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# Progress on Integrated Assessment Modelling at CIAM

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EMEP Steering Body and Working Group on Effects

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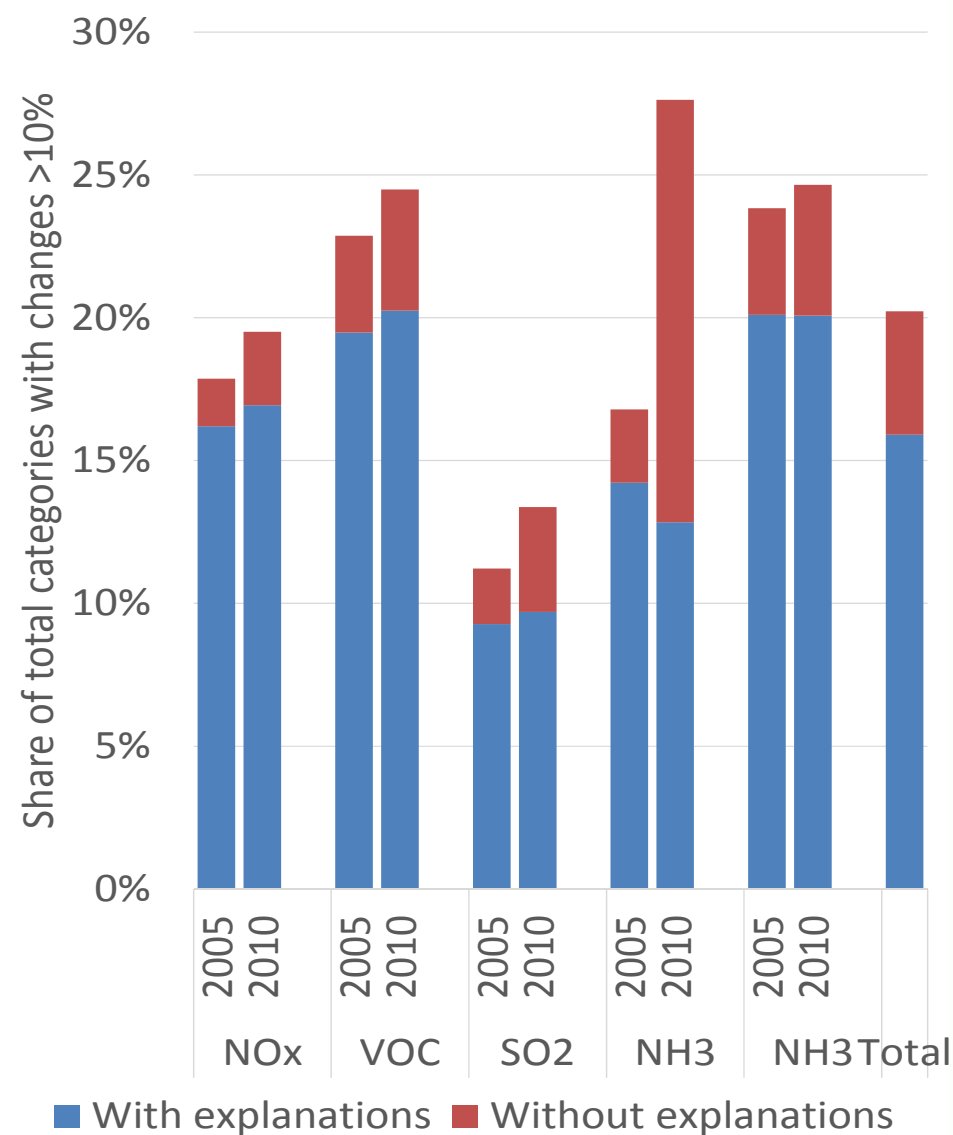


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## Updating emission projections for 2030

- Updated emission projections taking into account
  - Reported changes in historic emission inventories 2014-2017
  - PRIMES 2016 Reference activity projection
- Determine additional actions to meet the NECD Emission Reduction Requirements for 2030
- For EU countries to be presented at the Clean Air Forum 2017
- Updates for non-EU countries will follow

## # of inventory changes >10% between the 2014 and 2017 submissions for 2005 and 2010



## Parties report significant changes of their historic emission inventories

- These changes might have important impacts on the achievement of the Emission Reduction Requirements (ERR) specified in the Gothenburg Protocol and NECD
  - Changes of base year inventories
  - Changes of sectoral shares, sectoral baseline developments and sectoral emission reduction potentials
- In general, the new inventories are based on more solid methods and should be more realistic.
- However, also many of the earlier inventories have passed the in-depth review.
- Further updates are in the pipeline.

## Important differences between Tier I and II, especially for NH<sub>3</sub> and PM2.5

- E.g., for NH<sub>3</sub>, Tier I excretion rates and emission factors often only poorly reflect the actual situation – this is not new.
- The Tier I estimates were developed based exclusively on Western European experience, for relatively productive animals – not representative for large parts of Europe.
- Example: Analysis by Poland

Table 5.3. Country specific Nitrogen excretion rates (Nex) in manure by livestock categories

Livestock	Nex [kg/head/year]	
	CS	EMEP/EEA
Dairy cattle:		
1988–1995	65.0	105
1996–2000	70.0	
2001–2005	75.0	
2006–2010	80.0	
Since 2011	83.0	

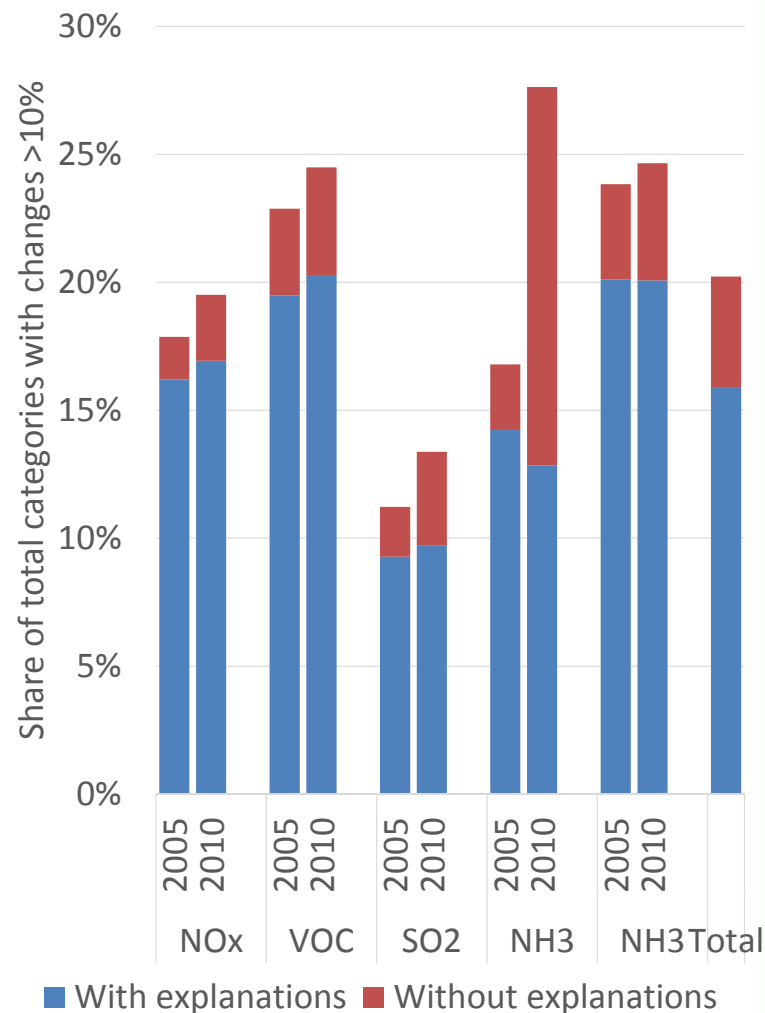
- Tier II includes these aspects and should be more realistic

## **Tier I methods do not reflect emission controls**

- As Tier I does not take account of changes in emission reduction measures, it provides misleading results if used for emission projections!
- **Should Tier II reporting become mandatory for key sectors?  
There is now plenty of practical experience among Parties!**
- **Should the in-depth reviews flag Tier I estimates?**

## The IIRs often lack sufficient documentation

# of inventory changes >10%  
between the 2014 and 2017  
submissions for 2005 and 2010



- Independent validation/review of new estimates will be essential for credibility
- A major incoherence in PM inventories remains for condensables – will this require another series of revisions/adjustment procedures etc.

# Key messages on emission projections

- The further evolution of emission inventories reveals important new information, but needs solid validation
- Use of Tier-II methods by all Parties is indispensable for emission projections, and will enhance the robustness of emission inventories and policy agreements
- The recent changes in reported inventories point to a potentially huge demand for inventory reviews and adjustments in the future



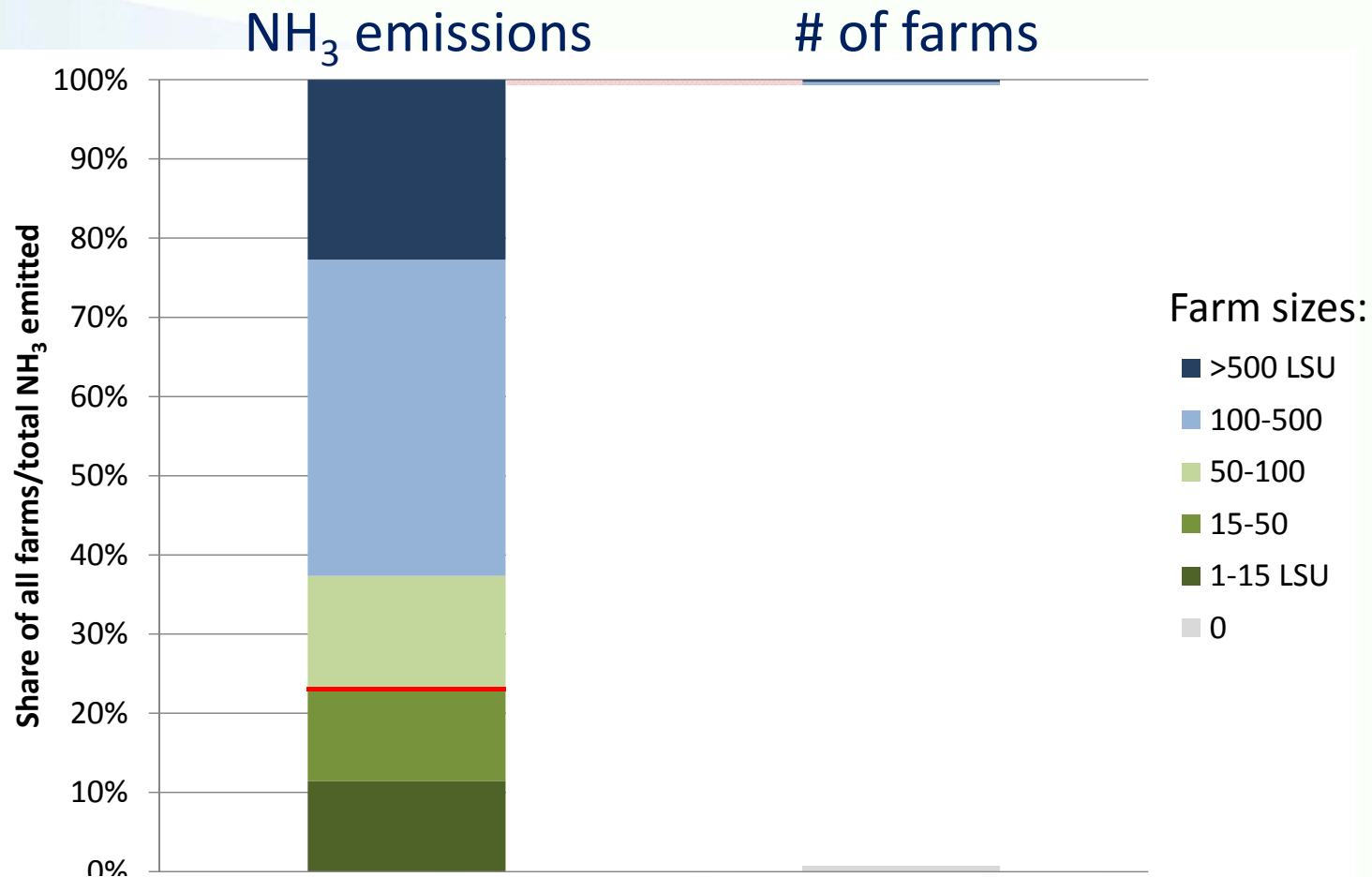
## 2050: Long-term targets in reach

- Long-term objective: Achievement of WHO guidelines and CL/levels
  - Forthcoming revision of WHO AQ guidelines
  - PM, O<sub>3</sub>, NO<sub>2</sub>
- Decarbonisation of energy systems should be completed by 2050,
  - Non-CO<sub>2</sub> and SLCPs will become more relevant
- Natural sources will become more important
  - Modelling challenges
  - Quantifications of impacts, e.g., soil dust (WHO Europe↔Global)
- Future trends in hemispheric transport
- Residual local exceedances – need for better understanding of remaining sources and local dispersion:
  - Wood/coal stoves
  - Agriculture – NH<sub>3</sub>, CH<sub>4</sub>, N<sub>2</sub>O

# Policy drivers

- Long-term policy targets (e.g., full achievements of critical loads, WHO guidelines)
- SDGs include air quality only in an indirect way
- Which benefits are tangible for decision making?
- Challenges:
  - Monetized health and nature benefits
  - Distribution of benefits
- Inequalities of pollution
  - SDG #10: Reduce inequality within and among countries

## 80% of NH<sub>3</sub> emissions emerge from 5% of the farms in the EU

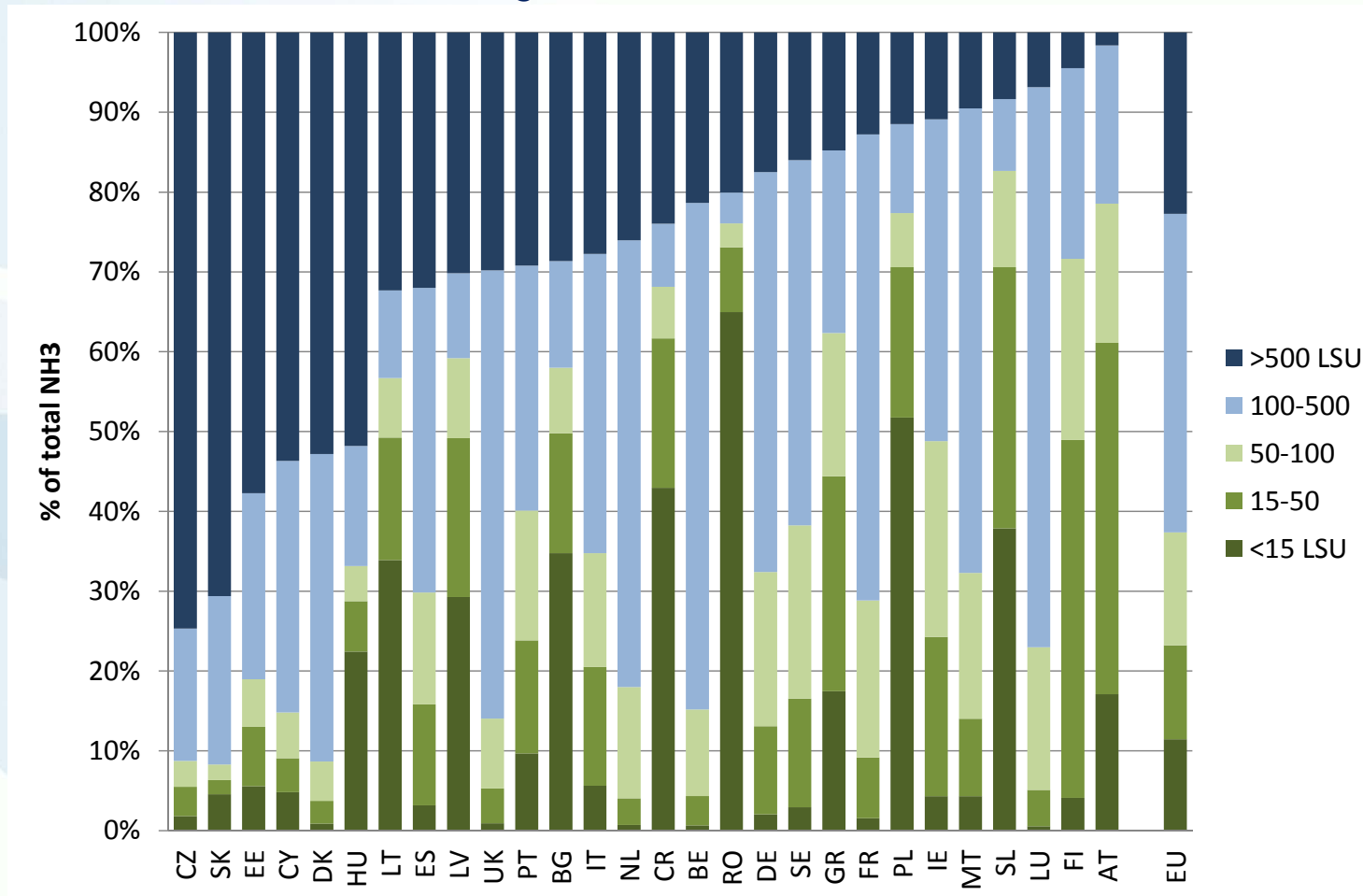


Source: IIASA-GAINS

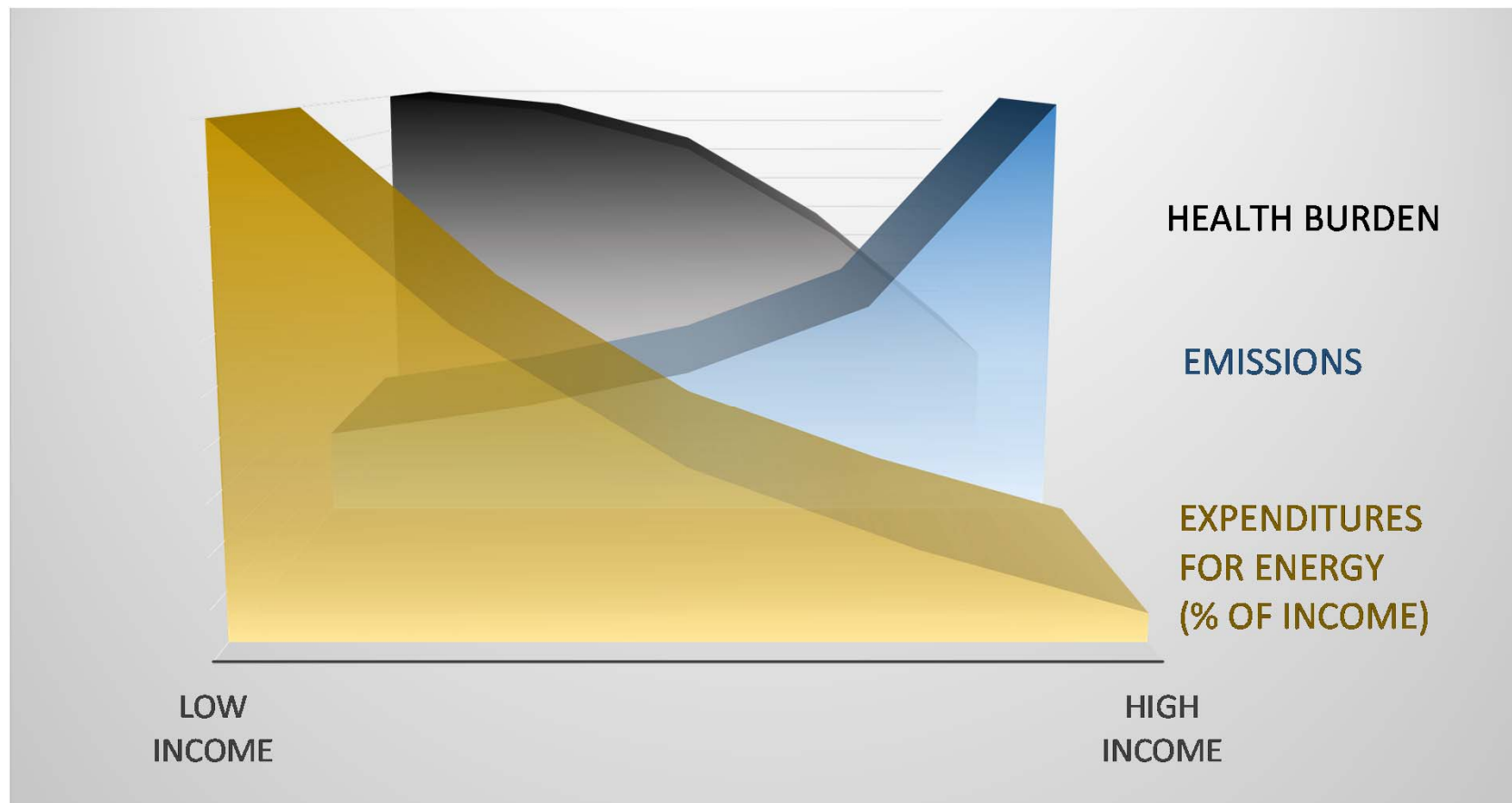
The NEC proposal suggests measures for 3% of the farms,  
i.e., for large industrial animal holdings

# There are large differences in the size structure of farms in the EU

NH<sub>3</sub> by farm size – 2005



Inequalities of pollution:  
Who pollutes – who suffers – who pays?  
India - 2010



Source: Kiesewetter et al., 2017

# Key messages

- The further evolution of emission inventories reveals important new information, but needs solid validation
- Use of Tier-II methods by all Parties is indispensable for emission projections, and will enhance the robustness of emission inventories and policy agreements
- The recent changes in reported inventories point to a potentially huge demand for inventory reviews and adjustments
- New scientific challenges for addressing long-term perspectives call for strategic planning of the EMEP and WGE work plans
- In-equalities in emissions, air quality impacts, costs and benefits are important for policy making; current models catch such aspects only partially



# Thank you!

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