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Cost-effective measures to achieve further improvements of air quality in Europe

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emep

Co-operative programme for monitoring
and evaluation of the long-range
transmissions of air pollutants in Europe



Issue and approach

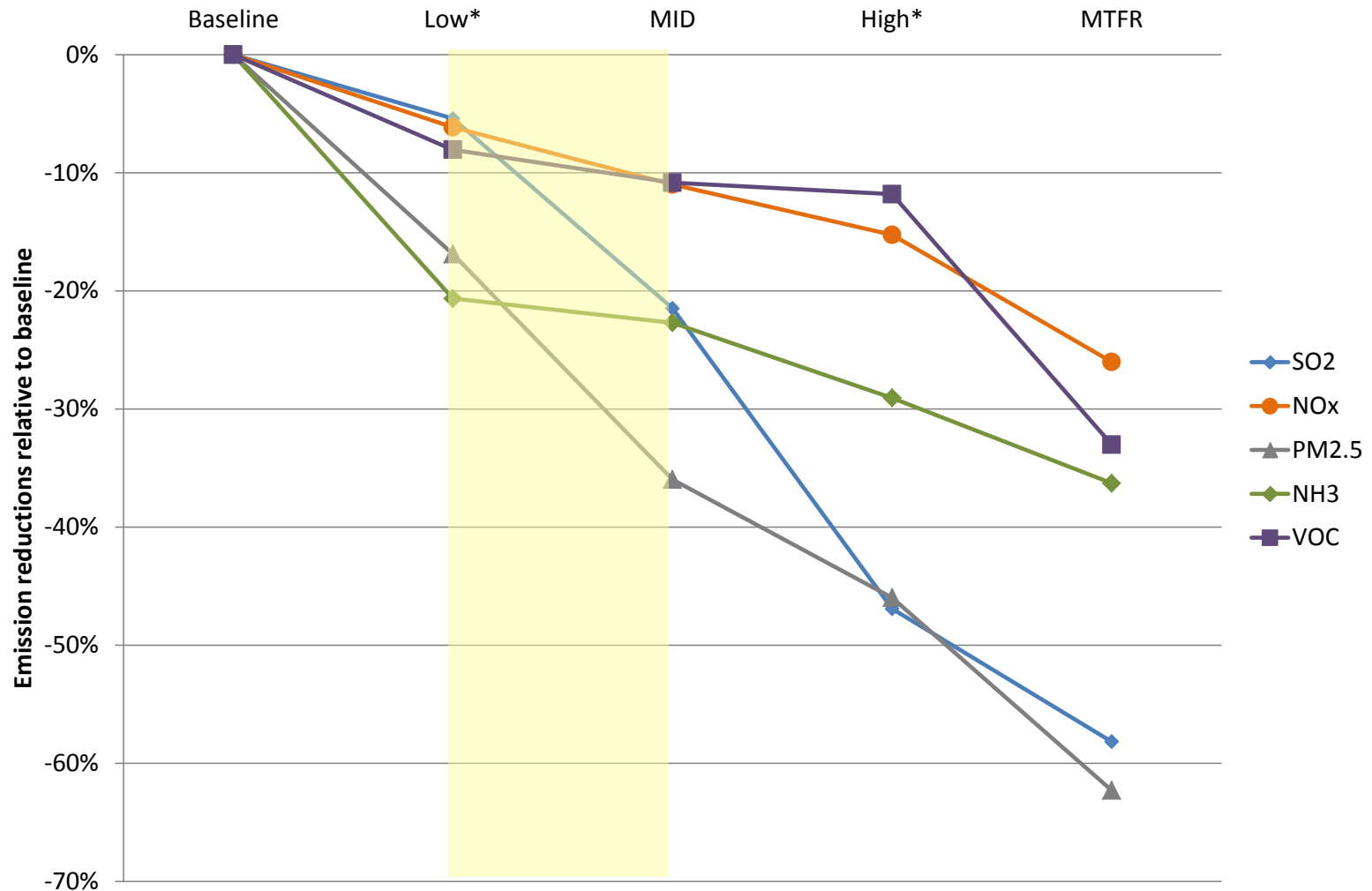


- The issue:
 - Identify a limited set of key measures that lead to cost-effective further improvements of air quality in Europe (to offer guidance to the negotiations on technical annexes)
 - Trade cost-effectiveness against simplicity

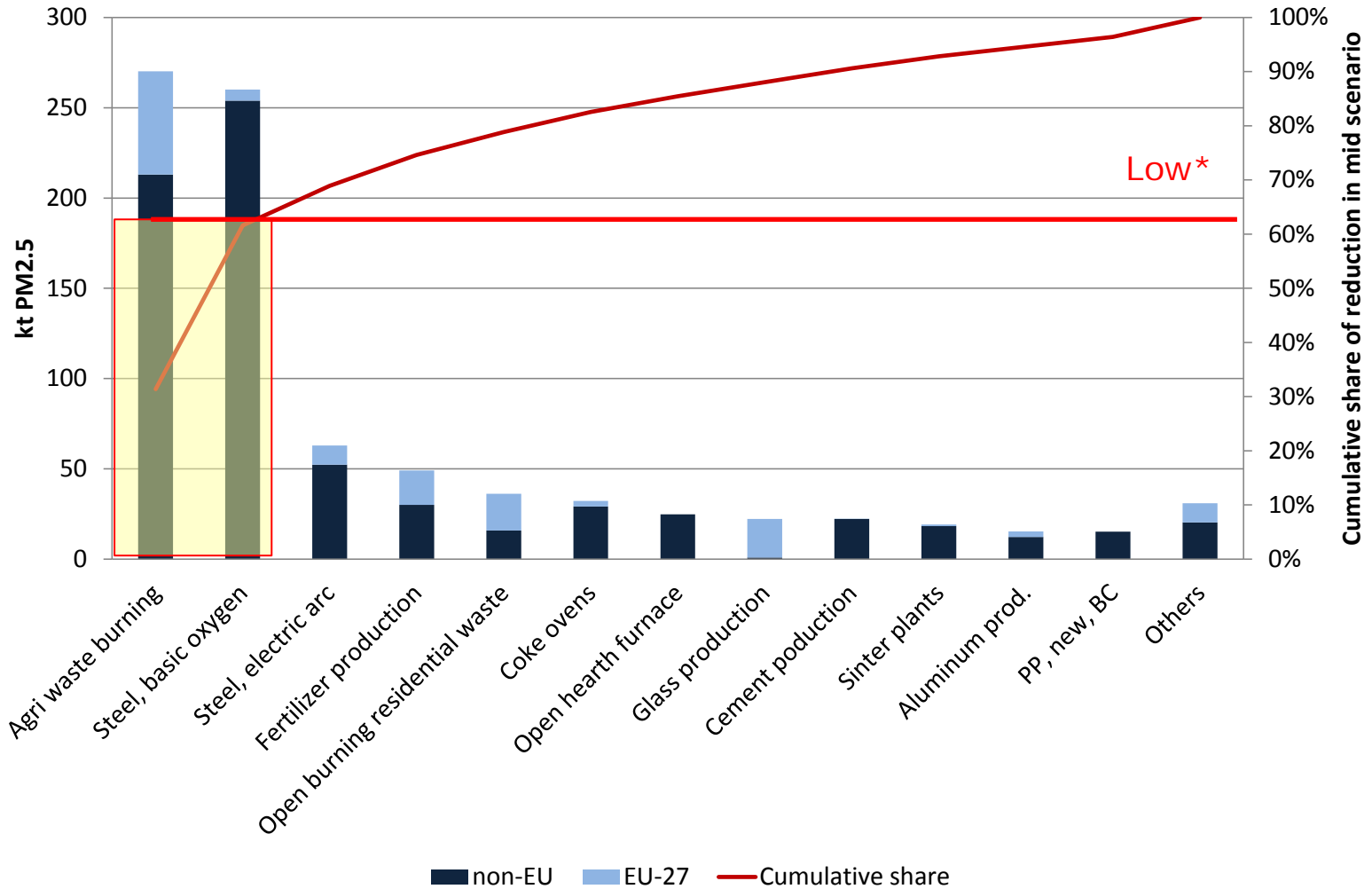
- We applied a hybrid approach to identify a (*subjective*) set of key measures:
 1. Identify the set of cost-effective measures of the mid scenario
 2. Rank measures by their emission reduction potential in the EMEP region
 3. *Choose a sub-set of measures that achieves a large fraction of emission reductions, e.g., measures that achieve overall reductions of the Low* scenario*
 - *Remaining reductions that are not achieved by these measures could be subject to national emission ceilings*

- Starting point:
 - The scenarios of cost-effective emission reductions presented in the CIAM 1/2011 report (at TFIAM 39 and WGSR 48)

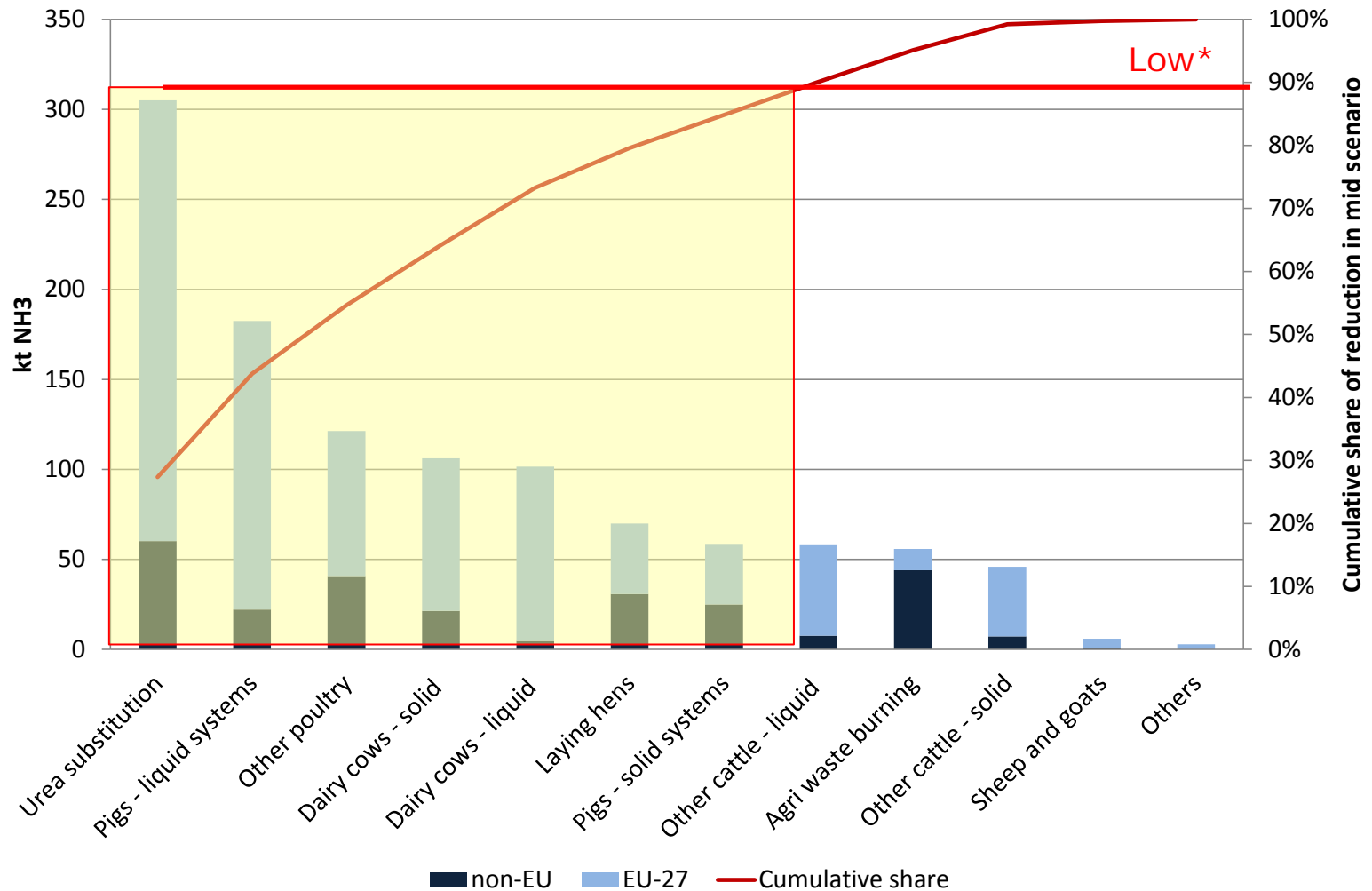
Priorities for cost-effective emission reductions in the CIAM1/2011 report



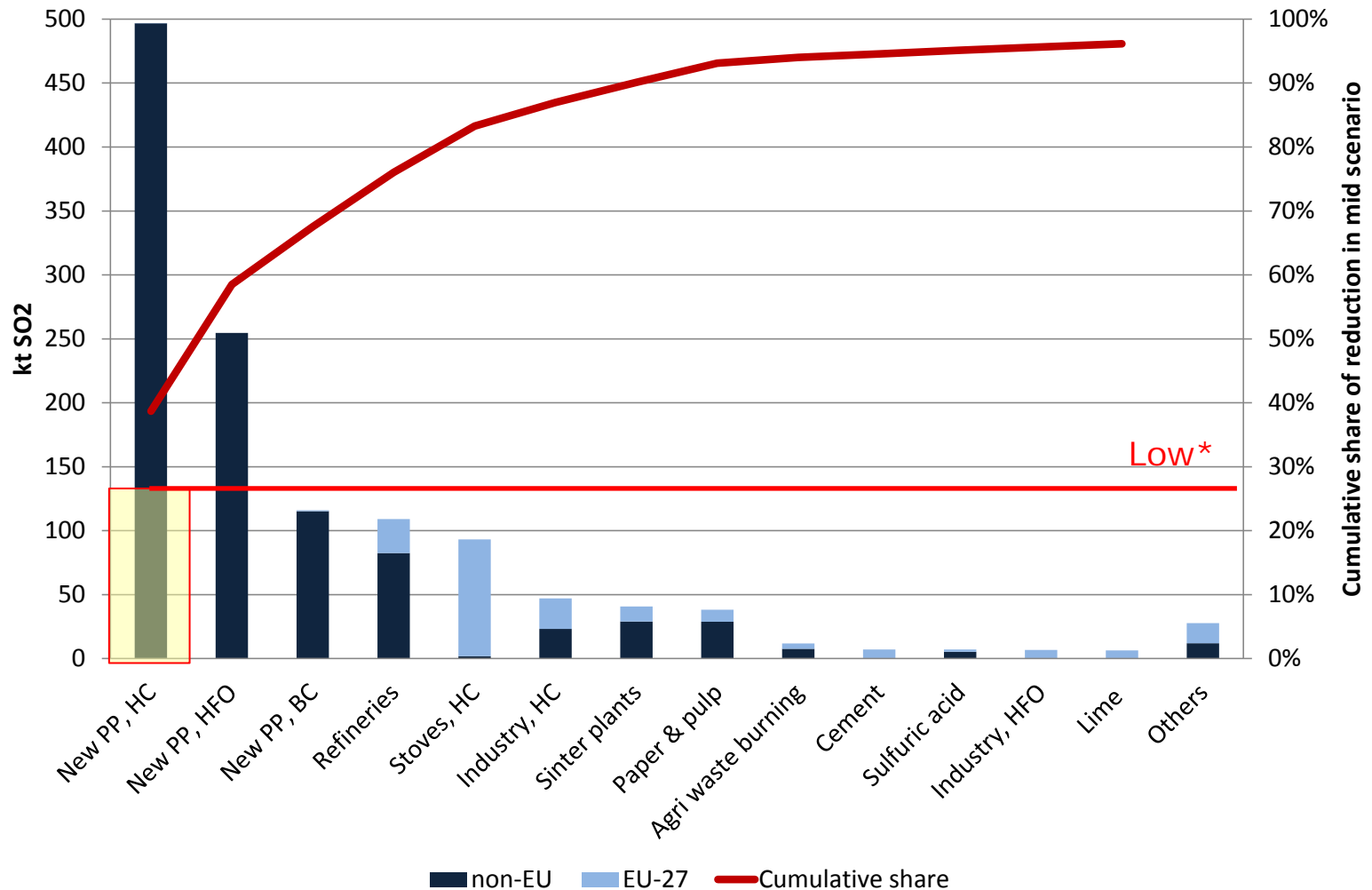
Cost-effective PM2.5 reductions in the mid scenario



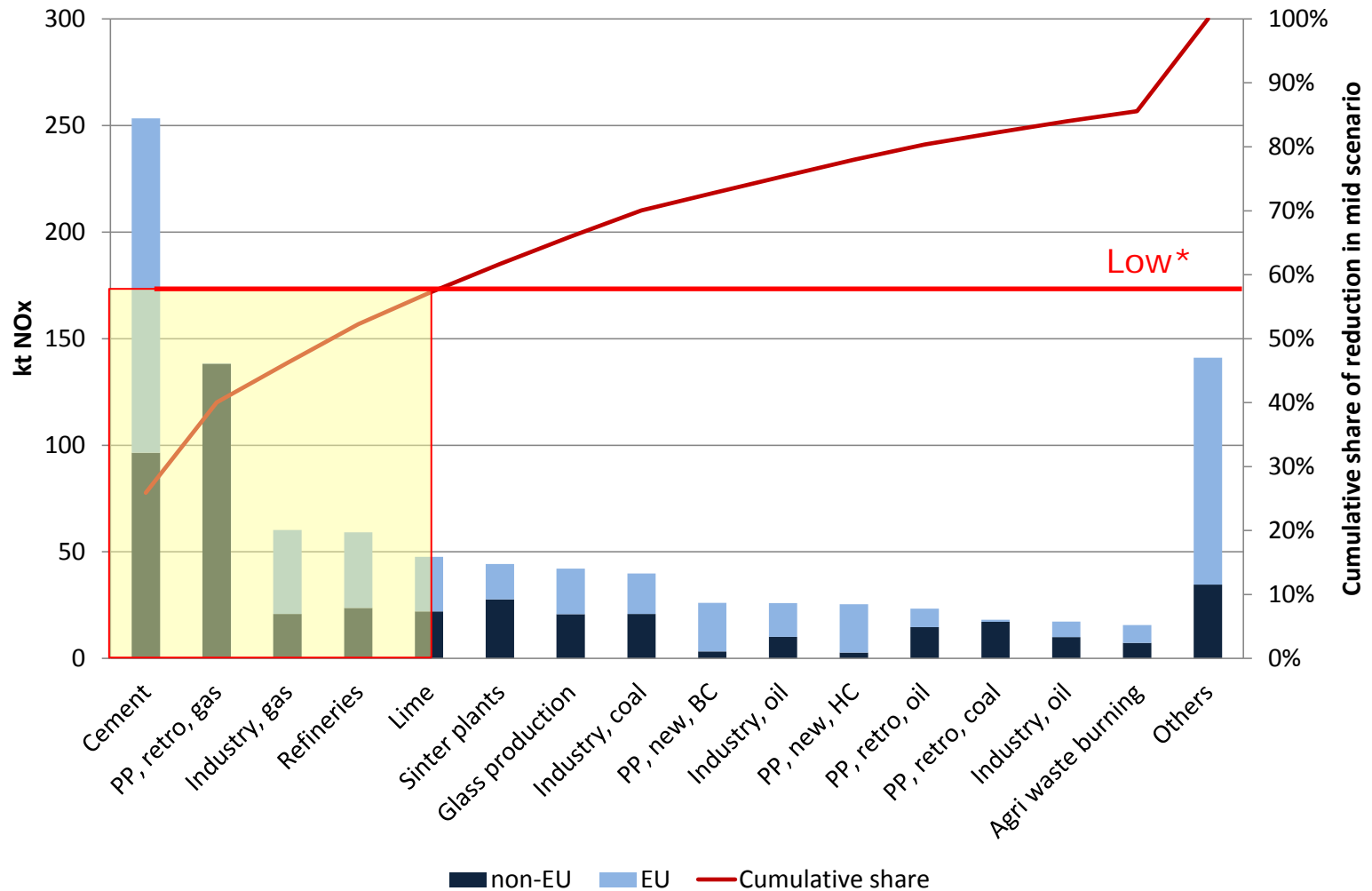
Cost-effective NH₃ reductions in the mid scenario



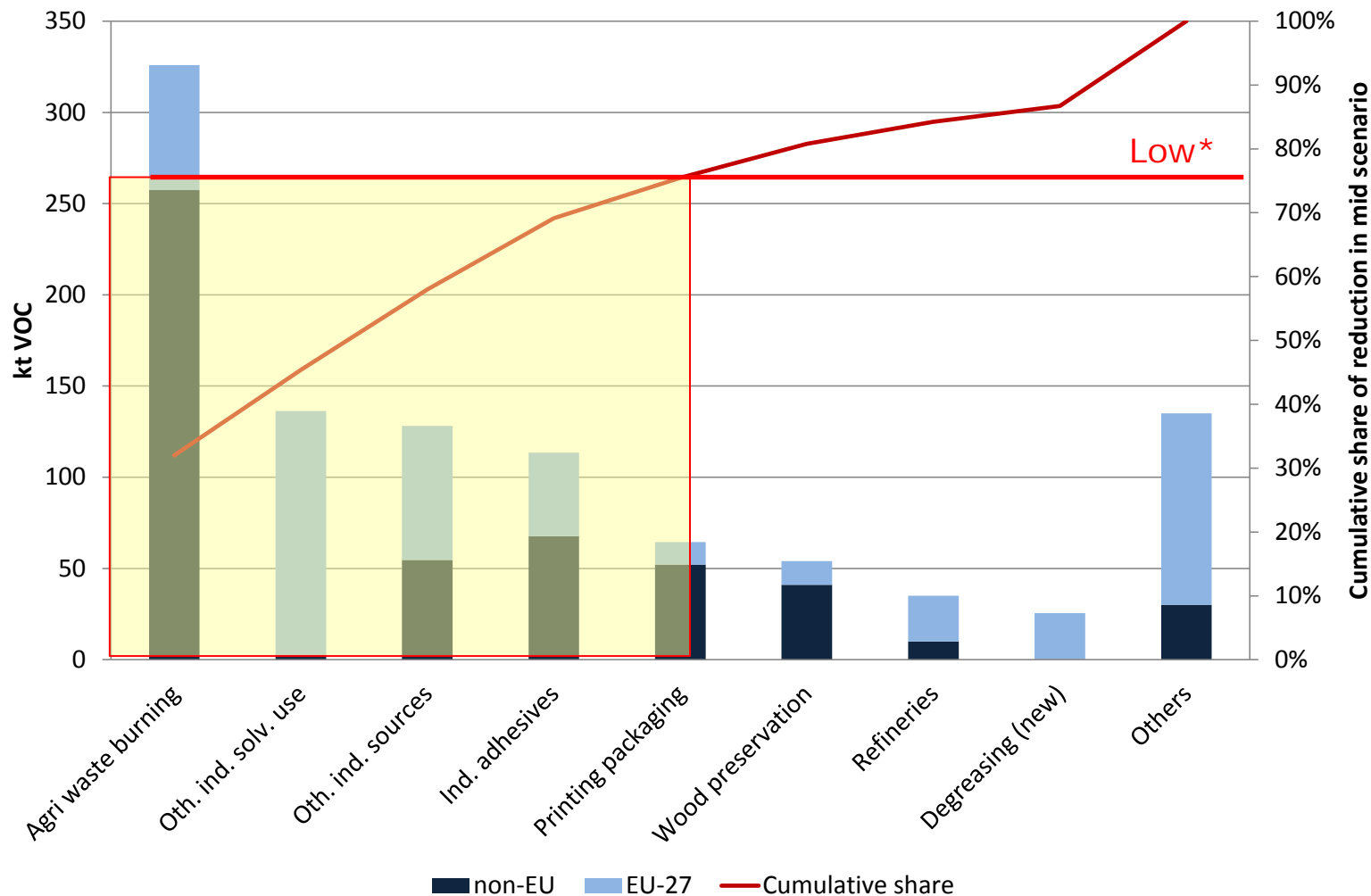
Cost-effective SO₂ reductions in the mid scenario



Cost-effective NO_x reductions in the mid scenario



Cost-effective VOC reductions in the mid scenario



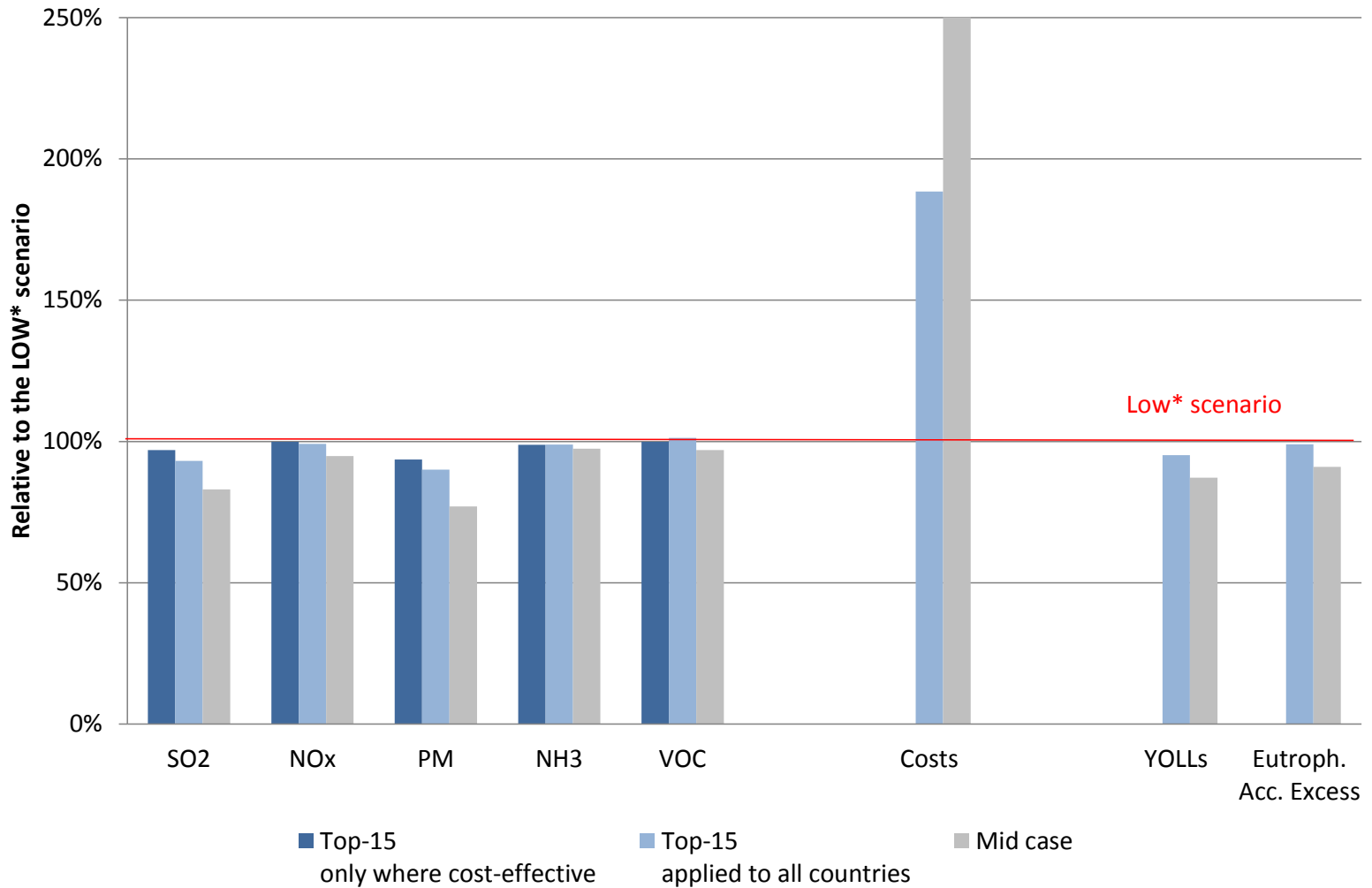
The smallest set of measures to achieve the emission reductions of the Low* scenario in the EMEP region



SO ₂	Desulfurization of new hard coal power plants
NO _x	Retrofitting low-NO _x burners at existing gas power plants Low-NO _x burners for gas in industry Low-NO _x burners for refineries Cement and lime production
PM _{2.5}	Ban of open burning of agricultural waste Steel production, basic oxygen
NH ₃	Urea substitution Pigs - liquid and solid slurry systems Dairy cows – liquid and solid slurry systems Other cattle - liquid slurry systems Laying hens and other poultry
VOC	Industrial solvents use Other industrial VOC sources Industrial use of adhesives

All these measures are in addition to the current legislation in each country

Cost-effectiveness of the selected measures



Conclusions



- A set of 15 measures has been identified that achieves Europe-wide the emission reduction of the Low* scenario. It involves largest reductions for PM_{2.5} and NH₃ emissions (relative to baseline)
- Priority pollutants/measures:
 - Non-EU: PM_{2.5} (industry) and SO₂ (power plants)
 - EU-27: NH₃
 - and, to a lesser extent, in both groups on NO_x and VOC.
- This a subset of the cost-effectiveness measures to achieve the mid scenario, but not necessarily the most cost-effective set to attain the impacts of the Low* scenario.
 - In particular, if applied uniformly in all countries, such a sub-set would ask for measures in countries where they might not be cost-effective.
- However, the identified measures might guide negotiations on sectors to be included in technical annexes of the protocol

Detailed material



- In-depth information will be made available soon at the GAINS web site

<http://gains.iiasa.ac.at>

- CIAM Report 3/2011
- Excel sheets with country-specific information for EU and non-EU countries