



Major Air Pollutant Emissions in Europe

past - **present** - future
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Green Week 2013

Tuesday 04/06/2013

Session 1.4 Major pollutant sources and source identification





Outline

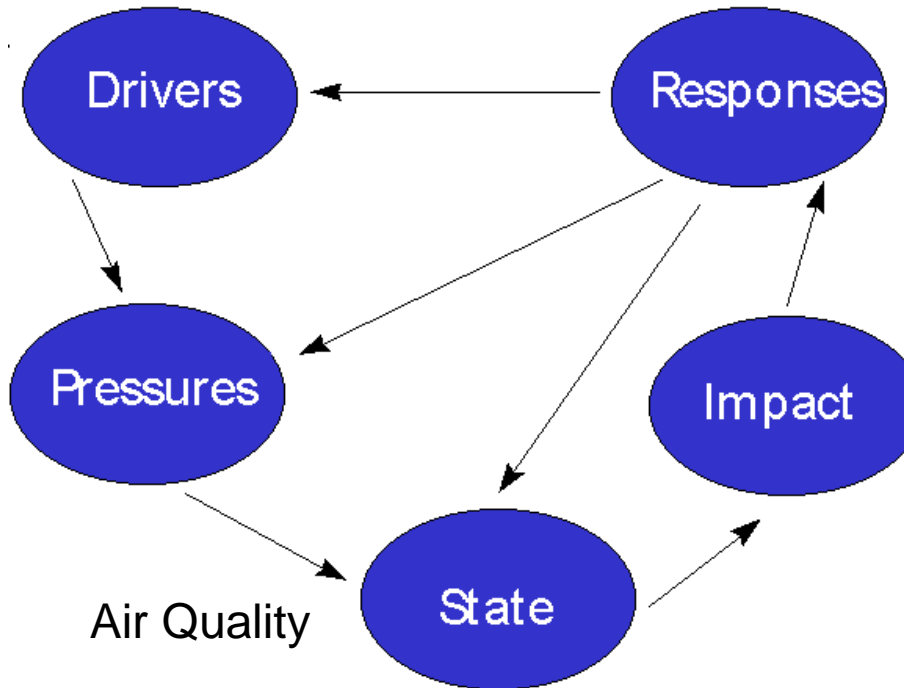
- › Why investigate emissions?
- › Past 2 Present
- › Major sources?
- › Future?
- › Discussion issues
- › Conclusions



Why account emissions? - Why identify source origin?

The DPSIR Framework

Economic activities
transport



Policies:
Cleaner fuels,
New technologies

Health effects
Biodiversity loss
Crop damage

Pollutant Emissions
PM10, NO_x, CO₂

Air Quality

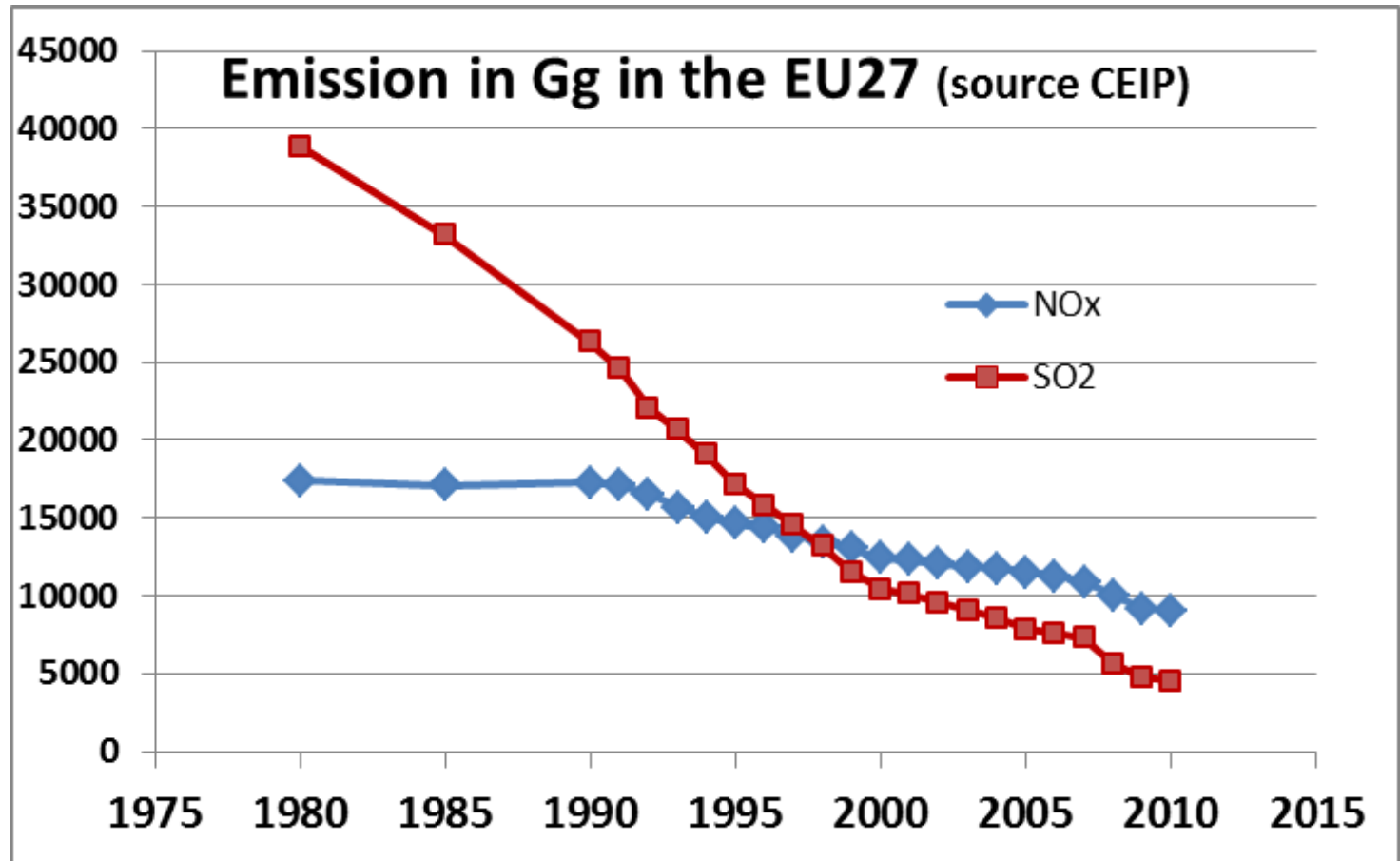
*To relieve the pressure without killing the economic activity
you have to reduce emissions...*

– to do that you need to know what source it is coming from..



Past to Present....

EU-27 emission trends for the main air pollutants, PM, HMs and POPs



- End of pipe measures (stacks)
- Lower the S content of the fuel



Conclusion - Highly successful for some AP!

Q: are we finished?

- › No, not all addressed equally successful
- › No, started because pressures on ecosystems and human health are unacceptable – that is still the case!

**See recent Review EU Thematic Strategy on Air Pollution
DG environment**

- › No, we need to invest more, not less! The low hanging fruit is picked, now it becomes increasingly hard, more costly....



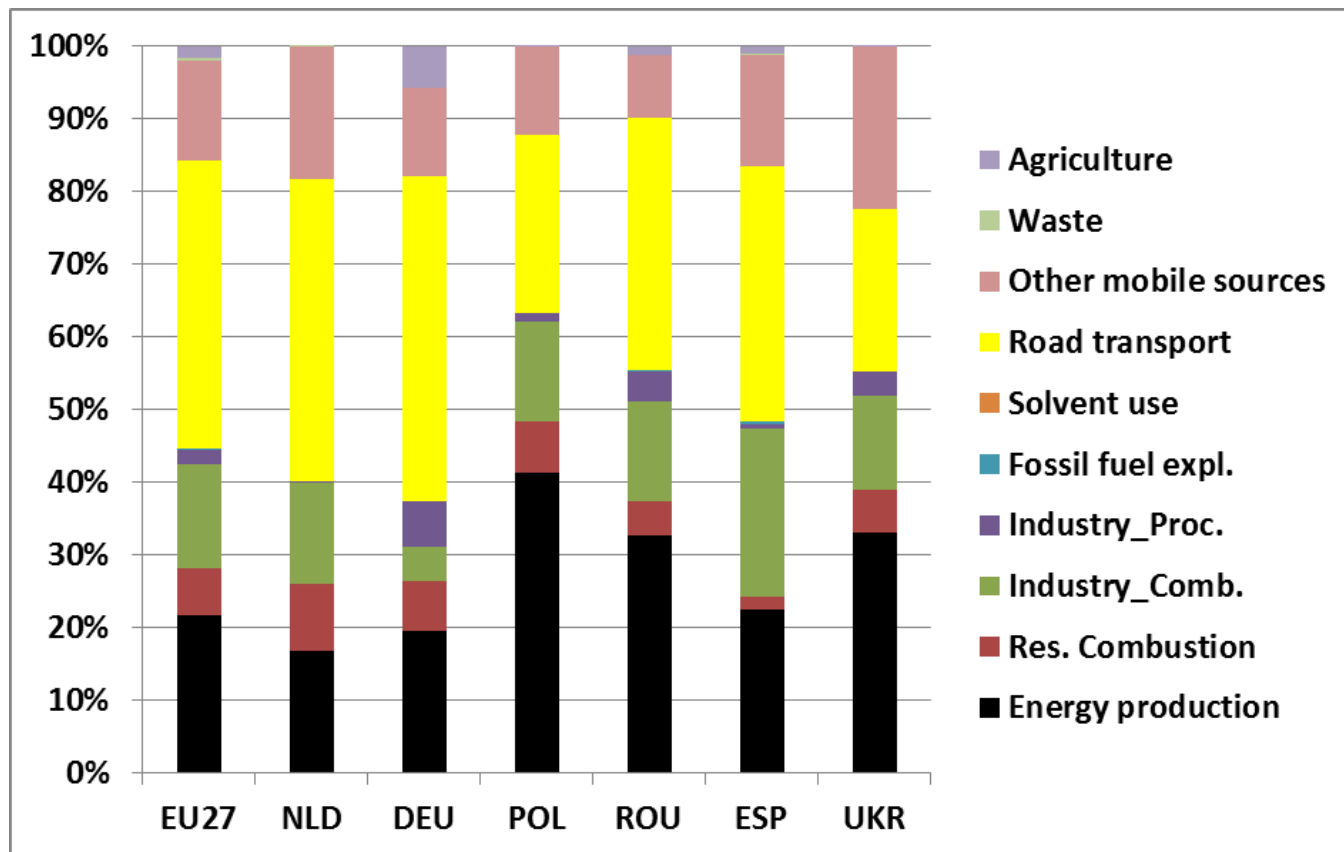
So, What are the major pollution sources in Europe?

Pollutant	Major source	EU27+	EU27+ Sea	Int. Shipping
CH4	Agriculture	46%		
CO	Res. Combustion	35%		
NH3	Agriculture	93%		
NMVOC	Solvent use	42%		
NOX	Road transport	42%	29%	30%
PM10	Res. Combustion	30%	26%	12%
SO2	Energy production	63%	42%	33%

- › **Differs by pollutant, not one main culprit!**
- › **Trends?** Point sources being reduced, fugitive and diffuse sources more and more important, relative source contributions change (road transport reduced, residential combustion & international shipping not (except SECA), agriculture not much...



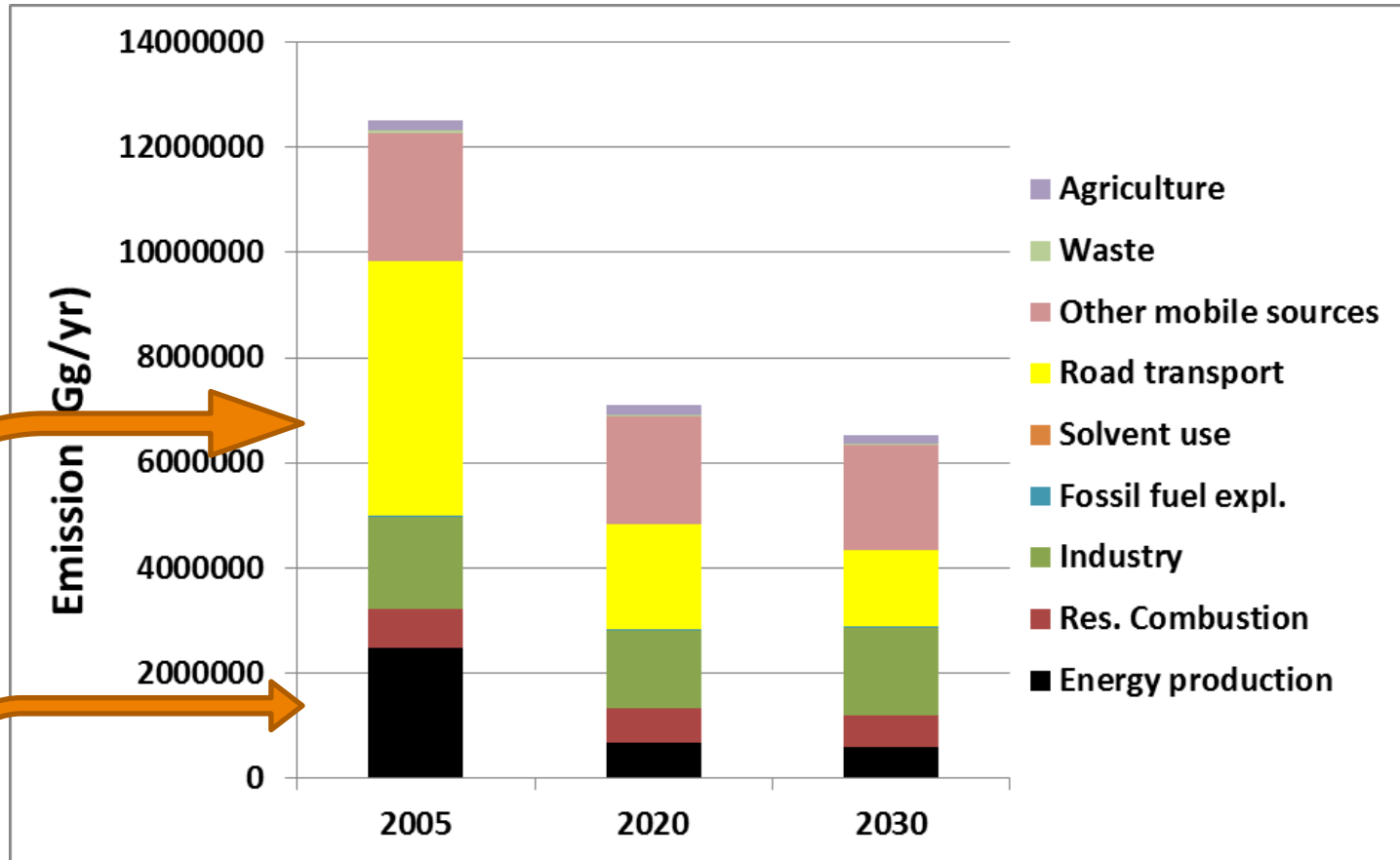
NOx emission by source sector in 2009



- › Addressing road transport and Energy production is a generic, sensible approach!



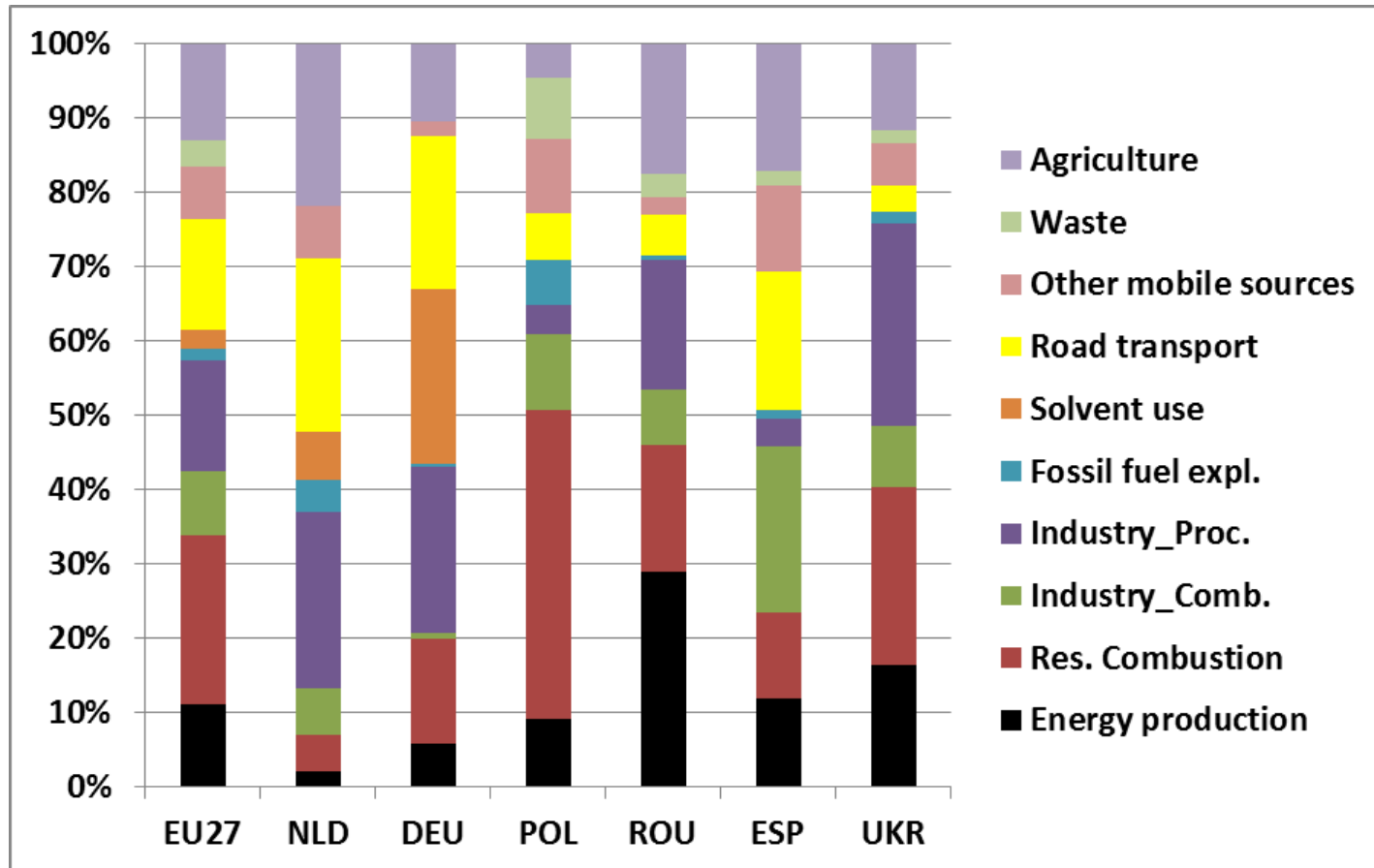
EU15+ NO_x 2005 – 2020 – 2030 all source sectors (source EU FP7 Transphorm)



› Foreseen policies address Road transport (yellow) & Energy production (Black)



PM10 emission by source sector in 2009

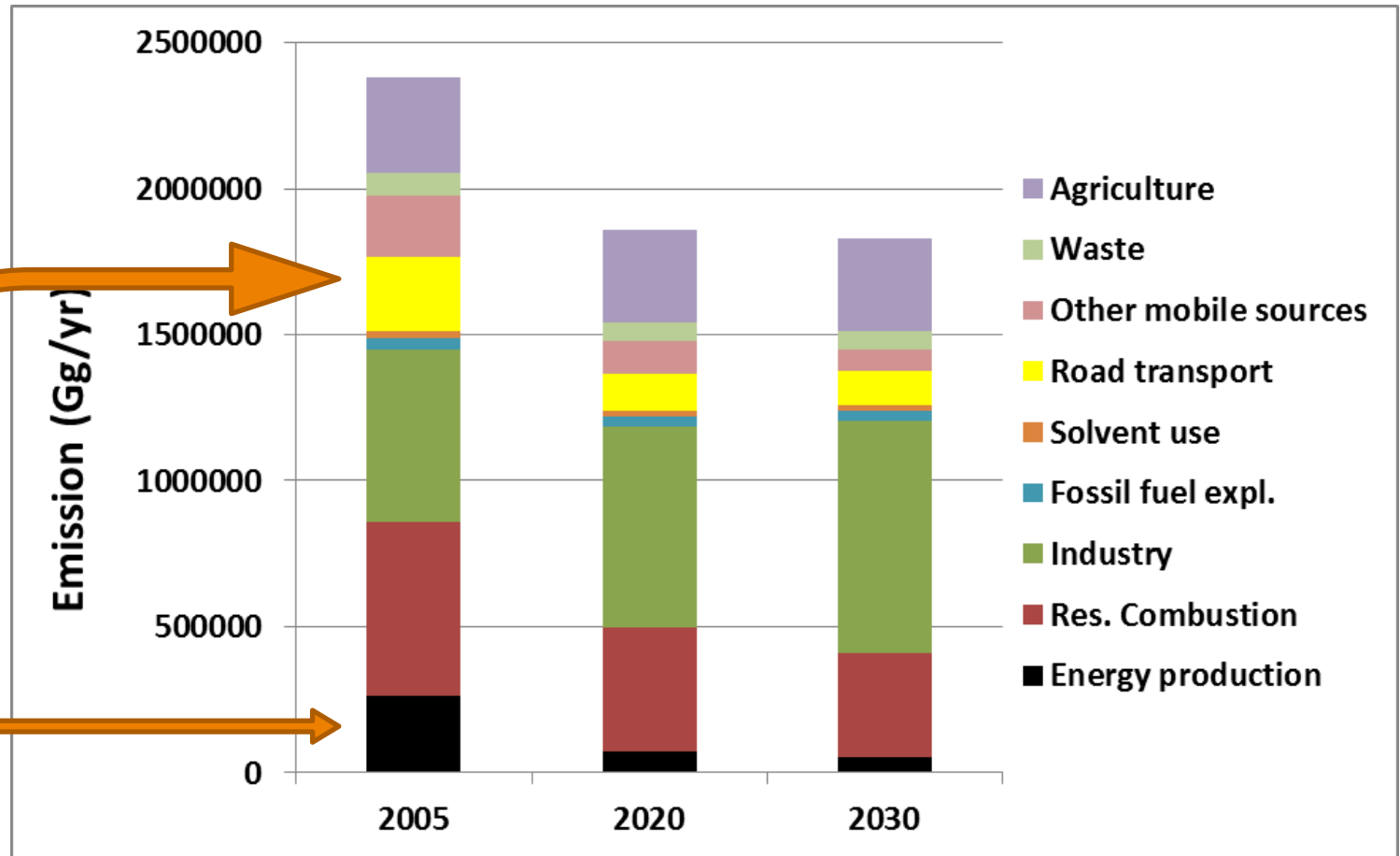


- › Generic measures will not be effective/applicable everywhere.
- › PM emission reduction asks more for tailor made solutions



EU27+ PM10 2005 –2020 – 2030

all source sectors excl Int. shipping (source TNO & FP7 Transphorm)

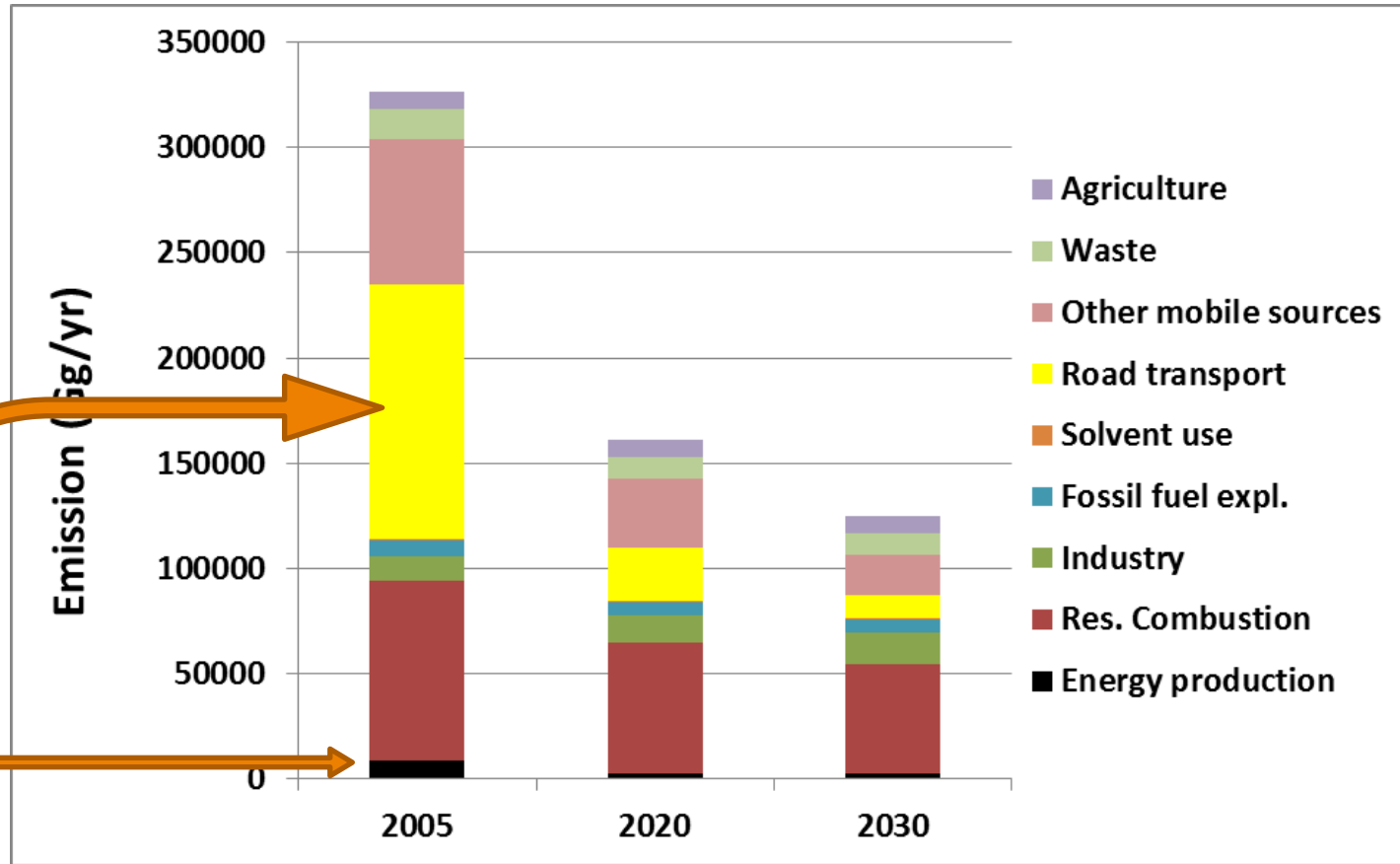


› Foreseen policies Road transport & Energy prod. limited effect on PM10



EU27+ Elemental Carbon 2005 –2020 – 2030

all source sectors excl Int. shipping (source TNO & FP7 Transphorm)



› Foreseen policies Road transport impact EC, Energy prod. Limited effect



Issues for discussion: *what may limit (future) success?*

- › Do technologies deliver what is promised? Real emission reductions?
- › Europe is a lot of very different situations & International (shipping) emissions should not be neglected.
- › Not only focus on limit values (“we comply, problem solved”) – Keep an eye on the why! Need guidance from Health / Ecosystems research.
- › Ambient concentrations may not reflect primary, direct emissions! Source identification in ambient air and/or deposition is critical information
- › Opposing ambitions: global climate (CO₂) vs local exposure (PM)
- › New pollutants: Black carbon, Ultrafine particles - different strategy?
- › Economic pressure... (“China doesn’t have to do it”), Emission reduction legislation perceived as a negative force, a threat to welfare... Implying no political support.....



Conclusions

- › For some AP large reductions achieved
- › AP emissions decoupled from economic growth (unlike CO₂).
- › Complexity is ever increasing.....each pollutant asks for its own solution
- › Countries are very different – in sources – in achieved reduction...
- › “Conflicting” interests may occur e.g. Climate vs AP (CO₂ vs PM)?
- › If we know what key is, we can, based on source sector knowledge, make mitigation plans – Emission inventories & source recognition needed to monitor
- › New developments may go quicker than legislation (EC, ultrafines)
- › important to communicate what we gain! – it’s not just making trouble....



THANK YOU FOR YOUR ATTENTION

ACKNOWLEDGEMENTS
MANY COLLEAGUES FROM VARIOUS INSTITUTES
FP PROJECTS



EUCAARI



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