country's already huge air pollution problem. More than 97% of the urban population in Turkey is exposed to unhealthy levels of particulate matter, which is the most harmful pollutant for health.

Medical experts in Turkey advocate a change in energy policies to reverse investment into coal. Dr. Bayazıt İlhan, President of the Central Council of Turkish Medical Association, says: "A

large coal-fired power plant emits several thousand tons of hazardous air pollutants every year and has an average lifetime of at least 40 years. The plans for a massive increase in investment would mean that coal's contribution to respiratory and cardiovascular disease would continue for decades. This unhealthy future has to be avoided. We would like to see the Turkish government detaching itself from this polluted and outmoded source of energy."

Source: HEAL press release, 20 May 2015.

The entire report "The unpaid health bill, How coal power plants in Turkey make us sick" is available at [www.env-health.org/unpaidhealthbill](http://www.env-health.org/unpaidhealthbill).

## 4 out of 5 largest EU CO<sub>2</sub> emitters are German

In 2014, RWE's Weisweiler lignite power station replaced the UK's Drax power station as Europe's fifth largest CO<sub>2</sub> emitter. This means for the first time since the EU Emission Trading Scheme (ETS) was set up in 2005, four out of five of the largest CO<sub>2</sub> emitters are German lignite power stations.

Three of the lignite power stations are owned by RWE (Neurath, Niederaussem and Weisweiler) and one is owned by Vattenfall (Jaenschwalde). Poland's PGE owns Europe's top CO<sub>2</sub> emitter, Bełchatów. Drax fell out of the top five as it cut reported CO<sub>2</sub> emissions by 18 per cent in 2014 by replacing some coal burning by biomass. German lignite power stations are also in eighth and tenth places, both advancing a place on last year. Emission data comes from the European Commission's published ETS data for 2014.

Source: Sandbag press release, 1 April 2015.



# Shipping monitoring will contribute to CO<sub>2</sub> targets

The newly adopted EU Monitoring Reporting and Verification (MRV) regulation that requires ship operators to publicly report information on the environmental performance of ships is expected to contribute to a decrease in shipping sector CO<sub>2</sub> emissions.

**The regulation creates** an EU-wide legal framework for collecting and publishing verified annual data on CO<sub>2</sub> emissions from all large ships (over 5,000 gross tons) that use EU ports, irrespective of where the ships are registered.

The MRV Regulation requires the monitoring and reporting to be based on three metrics: the theoretical energy performance of the ship known as the Energy Efficiency Design Index (EEDI); its real-world fuel consumption; and its energy efficiency, that is, the amount of fuel divided by the amount of cargo.

Shipping users will for the first time be granted access to transparent data that identifies the most efficient ships and practices. Until now this mainly existed in the form of the voluntary “Clean Shipping Index”.

The access of the public to fuel efficiency data for the shipping sector is expected to boost competition for the best ships and routes, which in turn will trigger market

forces that will result in fuel savings. This regulation will thus contribute to meeting CO<sub>2</sub> targets by cutting emissions from the shipping sector.

However, an increase in transport demand by shipping will offset any gains in fuel efficiency improvements. In its latest greenhouse gas (GHG) study, the UN’s shipping body, the IMO, projects a 50 to 250 per cent rise in shipping emissions by 2050. Currently ships are responsible for over three per cent of global greenhouse gas (GHG) emissions. According to the IMO study on GHG emissions from ships, under a business-as-usual scenario, shipping could represent 10 per cent of global GHG emissions by 2050.

Sotiris Raptis, clean shipping officer at Transport & Environment, said: “This law is expected to produce a virtuous circle of increased transparency, increased competition and greater fuel efficiency. But this is where our cheering stops. Given that the sector’s rapid growth is set to outstrip

efficiency gains, only CO<sub>2</sub> targets under the EU’s 2030 plan and Energy Union can deliver actual emissions cuts.”

The next opportunity for the EU to support a global CO<sub>2</sub> target for the sector is at IMO’s environment committee (which among other things will debate a submission from the Marshall Islands) in May.

More information at:

More information on EU measures and strategy on fuel-efficient shipping: [http://ec.europa.eu/clima/policies/transport/shipping/index\\_en.htm](http://ec.europa.eu/clima/policies/transport/shipping/index_en.htm)

International Maritime Organization, Reduction of GHG emissions from ships – Third IMO GHG Study 2014, (July 2014). <http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/MEPC%2067-INF.3%20-%20Third%20IMO%20GHG%20Study%202014%20-%20Final%20Report%20%28Secretariat%29.pdf>

Transport and Environment press release of 28 April 2015: <http://transenv.eu/1DSozzp>

Shipping users will for the first time be granted access to transparent data that identifies the most efficient ships and practices



# Sweden without gas

Natural gas is not a necessary part of the fuel mix. Most of Sweden, including Stockholm, has no natural gas. The combined pressure of environmental NGOs and farmers stopped gas and led to the development of biomass instead.

In most of Europe, fossil natural gas is considered a necessity. Not so in Sweden. Only a small part of the country, essentially the coastal region from Malmö in the south to Gothenburg in the southwest, is connected to the European gas grid, from Denmark.

Environmental NGOs have opposed extensions of the grid since 1990. They have seen it as an obstacle to the development of renewable energy, especially bioenergy. And they won that battle, together with the agricultural lobby LRF.

For about 50 years there have been plans to build a natural gas grid covering much of Sweden, taking gas from Russia or Norway. Various consortia ran big lobbying campaigns several times, but little came of it.

In 2013, Sweden used some 12 TWh of natural gas, slightly more than two per cent of primary energy.

Gas is hardly used for heating homes. Swedes use district heating, or heat pumps, or electric heating, or wood, or oil to heat their homes. The district heating is pro-

vided mainly by burning wood and waste.

Some parts of industry use gas, but most of heavy industry is not linked to the gas grid, and uses LPG, oil or biomass for heating.

Gas for power generation is not widely used and not needed at all. Sweden gets most of its electricity from hydro, nuclear, wind and biomass CHP, and has a huge surplus for export. In 2013 and 2014, natural gas supplied less than one per cent of electricity in Sweden, compared to seven per cent from rapidly growing wind power.

The minimal 1 TWh of gas power can also be compared with net electricity exports of 10 TWh, and with the target of three TWh alone for Eon's new, highly controversial Öresundsverket power plant in Malmö

This plant was mostly idle in 2013 and even more so in 2014. So was the other big gas power plant in Gothenburg. If Eon and Gothenburg Energy had listened to the NGOs they would have saved a large amount of money.

The NGO victory over natural gas did not come immediately. Eon tried to extend the gas grid towards Stockholm for several years, but finally had to give up in 2011. A pipeline has to pay its way every 50 kilometres or so by recruiting customers nearby. Eon wanted to build a pipeline up north to Jönköping at the southern tip of Lake Vättern, 300 kilometres south of Stockholm. When the local utility company, Jönköping Energi, decided to fuel its next CHP plants with wood chips and other biofuels, the potential demand for gas in the area became too small.

The road to Stockholm was closed in a most undramatic way. But it reflects a deep change in the energy system.

**Biomass is nothing** new. More than half of Sweden is covered by forest, so the timber, pulp and paper produced by the wood industry have always been important for the Swedish economy. Just think Ikea!

But the real expansion in biomass started around 1980, in the aftermath of the oil





crises. At that time Sweden got 48 TWh of its primary energy from biomass. By 2012 this had increased to 140 TWh, which is much more than nuclear (61 TWh) and more than 10 times the amount from natural gas (12 TWh). There are some methodological issues here, but the broad pattern is unambiguous.

This development was policy-driven. Sweden was very oil-dependent in the 1970s, and there was a broad political consensus on the need to reduce this dependence. The measures taken included: high taxes on oil, stricter environmental requirements for oil-fired plants, and direct subsidies for biofuel plant investments and R&D. In 1991 a heavy CO<sub>2</sub> tax was added, soon followed by a conversion subsidy for homeowners switching from oil to anything else.

Most of the biomass resource comes from wood byproducts, and is used to generate electricity and heat – mainly district heating, or process heat for the paper and pulp industry.

Sweden has a lot of district heating, much more in absolute numbers than the UK and not so far behind Germany, Italy and Poland. The new Stockholm bio-CHP plant, to be commissioned in 2016, is believed to be the biggest such plant in the world.

Besides the bulk use of many forms of biomass for heat and power, Sweden has also pioneered biogas and biodiesel. Biogas development was pioneered by the city of Linköping, which has a population of 150,000 and is situated south of Stockholm. A large plant that used slaughter waste as a substrate was in operation from 1997, with part-financing from the government. Linköping's buses, most of the buses in the surrounding province, other heavy vehicles, taxis and thousands of cars run on biogas. There are 12 public filling stations. Biogas is also produced in nearby Norrköping as a by-product of ethanol production, from food waste and manure in several towns, and from sewage treatment. It is all produced by anaerobic digestion. The gas is refined to the same grade as natural gas.

This shows that qualitatively you can have gas without fossil fuel.

**But is it** big enough to matter, to cut transport emissions? Until very recently, the answer would have been “not really”.

Swedish transport GHG emissions did drop some 13 per cent from their peak in 2007 to 2013, some of which can be attributed to biogas but more to improved efficiency and ethanol. But in 2014, GoBiGas in Gothenburg went into operation and will produce 150 GWh gas/year from thermal gasification of cellulose. This is the second generation of biofuels. It uses as feedstock the branches and tops of trees, parts that cannot be used for timber or paper. This offers huge potential. If the technology works well, it could also use other cellulosic waste from agriculture.

A new and much bigger plant with an output of 1000 GWh gas/year is planned, and was awarded 58.8 million euro from the NER300 EU programme, although investment is pending results from the first plant.

**The timing is** fairly good. Wood residues for heating do not have a very promising future, as buildings get more efficient and winters get warmer. Demand for paper is dropping. So is demand for electricity, and the room for biomass CHP is shrinking even faster, due to rapid wind power growth in Sweden and surrounding countries. So the forestry industry needs new markets, and biofuel may develop into a great market.

There are other options. Evolution diesel oil, which is made from tall oil, a byproduct of the chemical pulp process, is blended with fossil diesel. This is equivalent to taking 276,000 cars off the road, according to oil refinery company Preem. New products, such as resins for paints and glues, are being developed as by-products of the by-product.

There is a real conflict between gas and biomass, just as the NGOs claimed 25 years ago.

The development of wood-based energy and products would largely have been stifled by an abundance of natural gas.

There are more than 2,000 buses and several other vehicle types that run on gas, and though some of it is fossil, most is biogas.

Fredrik Lundberg

Kalix heat power plant, one of many biomass facilities in Sweden.



# Potential for shore-side electricity

Connecting ships at berth to onshore power will provide health and environmental benefits by reducing air pollution, greenhouse gases and noise.

**A recent study** by Ecofys on behalf of the European Commission's DG CLIMA has investigated the potential for shore-side electricity (SSE) in Europe, including the barriers to implementation, and provides recommendations on policy action that the Commission could take to accelerate the implementation of SSE in European harbours.

When at berth, ships typically burn fuel oil in their auxiliary engines to generate electrical power for communications, lighting, ventilation and other onboard equipment. Ships may also burn fuel oil in boilers, for instance to supply hot water and heating and to prevent the heavy fuel oil from solidifying.



Only 0.1 per cent of the European electricity consumption is needed to supply all ships at berth.

This combustion of fuel oil results in emissions of air pollutants, including the main greenhouse gas, carbon dioxide, in the port areas, which are often located in or near cities. SSE is an option for reducing unwanted environmental impacts of ships at berth.

According to the study's mapping of the health benefits of SSE, ports in the UK, France, Belgium, the Netherlands, Germany, Denmark, Sweden, Italy, Greece and the Mediterranean islands would gain large benefits from NO<sub>x</sub> reductions. Concerning SO<sub>2</sub>, the biggest benefits of SSE are to be found in the Mediterranean area, Ireland and the western part of the UK.

Current SSE projects show that there

can be a business case for all parties, says the study. The initial investment for ship owners and in ports is substantial, but can be recouped from lower operating costs. Furthermore, huge benefits have been documented in terms of reductions in noise and air pollutant emissions.

The study estimates that if all seagoing and inland ships in European harbours in 2020 were to use SSE to cover their energy demand at berth, they would consume 3,543 GWh annually, equivalent to 0.1 per cent of the electricity consumption of Europe as a whole in 2012. In general, the increase in demand is not seen as problematic for the electricity grid, especially considering that expanding the use of SSE is a medium to long-term process.

Christer Ågren

The study: Potential for Shore Side Electricity in Europe (January 2015). By Ecofys, the Netherlands. Downloadable from: <http://www.ecofys.com/en/publication/potential-for-shore-side-electricity-in-europe/>

## New test for diesel cars

Member states have agreed on the first "on the road" NO<sub>x</sub> emission test for diesel cars. The limit of 80 milligrams of nitrogen oxides per km for diesel cars was agreed back in 2007. Car emissions are currently assessed in laboratory tests that do not reflect real driving conditions, leading to results that are much better than the reality.

In several European cities air quality limits for nitrogen dioxide are exceeded, which causes asthma and shortens the life expectancy of inhabitants.

There are still a few details that need to be worked out, such as the starting date for the new test and if there is going to be a transition period for the industry to adapt.

Sources: ENDS Europe, 20 May 2015  
Press release T&E, 19 May 2015

## Air pollution costs European economies US\$ 1.6 trillion a year

A staggering US\$ 1.6 trillion is the economic cost of the approximate 600,000 premature deaths and of the diseases caused by air pollution in the World Health Organization's (WHO) European region in 2010. The amount is nearly equivalent to one tenth of the gross domestic product (GDP) of the EU in 2013, says a new study by the WHO Regional Office for Europe and the Organisation for Economic Co-operation and Development (OECD).

Over 90 per cent of citizens in the 53 countries of the region are exposed to annual levels of outdoor fine particulate

matter that are above WHO's air quality guidelines. This accounted for 482,000 premature deaths in 2012 from heart and respiratory diseases, blood vessel conditions and strokes, and lung cancer. In the same year, indoor air pollution resulted in an additional 117,200 premature deaths, five times more in low- and middle-income countries than in high-income countries. Source: WHO press release, 28 April 2015. Link: [http://www.euro.who.int/en/media-centre/sections/press-releases/2015/air-pollution-costs-european-economies-us\\$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says](http://www.euro.who.int/en/media-centre/sections/press-releases/2015/air-pollution-costs-european-economies-us$-1.6-trillion-a-year-in-diseases-and-deaths,-new-who-study-says)



# Rooftop gardens could provide three-quarters of the vegetables for a city

In a study conducted in Bologna, researchers have estimated that more than 12,500 tonnes of vegetables could be produced if all the space on suitable rooftops was used for gardening. This represents 77 per cent of the actual consumption of the city.

In the trials, the researchers grew lettuce, black cabbage, chicory, tomato, aubergine, chilli pepper, melon and watermelon, either in plastic pipes, recycled pallets filled with compost or on polystyrene panels floating in tanks, also made from recycled pallets.

The gardens would also be able to capture 624 tons of CO<sub>2</sub> each year, as well as improve the microclimate and the biodiversity of the city.

Source: Science for Environment Policy, 26 March 2015

Link: [http://ec.europa.eu/environment/integration/research/newsalert/pdf/rooftop\\_gardens\\_could\\_grow\\_three\\_quarters\\_of\\_citys\\_vegetables\\_409na2\\_en.pdf](http://ec.europa.eu/environment/integration/research/newsalert/pdf/rooftop_gardens_could_grow_three_quarters_of_citys_vegetables_409na2_en.pdf)



CHRISTOPHER PORTER/FLICKR.COM/ CC BY-SA

## European coal and gas power on the way out

In a conference in mid-May organised in the run-up to the Paris climate negotiations in December 2015, gathering corporate executives from major power companies, Gérard Mestrallet, chief executive of Engie, one of the world's biggest power companies said that fossil fuel electricity generation indeed is on its way out in Europe.

The profitability of gas and coal power generation have deteriorated to the point that future growth is more likely to come in big emerging markets such as India and China. According to Mr Mestrallet, power companies have stopped investing in thermal power generation in Europe and instead are investing in renewables. European power companies are adapting to a market in which renewables are more profitable. Furthermore these power companies often struggle with overcapacity and competition from the growth of subsidised renewables. However, European power companies continue to build big power plants in emerging countries: Brazil, Chile, Peru, the Middle East and Asia.

Most of the corporate executives claimed to take climate change seriously and thus wanted to see Europe as a zero emissions area in 2050, with companies such as Czech CEZ taking the lead.

Source: Financial Times, 21 May 2015

# Climate change threat to global coffee production

Suitable areas for growing Arabica coffee will shrink and move to higher elevations if temperatures rise by 2°C by 2050. Researchers have modelled changes in the local climate and predict a total negative impact on production in all coffee-producing countries, although within each country there would be large variations. Central America would be the most affected region, specifically Nicaragua and El Salvador. Strongly negative effects of climate change are also expected in Brazil, the world's largest Arabica producer.

Coffee ranks just after oil in its value among traded commodities and is grown by more than 25

million farmers, most of whom are small-holders who depend on coffee for their livelihood. For many tropical developing countries, coffee is a significant part of export income, for example, coffee contributes 59 per cent of Burundi's export earnings and 17 per cent of Nicaragua's.

Source: Ovalle-Rivera O, Läderach P, Bunn C, Obersteiner M, Schroth G (2015) Projected Shifts in Coffea arabica Suitability among Major Global Producing Regions Due to Climate Change. PLoS ONE 10(4)

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0124155>



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### Gasping for air

Air pollution is one of Europe's gravest environmental threats. Every year 400,000 people die prematurely because of poor air quality, but the European Parliament has the power to change that. Members of the European Parliament are now starting to work on a number of EU laws, including the National Emissions Ceilings and Medium Combustion Plants Directives, which could substantially improve the air we breathe.

Twelve factsheets reveal how air pollution affects us, from our health to our economy, and explain what the main sources of pollution are. Crucially, they contain policy recommendations to MEPs that will help clean up our air. Everywhere.

### The 10 best climate measures in Northern Europe

A number of national environmental NGOs were asked to describe and rank their ten best climate measures.

There is a great diversity among these measures. Hardly any country seems to have noticed what their neighbours are doing. So all climate policymakers should take a look, not only at the ten winners, but at the full smorgasbord of measures in neighbouring nations.

### Carbon Capture and Storage in Norway – The moon landing that failed

The Norwegian interest in CCS depends largely on the oil and gas sector. In the 1990s, oil companies operating in Norway began research and development. In 2005 the government took the lead. Prime minister Jens Stoltenberg announced the building of a full-scale CCS plant at Mongstad outside Bergen in 2006, a project equivalent to the moon landing, in his own words. For a period the per capita investment in CCS research and development was among the highest in the world. In 2013 the project to build a full-scale CCS plant at Mongstad in Norway was ended.

## Coming events

**23rd European Biomass Conference and Exhibition.** Vienna, Austria, 1 - 4 June 2015.  
Information: <http://conference-biomass.com/>

**Green Week 2015: Nature – our health, our wealth.** Brussels, Belgium, 3 - 5 June 2015.  
Information: [www.greenweek2015.eu/](http://www.greenweek2015.eu/)

**UNFCCC meeting of subsidiary bodies.** Bonn, Germany, 1 - 14 June 2015. Information: <http://unfccc.int/>

**EU Environment Council.** Brussels, Belgium, 15 June 2015. Information: <http://europa.eu/newsroom/calendar/>

**EU Sustainable Energy Week.** 15 - 19 June 2015. Information: [www.eusew.eu/index.php](http://www.eusew.eu/index.php)

**Ende Gelände – A mass action to #end coal.** Rhineland, Germany, 14-16 August 2015. Information: <https://ende-gelände.org/en>

**3rd session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action.** Bonn, Germany, 31 August – 4 September. Information: <http://unfccc.int/>

**CLRTAP EMEP Steering Body & Working Group on Effects.** Geneva, Switzerland, 14 - 18 September 2015. Information: [www.unece.org/env/lrtap/](http://www.unece.org/env/lrtap/)

**European Photovoltaic Conference and Exhibition (EUPVSEC 2015).** Hamburg, Germany, 14 - 18 September 2015. Information: [www.photovoltaic-conference.com](http://www.photovoltaic-conference.com)

**4th session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action.** Bonn, Germany, 19 - 23 October. Information: <http://unfccc.int/>

**Acid Rain 2015.** Rochester, NY, USA, 19 - 23 October 2015. Information: <http://acidrain2015.org/>

**EU Environment Council.** Brussels, Belgium, 26 October 2015. Information: <http://europa.eu/newsroom/calendar/>

**UNFCCC Conference of the Parties (COP) 21.** Paris, France, 30 November - 11 December 2015. Information: <http://unfccc.int/>

**CLRTAP Working Group on Strategies and Review.** Geneva, Switzerland, 15 - 17 December 2015. Information: [www.unece.org/env/lrtap/](http://www.unece.org/env/lrtap/)

**7th International Nitrogen Initiative (INI 2016).** Melbourne, Australia, 4 - 8 December 2016. Information: <http://www.ini2016.com/>

**EU Environment Council.** Brussels, Belgium, 19 December 2015. Information: <http://europa.eu/newsroom/calendar/>

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