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Recent changes in the GAINS model

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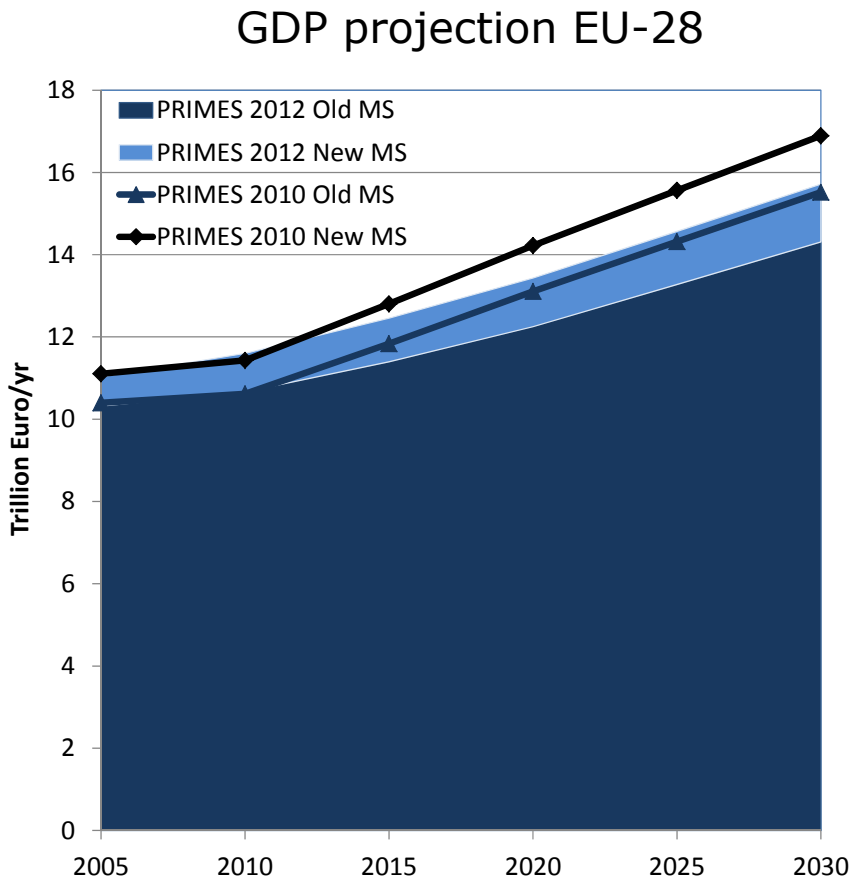
Recent changes

- Bilateral consultations with 15 Member States:
  - Improved emission inventories, etc.
  - Amended TSAP-2012 Baseline (based on PRIMES-2010)

- Health impact assessment based on HRAPIE recommendations:
  - Mortality from chronic exposure to PM2.5:
    - RR: 1.062/10µg (instead of 1.06)
    - only from anthropogenic sources, no threshold (as before)
  - Ozone:
    - Acute mortality: RR: 1.0029/10µg (instead of 1.003) - SOMO35
    - Chronic exposure as sensitivity case for benefits assessment

Draft TSAP-2013 Baseline

- Draft PRIMES-2012 Reference scenario, consulted with MS (DG-ENER/CLIMA)
- Strong economic growth, although GDP in 2030 7.5% lower than in PRIMES-2010
- Assumes adopted EU energy, transport and climate policies
- Euro-6 for diesel LDV: 310 mg NO_x/km 2014-2017, 120 mg NO_x/km 2018-

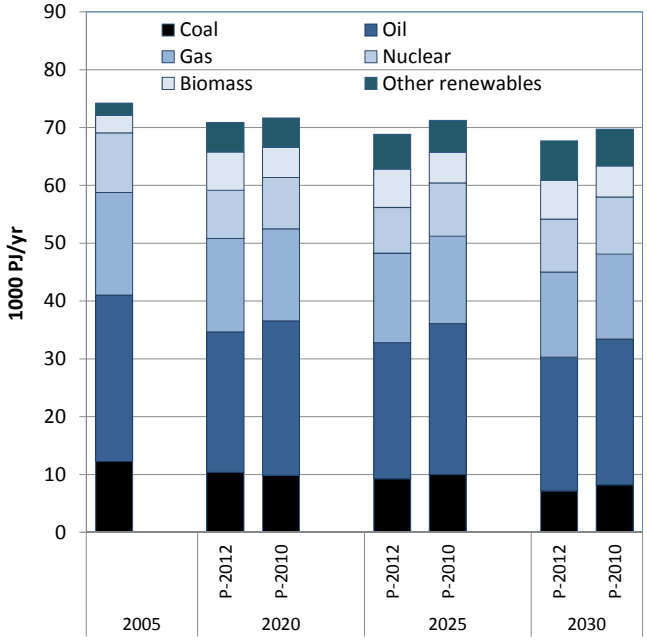


Energy use and livestock
TSAP-2013 vs TSAP-2012

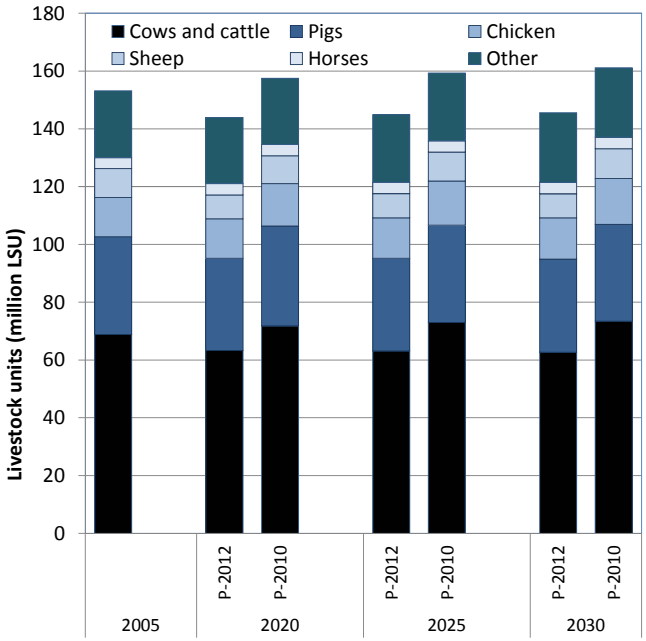
TSAP-2013 incl. draft PRIMES-2012:

- Strong energy efficiency measures
- Fast turnover of capital stock
- More diesel cars

Fuel consumption EU-28



Livestock EU-28

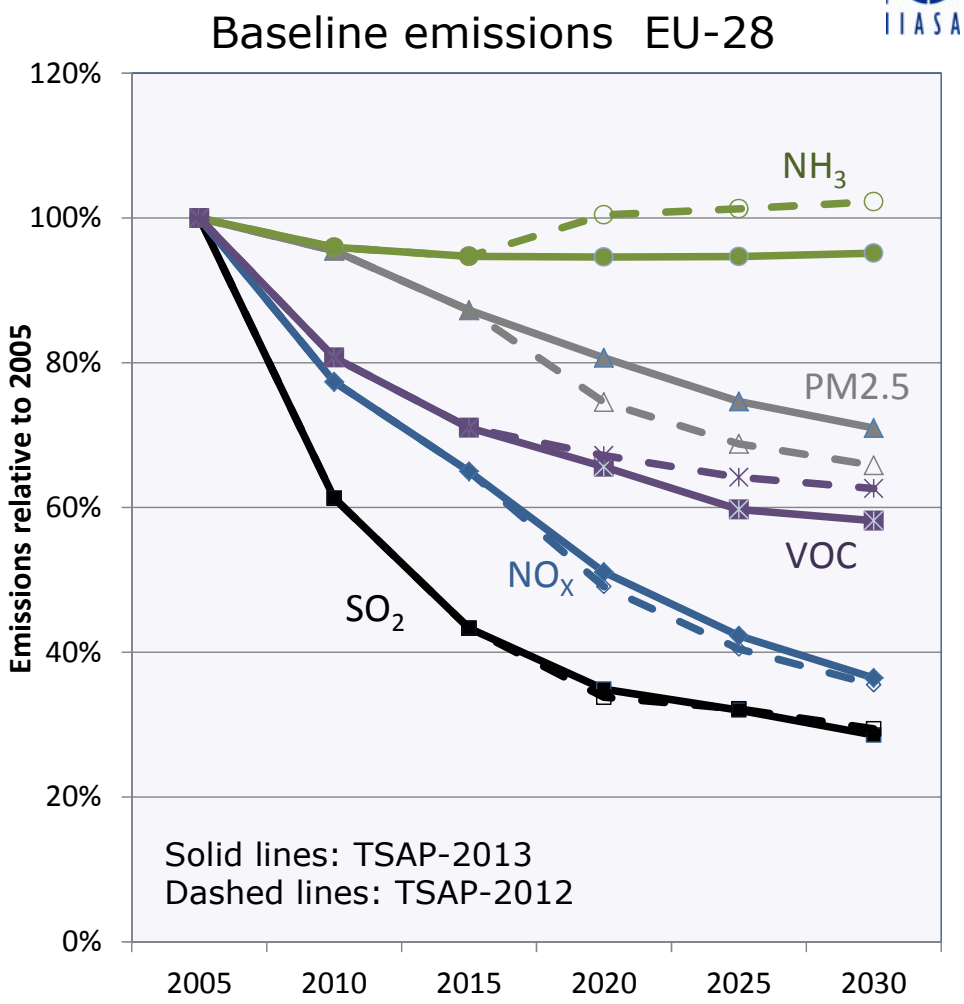


TSAP-2013 incl. draft CAPRI-2012:

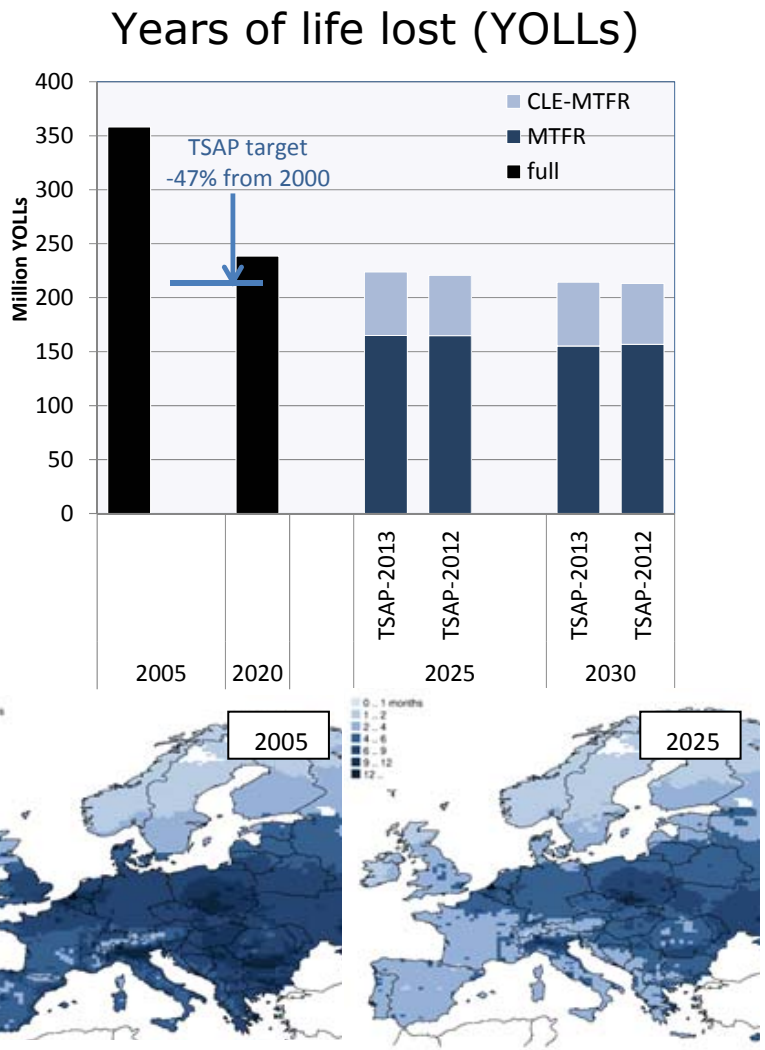
- No rebound above 2010 levels after 2015

Baseline emissions

- SO_2: Stabilization at -70% after 2020
- NO_x: continuous decline, -60% in 2030
- VOC: -40% in 2030
- PM: TSAP-2013 less optimistic (-30%) than TSAP-2012, due to more renewable energy
- NH_3: No rebound after 2015 in TSAP-2013

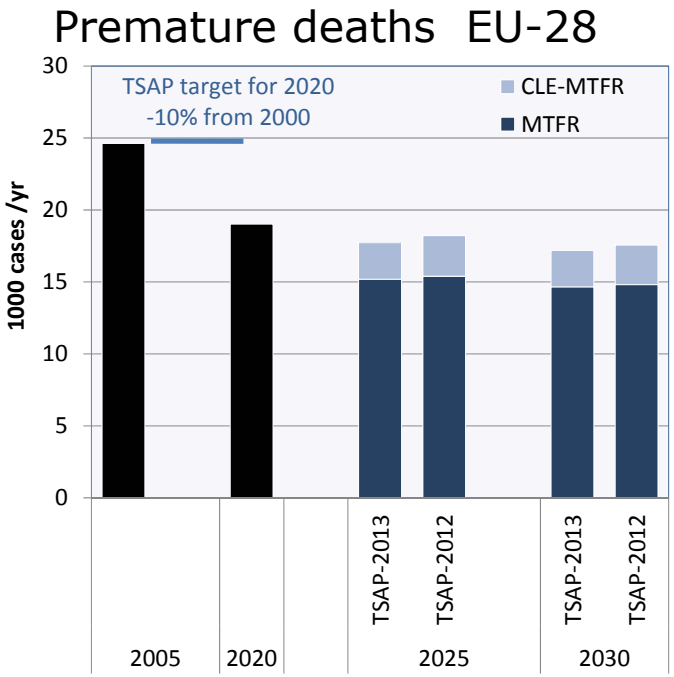


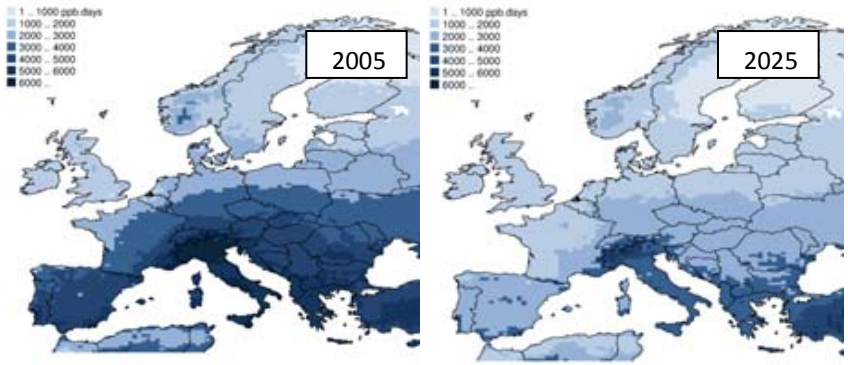
Health impacts from PM2.5



- Loss of life expectancy improves from 8.5 to 5.3 months by 2025
- TSAP-2013 slightly less optimistic: Higher PM2.5 compensate lower NH_3 and VOC
- European population will still lose 200-220 mio life years (YOLLs), especially in New Member States
- MTFR could gain 60-70 mio YOLLs
- TSAP targets for 2020 (-47%) will not be achieved by baseline

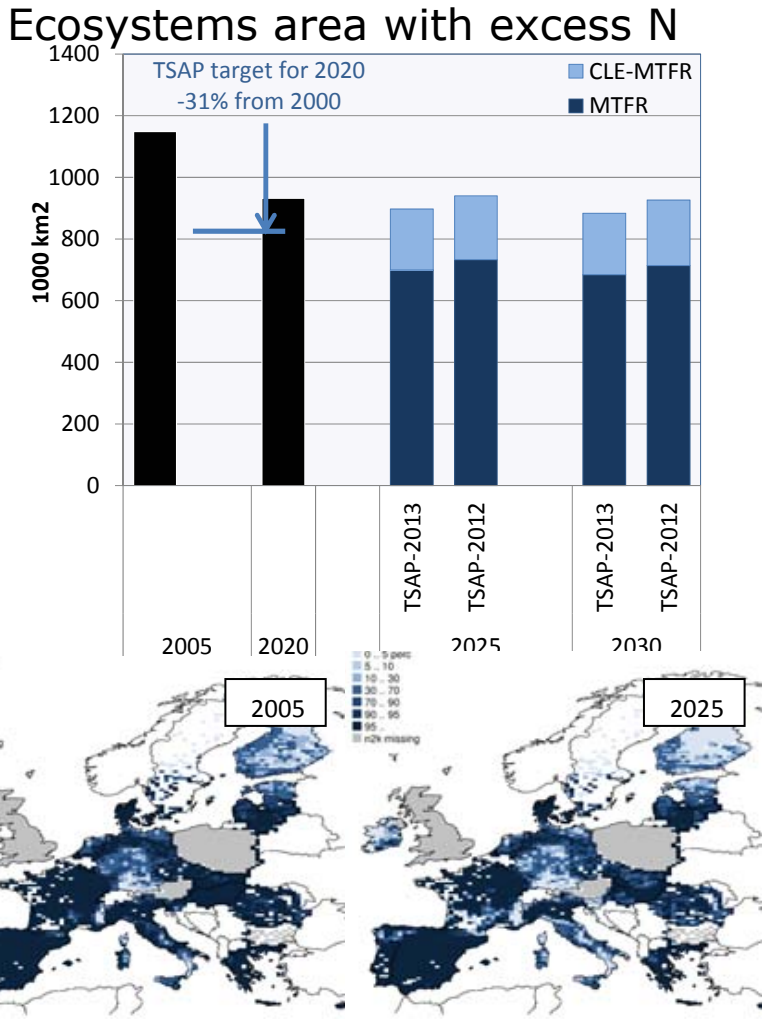
Health impacts from ozone





- Health impacts from ozone mainly in Mediterranean countries
- 25% decline in premature deaths from ozone up to 2025, but still 18,000 cases in EU-28
- Safely below TSAP target, mainly due to more optimistic assumptions on future evolution of hemispheric background
- Additional measures could save another 2,500 lives/year

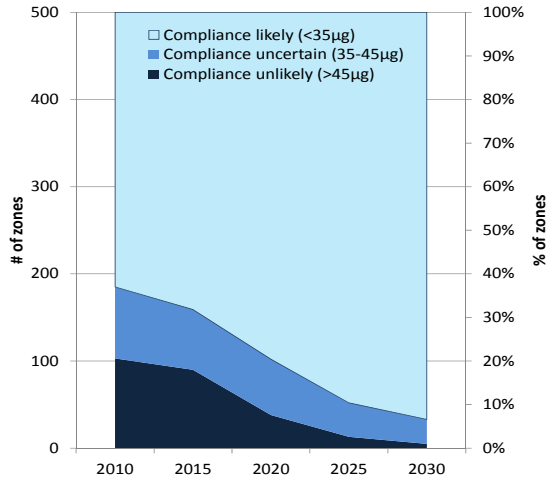
Eutrophication – Biodiversity

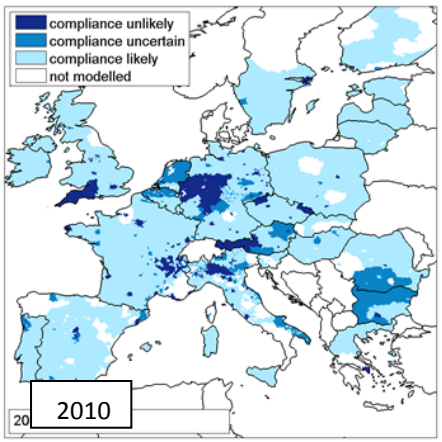


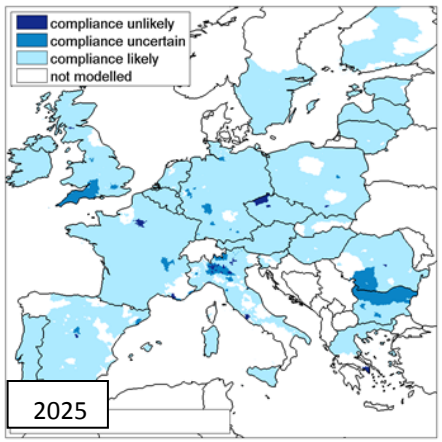
- 2005: 1.1 mio km^2 of ecosystems (66%) and 77% of Natura2000 areas were unprotected against excess N deposition
- NO_x measures will save 200,000 km^2
- But little change from NH_3
- In 2025, still 62% (420,000 km^2) of Natura2000 areas under threat
- Additional measures could protect 95.000 km^2 of Natura2000 areas
- Baseline will not achieve TSAP targets for 2020

Compliance with NO_2 limit values

Compliance of 500 AQM zones







2000+ stations modelled:

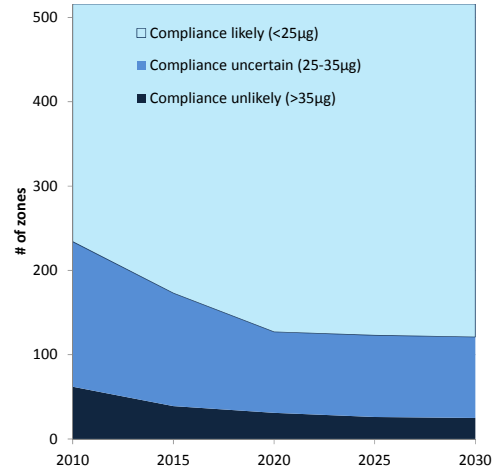
- Effective Euro-6 standards should eliminate almost all strong non-compliance cases/zones

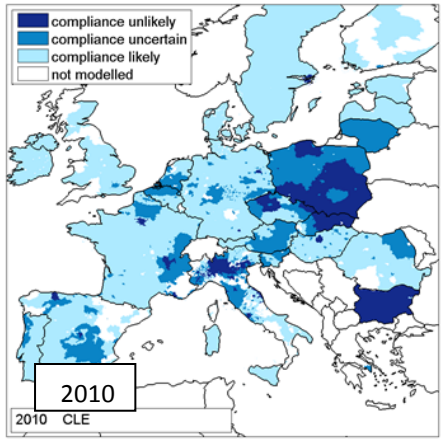
- Rate depends on assumed introduction schedule;
  TSAP baseline anticipates for 2020 still 10% of all zones in non-compliance

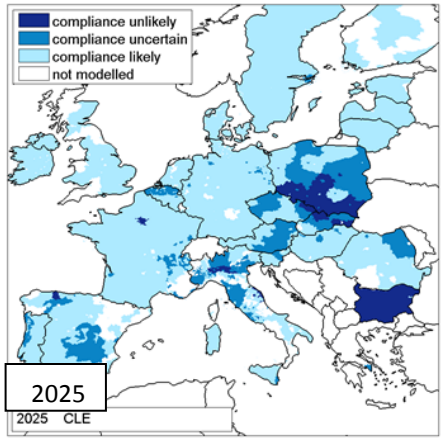
- Remaining problem areas should have realistic chance to achieve compliance with additional local measures

Compliance with PM10 AQ limit values

Compliance of 516 AQM zones



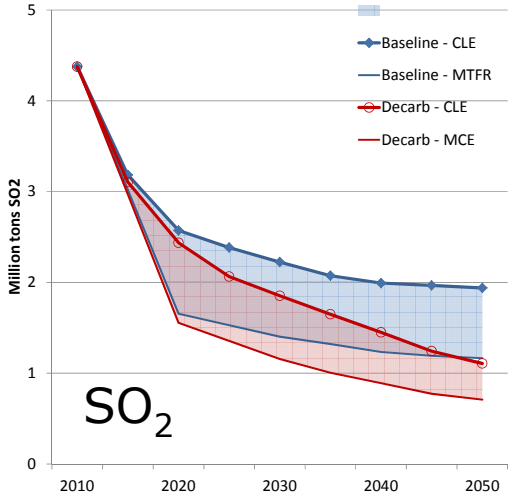


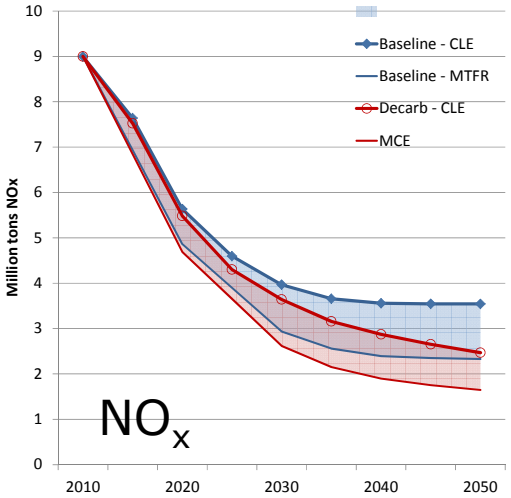


2000+ stations modelled:

- Until 2020, Europe-wide measures will reduce background, but no further progress beyond 2020
- In old MS remaining problems could be eliminated with local measures
- But problems will persist in new MS, due to continued reliance on solid fuels for heating.
- With more renewable energy, TSAP-2013 is more pessimistic than earlier projections

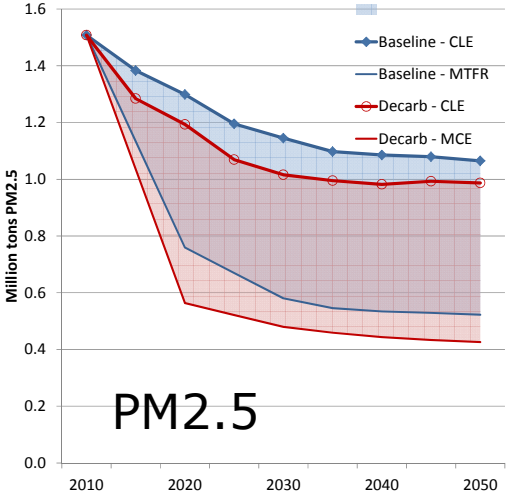
Outlook to 2050

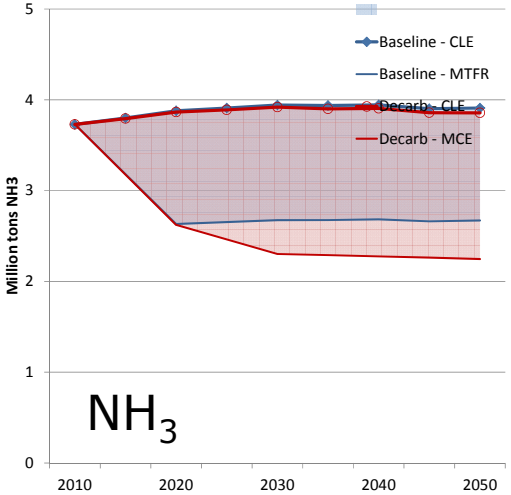


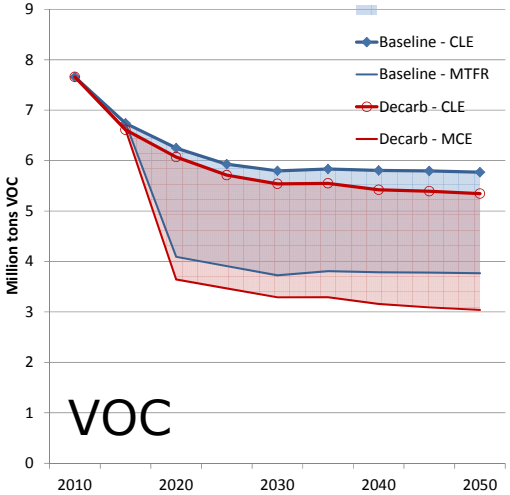


Further emission reductions only from:

- decarbonisation (only SO_2 and NO_x),
- further air pollution controls (could cut emissions by ~half).







Blue: BAU baseline, Red: climate policy + healthy diet scenario

Conclusions (1)
Draft TSAP-2013 Baseline

- TSAP-2013 Baseline: Up-to-date expectations on economic development and EU energy, transport, agriculture and climate policies
- Introduction of energy efficiency measures facilitated by fast turnover of capital stock, with benefits for air quality
- Similar baseline emission trends for SO_2 and NO_x as before; higher PM2.5 (from renewable energy), lower NH_3 and VOC;
- Emission declines flatten out after 2030 (except for SO_2 and NO_x in decarbonisation case)
- There is substantial scope for further emission reductions from dedicated air pollution control measures

Conclusions (2)
Air quality and impacts

Despite the air quality improvements of the TSAP-2013 Baseline:

- European population will still lose 200-220 mio life years (YOLLs)
- TSAP targets for PM and eutrophication will not be achieved in 2020

Potential gains from further policy interventions:

- 60-70 mio YOLLs + 2,500 less premature deaths
- Protection of 95,000 km^2 of Natura2000 areas against N deposition

Air quality limit values:

- NO_2: Effective Euro-6 should enable all zones to achieve compliance; baseline foresees full Euro-6 penetration until 2030
- PM10: Baseline will achieve compliance in most zones of old MS by 2020; problems remain in new MS from solid fuel heating