



The New Clean Air Policy Package:

Ammonia emissions from agriculture

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- *Why do we need a new clean air policy package?*
- *What does the package include?*
- *What are the costs and benefits of the package?*
- *Main conclusions and instruments relating to ammonia*



Why do we need a new clean air policy package?

Conclusions from a comprehensive air policy review 2011-2013

The existing Air Policy Framework

At international level

- UN ECE **Convention on Long-Range Transboundary Air Pollution** (CLRTAP) and its Protocols (e.g. the **Gothenburg Protocol** with national emission ceilings for 2010 and 2020)

At EU level

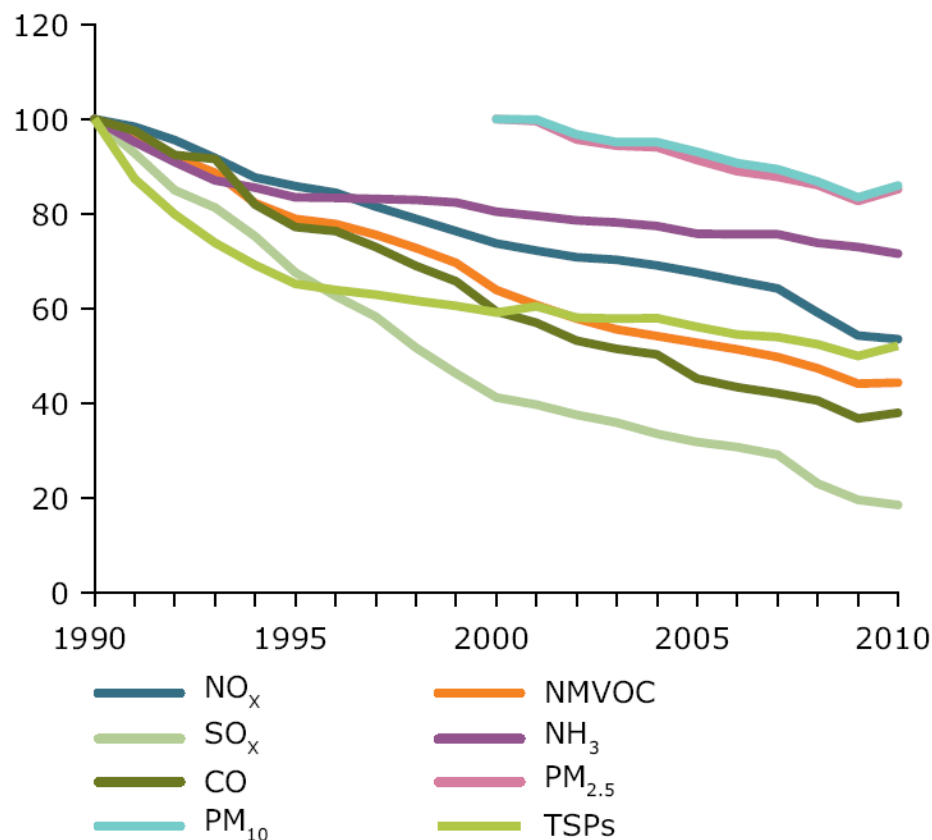
- **STRATEGIC OBJECTIVES**: the **7EAP** (2013), the EU **Thematic Strategy on Air Pollution** (2005), the **European Clean Air Programme** (2013)
- **EMISSION CAPS**: The **National Emission Ceilings Directive** (NECD)
- **LOCAL AIR QUALITY LIMITS**: The **Ambient Air Quality Directives**
- **SOURCE-SPECIFIC LEGISLATION**: the Industrial Emissions Directive, Euro standards, energy efficiency and fuel quality standards etc

At national level

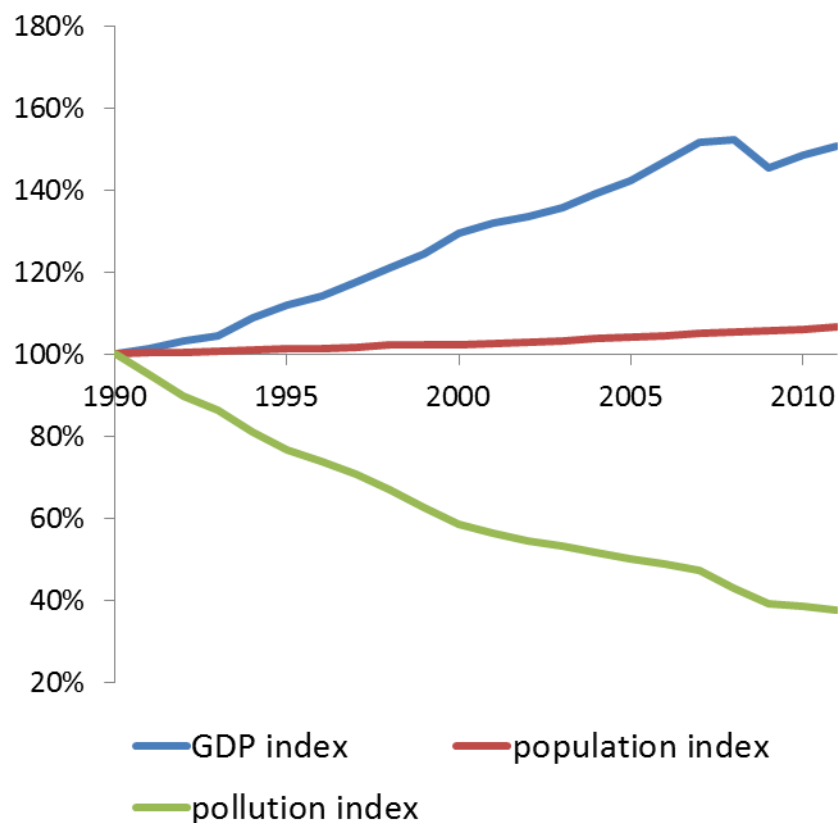
- National and local legislation and instruments

Air policy works: Emissions of major air pollutants greatly reduced ...

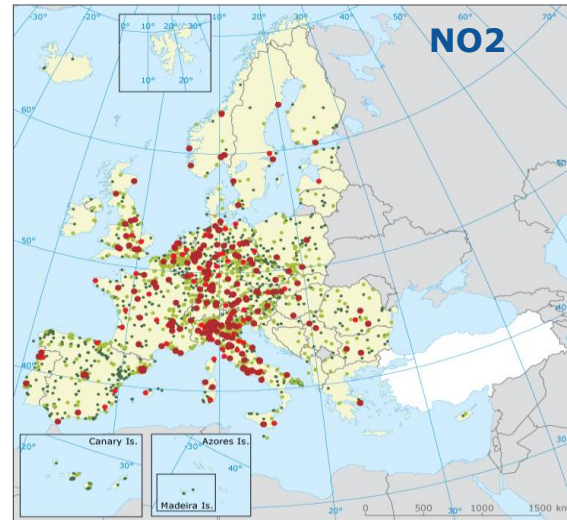
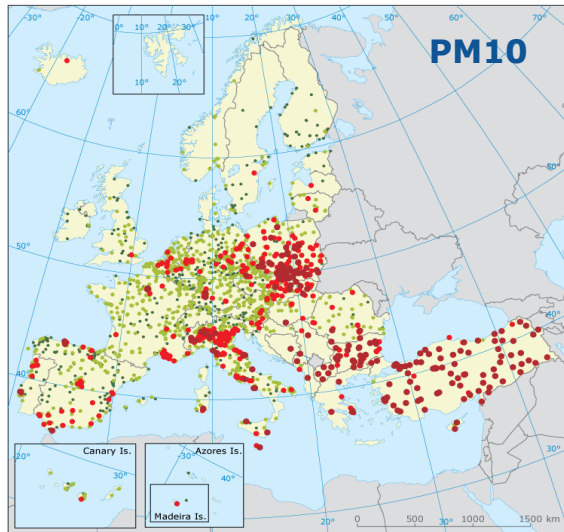
Index (1990 (2000) = 100)



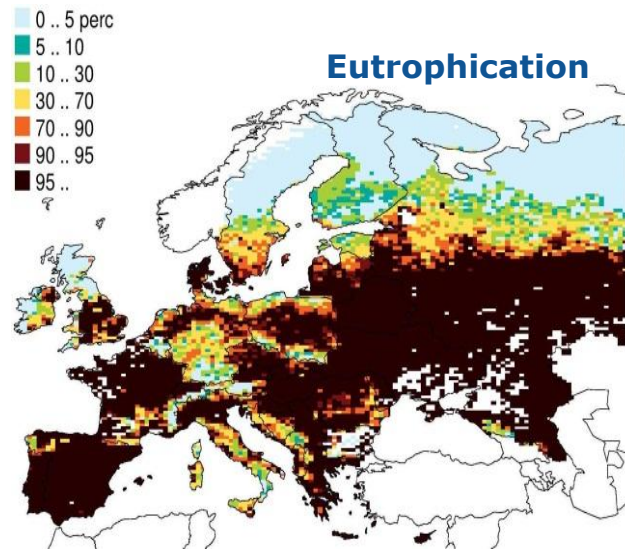
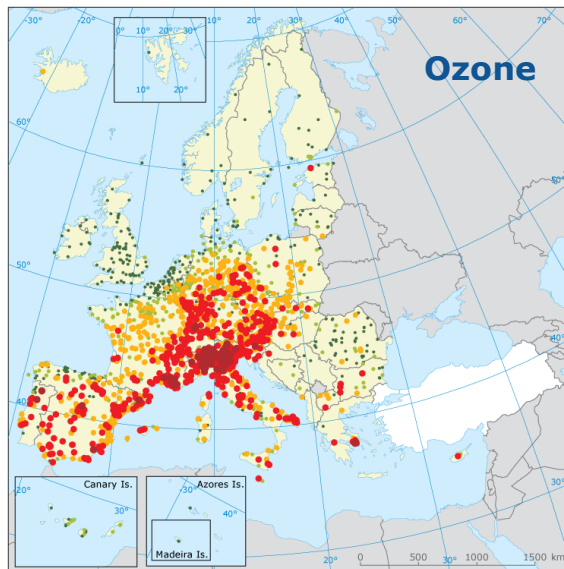
Index 1990 = 100%



... But significant air quality problems remain in the EU (2010)...



See also EEA Reports



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...And the problems will persist...

Headline Indicator	2010	2020	2025	2030
Premature deaths from chronic PM2,5 and short-term ozone exposure	406.000	340.000	330.000	327.000
Percentage forest area exceeding acidification critical load	9	4	4	4
Percentage ecosystem area exceeding eutrophication critical load	62	55	53	52

...with huge costs for society

External costs (health)	2010	2020	2025	2030
Low estimate (€ billion)	330	243	224	212
High estimate (€ billion)	940	775	749	740



What does the new policy package include?

The Clean Air Policy Package

Tabled in December 2013

The five main elements of the package:

1. A new European **Clean Air Programme** (overall strategy)
2. Proposal for a revised **National Emission Ceilings Directive** ("NECD")
3. Proposal for a **Directive on controlling emissions from Medium Combustion Plants** ("MCPD")
4. Proposal for a Council Decision on ratification of the 2012 **Göteborg Protocol** amendment
5. Accompanying **Impact Assessment**

The package will, by 2030:

- Avoid **58 000** premature deaths
- Save **123 000 km²** of ecosystems from nitrogen pollution
- Save **56 000 km²** protected Natura 2000 areas
- Save **19 000 km²** forest ecosystems from acidification

The new air policy in brief

- **Up to 2020:** Ensure full implementation of existing air quality legislation
- **Beyond 2020:** New policy to get on track to reach 7EAP air quality objective and WHO air quality guidelines by 2030
- **Implementation** through existing and new instruments:
 - A new **National Emission Ceilings Directive** and the UNECE Gothenburg Protocol: emission caps for 2020/2030 (incl ammonia)
 - **Existing EU source legislation:** new Euro 6/VI and NRMM vehicle standards, new BREFs under the Industrial Emissions Directive, new Eco-design standards for stoves, a revised Fertilisers Regulation...
 - **New EU source legislation:** The Medium Combustion Plant Directive
 - **Non-regulatory programme:** LIFE and other EU funds (incl the RDP), new Clean Air Forum, research and innovation (Horizon 2020), etc
 - Reinforced **international/national/local action**



What are the costs and benefits of the package?

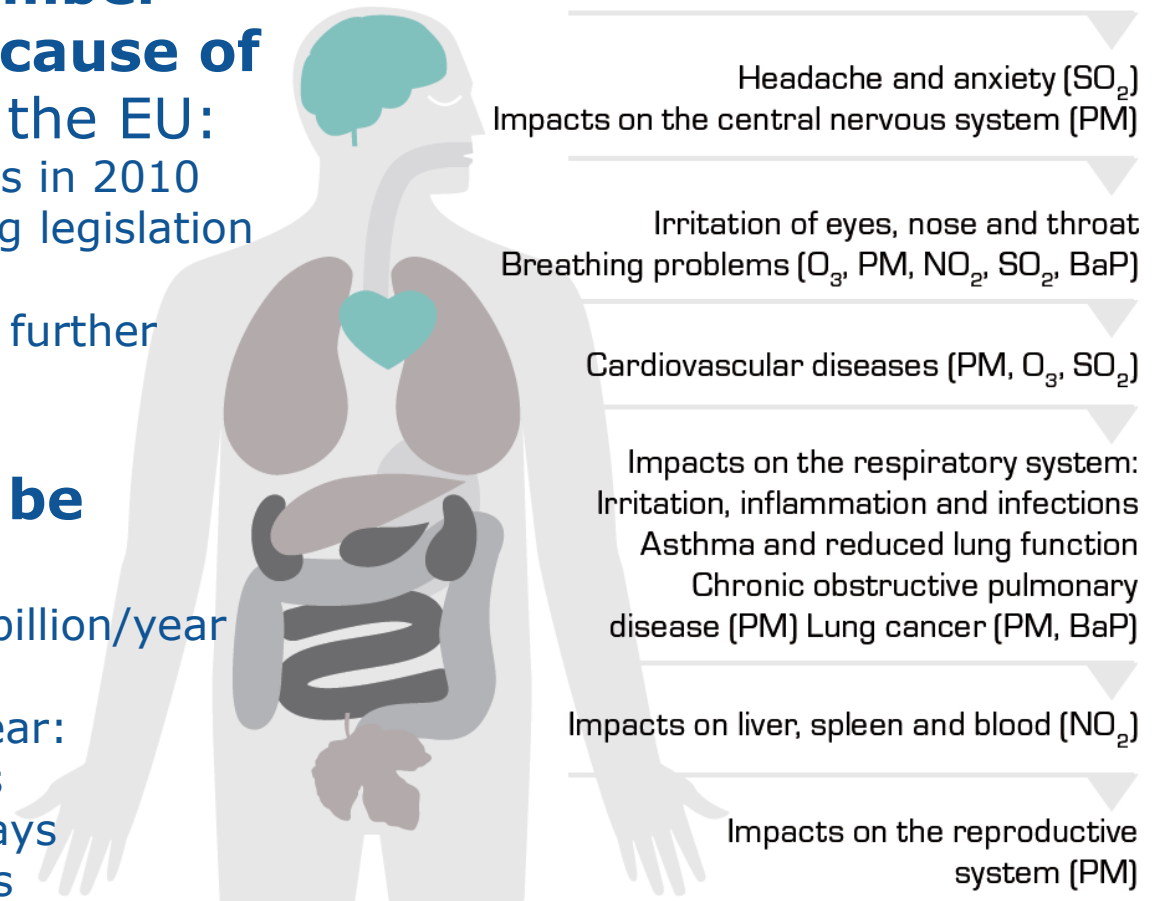
Bad air is very expensive

Air pollution is the **number one environmental cause of premature death** in the EU:

- 406 000 premature deaths in 2010
- 330 000 in 2020 if existing legislation is implemented
- 327 000 in 2030 (without further measures)

Health impacts can be monetized:

- External costs €330-940 billion/year (3-9% of EU GDP)
- Direct costs €23 billion/year:
 - 4 bn healthcare costs
 - 15 bn lost working days
 - 3 bn damage to crops
 - 1 bn damage to buildings



Economic benefits can be compared to implementation costs

External economic benefits from implementing the package:

€40 -140bn/year

- Estimate based on health benefits only
- Ecosystem benefits not possible to measure but are substantial

Direct cost savings from implementing the package in 2030:

€2,8 bn/year, due to

- Higher productivity of the workforce (€1900 million)
- lower healthcare costs (€ 550 million)
- higher crop yields (€250 million)
- less damage to buildings (130 million)

Implementation costs for the package: **€ 3,3bn per year**

- Corresponds to 0,021% of EU GDP in 2030
- 2,1bn if 2030 climate and energy package is implemented

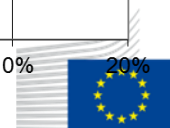
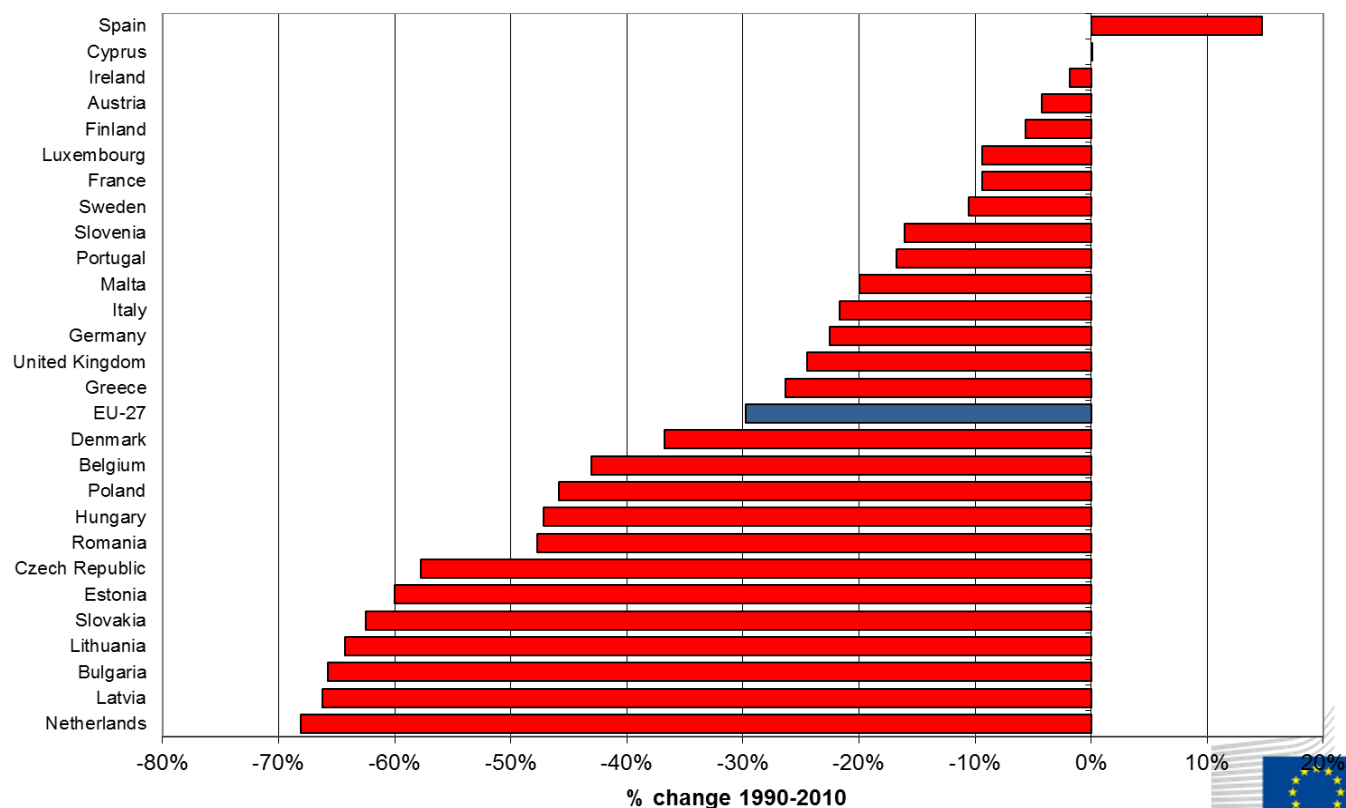
Cost benefit analysis: main conclusions

- Bad air is not only bad for our health but also **bad for the economy**
- Air policy **makes economic sense**
- The cost/benefit ratio for the package is between **1:12** (low estimate) and **1:40** (high estimate)
- Direct economic benefits are about **equal** to implementation cost
- Competitiveness analysis shows a **positive overall impact on the economy** both on EU GDP (+ €1,2bn) and on employment (+100,000)

- **Main conclusions and instruments relating to ammonia**

Large variation of ammonia reductions in different member states in the past

EU average 1990 – 2010: -30%
2002 – 2012: -7%



Main conclusions from the impact assessment relating to ammonia

- Ammonia emissions causes serious environmental problems (eutrophication, acidification, **health impacts** - secondary PM)
- Baseline emission projections indicate almost no ammonia reductions in future (without additional measures)
- The impact assessment therefore identifies ammonia reductions as particularly cost-effective, achieving substantial air quality benefits at low cost (one of few remaining "low-hanging fruits")
 - ***Measures do not include reductions in livestock numbers***
- The measures have potential co-benefits for farmers and may help complying with other environmental legislation (climate, nitrates)
- **Any effort to further reduce health impacts beyond baseline will be difficult (expensive) to achieve without additional measures for ammonia**

Main instrument to reduce ammonia emissions: the new NECD

- Staged tightening of commitments in Annex II:
 - 2020 – Gothenburg Protocol ceilings
 - 2030 – 70% "Gap Closure" of technical abatement potential
 - Interim targets for 2025 to ensure timely compliance

	<u>2020</u>	<u>2030</u>
SO₂:	59%	81%
NO_x:	42%	69%
NMVOCs:	28%	50%
NH₃:	6%	27%
PM_{2,5}:	22%	51%
CH₄:	--	33%

- New flexibilities
- Reinforced implementation
- Emission reduction measures for ammonia listed in Annex III

ANNEX II

National emission reduction commitments

Table (a): Emission reduction commitments for sulphur dioxide (SO₂), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC). Fuels sold, base year 2005.

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Member State	SO ₂ reduction compared with 2005		NO _x reduction compared with 2005		NMVOC reduction compared with 2005		
	For any year from 2020 to 2029	For any year from 2030	For any year from 2020 to 2029	For any year from 2030	For any year from 2020 to 2029	For any year from 2030	For any year from 2030
Belgium	20%	68%	41%	63%	21%	44%	
Bulgaria	78%	94%	41%	65%	21%	62%	
Czech Republic	45%	72%	35%	66%	18%	57%	
Denmark	35%	58%	56%	69%	35%	59%	
Germany	21%	55%	39%	69%	13%	43%	
Estonia	32%	71%	18%	61%	10%	37%	
Greece	74%	92%	31%	72%	54%	67%	
Spain	67%	89%	41%	75%	22%	48%	
France	55%	78%	50%	70%	43%	50%	
Croatia	55%	87%	31%	66%	34%	48%	
Ireland	65%	83%	49%	75%	25%	32%	
Italy	35%	75%	40%	69%	35%	54%	
Cyprus	83%	95%	44%	70%	45%	54%	
Latvia	8%	46%	32%	44%	27%	49%	
Lithuania	55%	72%	48%	55%	32%	57%	
Luxembourg	34%	44%	43%	79%	29%	58%	
Hungary	46%	88%	34%	69%	30%	59%	
Malta	77%	98%	42%	89%	23%	31%	
Netherlands	28%	59%	45%	68%	8%	34%	
Austria	26%	50%	37%	72%	21%	48%	
Poland	59%	78%	30%	55%	25%	56%	
Portugal	63%	77%	36%	71%	18%	46%	
Romania	77%	93%	45%	67%	25%	64%	
Slovenia	63%	89%	39%	71%	23%	63%	
Slovakia	57%	79%	36%	59%	18%	40%	
Finland	30%	30%	35%	51%	35%	46%	
Sweden	22%	22%	36%	65%	25%	38%	
United Kingdom	59%	84%	55%	73%	32%	49%	
EU 28	59%	81%	42%	69%	28%	50%	

Table (b): Emission reduction commitments for ammonia (NH₃), fine particulate matter (PM_{2.5}) and methane (CH₄). Fuels sold, base year 2005.

Member State	NH ₃ reduction compared with 2005		PM _{2.5} reduction compared with 2005		CH ₄ reduction compared with 2005	
	For any year from 2020 to 2029	For any year from 2030	For any year from 2020 to 2029	For any year from 2030	For any year from 2020 to 2029	For any year from 2030
Belgium	2%	16%	20%	47%	26%	
Bulgaria	3%	10%	20%	64%	53%	
Czech Republic	7%	35%	17%	51%	31%	
Denmark	24%	37%	33%	64%	24%	
Germany	5%	39%	26%	43%	39%	
Estonia	1%	8%	15%	52%	23%	
Greece	7%	26%	35%	72%	40%	
Spain	3%	29%	15%	61%	34%	
France	4%	29%	27%	48%	25%	
Croatia	1%	24%	18%	66%	31%	
Ireland	1%	7%	18%	35%	7%	
Italy	5%	26%	10%	45%	40%	
Cyprus	10%	18%	46%	72%	18%	
Latvia	1%	1%	16%	45%	37%	
Lithuania	10%	10%	20%	54%	42%	
Luxembourg	1%	24%	15%	48%	27%	
Hungary	10%	34%	13%	63%	55%	
Malta	4%	24%	25%	80%	32%	
Netherlands	13%	25%	37%	38%	33%	
Austria	1%	19%	20%	55%	20%	
Poland	1%	26%	16%	40%	34%	
Portugal	7%	16%	15%	70%	29%	
Romania	13%	24%	28%	65%	26%	
Slovenia	1%	24%	25%	70%	28%	
Slovakia	15%	37%	36%	64%	41%	
Finland	20%	20%	30%	39%	15%	
Sweden	15%	17%	30%	30%	18%	
United Kingdom	8%	21%	30%	47%	41%	
EU 28	6%	27%	22%	51%	33%	



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How can the ammonia ceilings be achieved?

- To reach the ceilings a wider EU-uptake of existing best practice is necessary
- Solid guidance already available by the UNECE (TFRN)
- Key measures listed in Annex 3 of the NECD include:
 - National/farm level **nitrogen management**
 - **Fertiliser management** (urea substitution/balanced fertilisation)
 - Low emission **manure application techniques** (band-spreading, direct injection, rapid integration in the soil)
 - Low emission **manure storage** (cover/lid)
 - Low emission **feeding strategies** (phase-feeding/low protein feed)
 - Low emission **housing facilities** (rapidly remove manure, decrease air velocity/temperature or surface area).

Content of National Air Pollution Control Programmes

PART I

**MEASURES WHICH MAY BE INCLUDED IN THE NATIONAL AIR POLLUTION
CONTROL PROGRAMME**

Where relevant, Member States shall make use of the UNECE Guidance Document for Preventing and Abating Ammonia Emissions (Ammonia Guidance Document),¹ and best available techniques set out in Directive 2010/75/EU of the European Parliament and of the Council² when implementing the measures set out in Part I.

A. Measures to control ammonia emissions

1. Member States shall establish a national advisory code of good agricultural practice for reducing ammonia emissions, based on the 2001 UNECE Framework Code for Good Agricultural Practice for Reducing Ammonia Emissions,³ covering at least the following items:
 - (a) nitrogen management, taking into account the full nitrogen cycle;
 - (b) livestock feeding strategies;
 - (c) low-emission manure spreading approaches;
 - (d) low-emission manure storage systems;
 - (e) low-emission manure processing and composting systems;
 - (f) low-emission animal housing systems;
 - (g) low-emission approaches for mineral fertilizer application.
2. Member States shall establish a national nitrogen budget to monitor the changes in overall losses of reactive nitrogen from agriculture, including ammonia, nitrous oxide, ammonium, nitrates and nitrites, based on the principles set out in the UNECE Guidance Document on Nitrogen Budgets⁴.

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3. Member States shall reduce ammonia emissions from inorganic fertilizers by using the following approaches:
 - (a) use of ammonium carbonate fertilizers shall be prohibited;
 - (b) urea-based fertilizers shall as far as possible be replaced by ammonium nitrate-based fertilizers;
 - (c) where urea-based fertilizers continue to be applied, methods shall be used that have been shown to reduce ammonia emissions by at least 30% compared with the use of the reference method, as specified in the Ammonia Guidance Document;

¹ Decision 2012/11, ECE/EB.AIR/113/Add.1

² Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17).

³ Decision ECE/EB.AIR/75, paragraph 28a

⁴ Decision 2012/10, ECE/EB.AIR/113/Add.1

- (d) inorganic fertilisers shall be spread in line with the foreseeable requirements of the receiving crop or grassland with respect to nitrogen and phosphorus, also taking into account the existing nutrient content in the soil and the nutrients from other fertilizers.



4. Member States shall by 1 January 2022 reduce ammonia emissions from livestock manure by using the following approaches:
- (a) reduce emissions from slurry and solid manure application to arable land and grassland, by using methods that reduce emissions by at least 30 % compared with the reference method described in the Ammonia Guidance Document and on the following conditions:
 - (i) manures and slurries shall only be spread in line with the foreseeable nutrient requirement of the receiving crop or grassland with respect to nitrogen and phosphorous, also taking into account the existing nutrient content in the soil and the nutrients from other fertilizers;
 - (ii) manures and slurries shall not be spread when the receiving land is water saturated, flooded, frozen or snow covered;
 - (iii) slurries spread to grassland shall be applied using a trailing hose, trailing shoe or through shallow or deep injection;
 - (iv) Manures and slurries spread to arable land shall be incorporated within the soil within four hours of spreading.



- (b) reduce emissions from manure storage outside of animal houses, by using the following approaches:
 - (i) for slurry stores constructed after 1st January 2022, low emission storage systems or techniques shall be used which have been shown to reduce ammonia emissions by at least 60% compared with the reference method described in the Ammonia Guidance Document, and for existing slurry stores at least 40%;
 - (ii) for stores for solid manure, the stores shall be covered;
 - (iii) farms shall have sufficient manure storage capacity to spread manure only during periods that are suitable for crop growth.
- (c) reduce emissions from animal housing, by using systems which have been shown to reduce ammonia emissions by at least 20% compared with the reference method described in the Ammonia Guidance Document.
- (d) Reduce emissions from manure, by using low protein feeding strategies which have been shown to reduce ammonia emissions by at least 10% compared with the reference method described in the Ammonia Guidance Document.

B. Emission reduction measures to control emissions of particulate matter and black carbon

- 1. Member States shall ban open field burning of agricultural harvest residue and waste and forest residue, and shall monitor and enforce its implementation. Any exemptions to such a ban shall be limited to preventive programs to avoid uncontrolled wildfires, to control pest or to protect biodiversity.



Summary: The Clean Air Policy Package...

...**Responds to a significant problem** facing EU citizens and the environment

...**Makes economic sense**; overall economic benefits are 12-40 times higher than implementation costs; positive net benefit on GDP and employment

...Applies a **two-phased approach**; to ensure compliance of existing legislation up to 2020, and further limit emissions at source by 2030

...Is based on **state of the art scientific and technical information** and analysis, including WHO guidelines

...Targets **sectors where emission reductions are the cheapest**, e.g. small and medium combustion plants **and the agriculture sector**

...Is **cost-effective, feasible, and supportive** of the EU's clean technology sector

...Is **consistent** with EU 2020 objectives and the recent Climate and Energy Package

More Information

The Clean Air Policy Package for Europe:

http://ec.europa.eu/environment/air/clean_air_policy.htm

The air policy review and supporting information:

http://ec.europa.eu/environment/air/review_air_policy.htm