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Project Overview and Main Results

Dr Russell C Frost

Team Leader

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Project Background

- Air pollutants and their impacts on human health & the environment

- International efforts to combat air pollution, including
  - Convention on Long Range Transport of Air Pollutants (CLRTAP)
  - EU National Emission Ceilings Directive SO_2, NOx, NMVOC and NH_3

- Present project is designed to help the transposition of the NECD in Turkey

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TA Project Overview

- Purpose
  - To help determine possible National Emission Ceilings for the pollutants referred to in the NEC Directive
- Implementation - March 2011 to November 2012
- Main expected results and outputs
  - National emissions inventory for NECD pollutants
  - Practicable emissions reduction strategies
  - Cost-benefit analyses
  - National emission projections to 2025
  - Identified possible national emission ceilings with Impacts Assessment (IA)
  - Guidelines for updating the inventory & projections

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Emissions Inventory 1990 - 2010

- EMEP/EEA Guidebook methodology was adopted

  Emission = Activity x Emission Factor
- A number of Ministries provided relevant sectoral data
- Guideline prepared for updating and developing the inventory
- Limitations of 1st NECD inventory
  - Barriers to information exchange
  - Consistency with GHG emissions inventory
  - Resolution of some data

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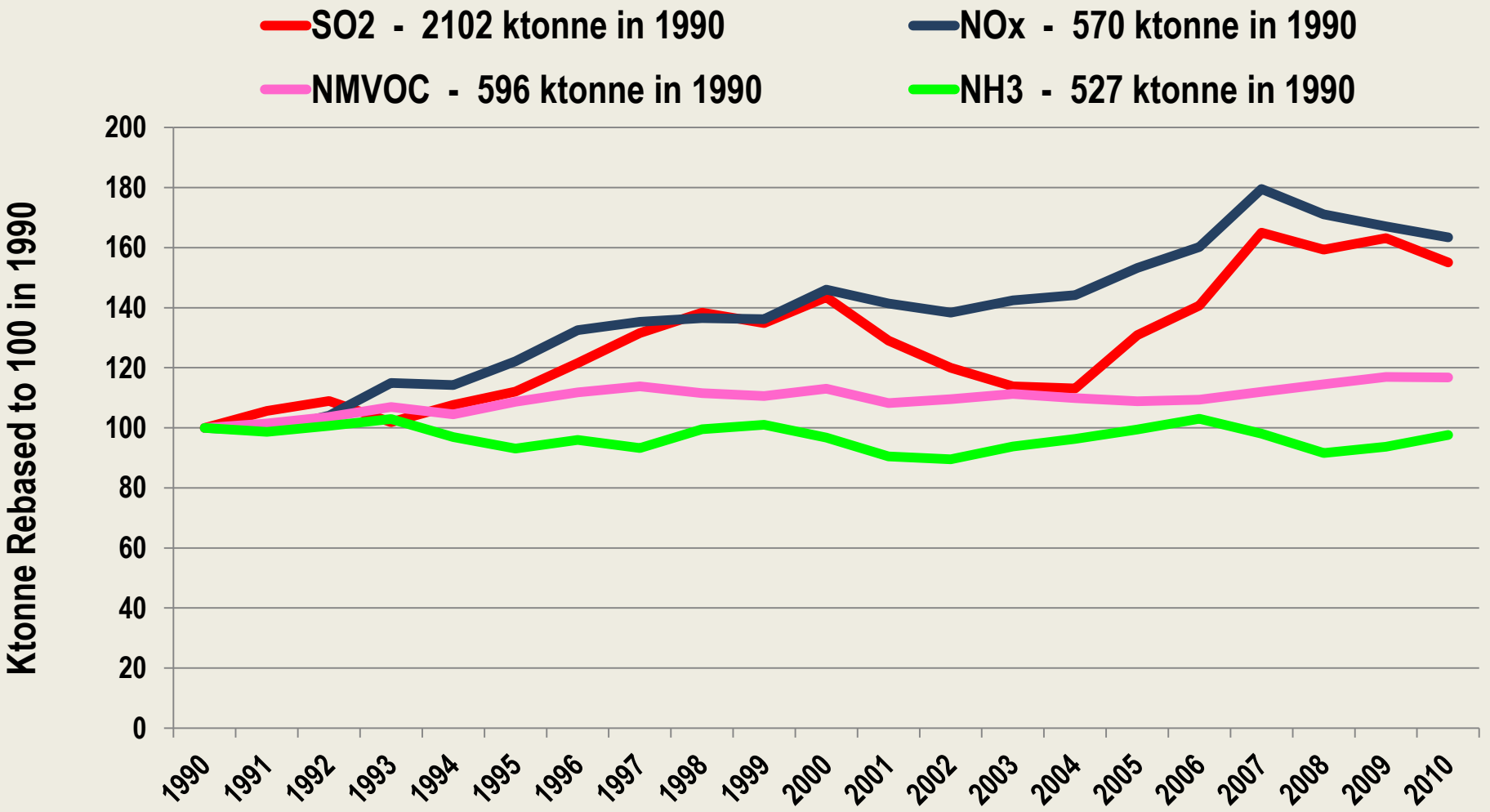
Emissions Inventory 1990 - 2010



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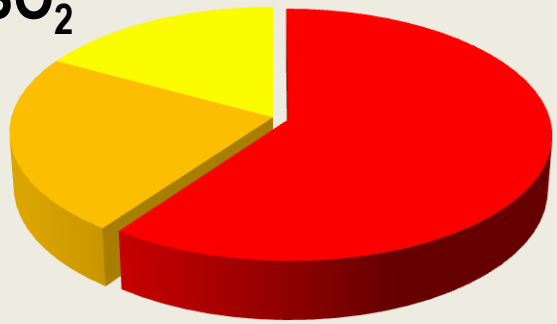
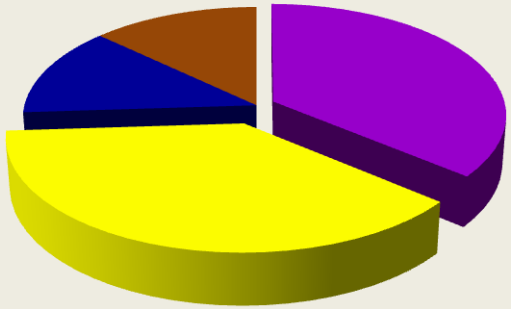
Major Emission Sources 2010

SO_2



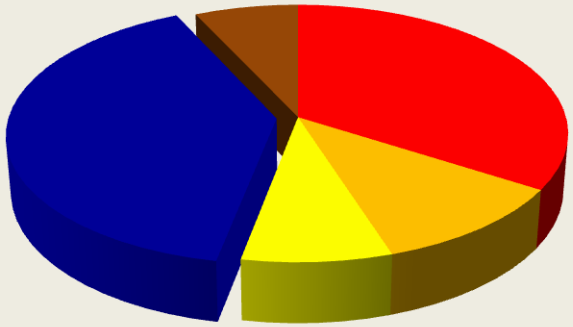
- Electricity generation
- Industrial combustion
- Residential combustion
- Road transport
- Other

NMVOC

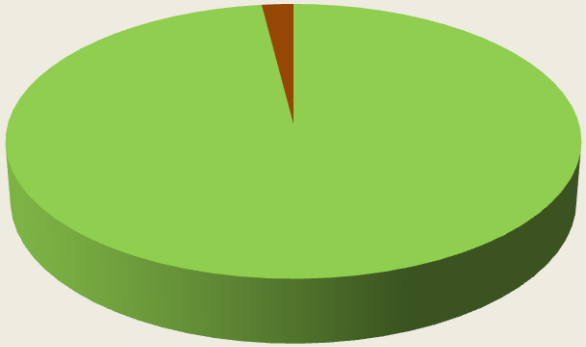


- Solvent use
- Residential combustion
- Road transport
- Agriculture
- Other

NOx



NH_3



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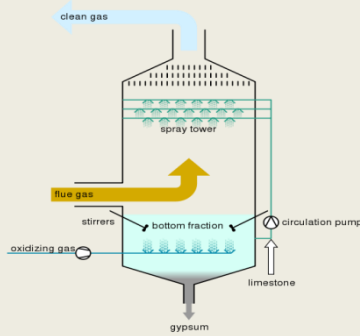
Emissions Management Strategies (EMS) - General

- Primary measures - emissions control e.g.
  - New vehicle engine emission standards
  - Flue gas desulphurisation
  - Organic solvent limits
- Secondary measures e.g.
  - Zero emission sources for electricity generation
  - Restrict fertiliser use in nitrate vulnerable zones
- Good practice measures e.g.
  - Energy efficiency
- Outreach programmes to promote good practice e.g.
  - Energy use, solvents use and livestock rearing



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Cost-Benefit Analysis (CBA)

- Emission reductions result in significant health and other benefits whose economic value is often not recognised
- For example, at 2010 prices
  - € 3600 / tonne SO_2
  - € 2300 / tonne NOx
- CBA takes such non-financial benefits into account

- CBA fully justifies
  - SO_2 control and NOx prevention at LCPs
  - Use of low-S liquid fuels
  - NH_3 control in livestock
- CBA does not support
  - NOx control (SCR) at Large Combustion Plants (LCPs)
  - However, regulations may require this in future for coal/lignite fired LCPs of ≥ 500 MWth

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Emission Projection Scenarios

- Without Measures (WoM) – business as usual
  - Allows for economic and population growth, e.g. growth in electricity demand
  - No new initiatives to manage emissions
- With Measures (WM) – adopting national policies such as Climate Change Action Plan 2011-23, e.g.
  - Electricity from renewable sources
  - Partial emissions management strategies
- With Additional Measures (WaM)
  - Implementation of all relevant transposed EU Directives
  - Full emissions management strategies

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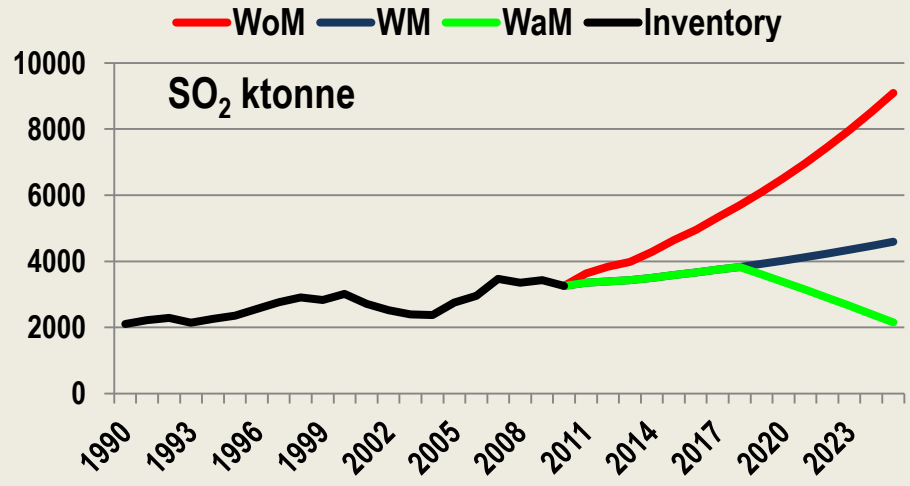
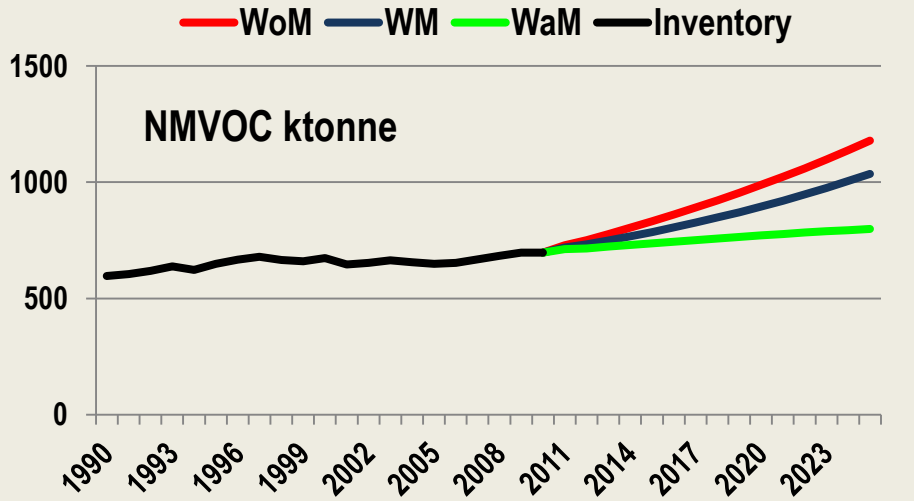
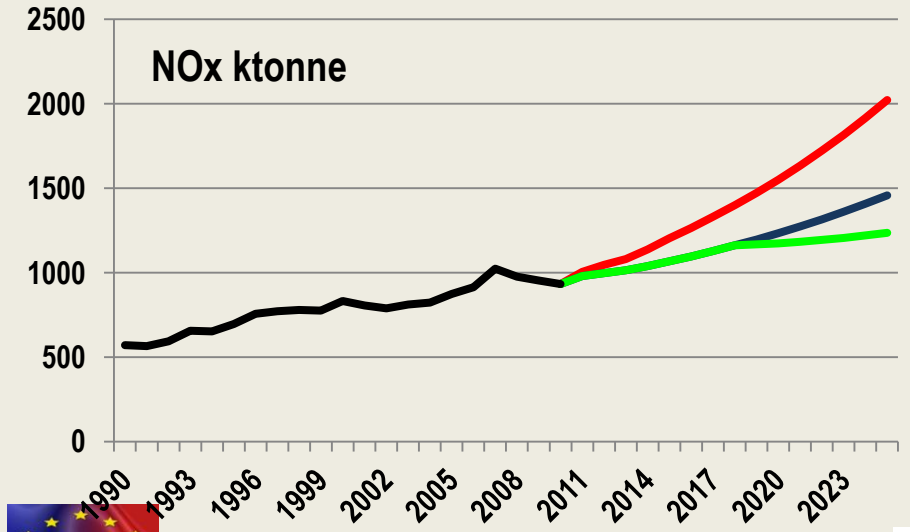
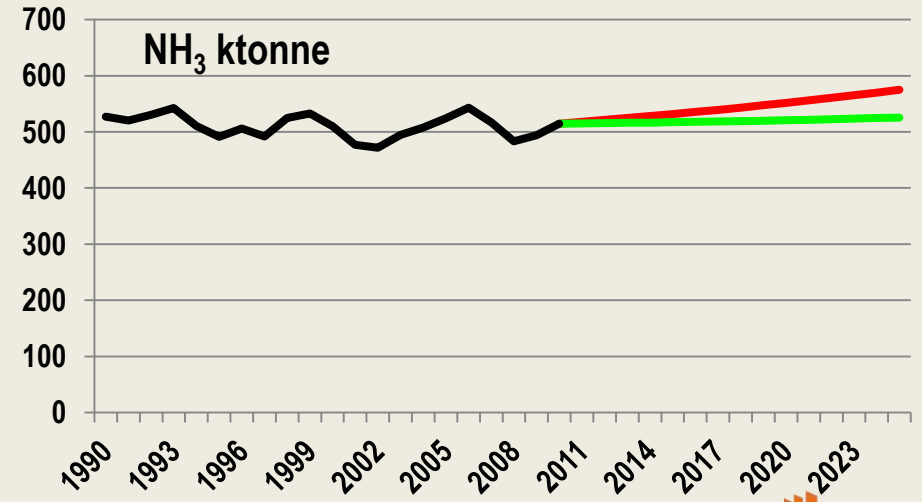
National Emission Projections to 2025









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Possible National Emission Ceilings for Turkey 2025

Based on WaM projections, sensitivity analysis and CBA

	ktonne
SO_2	2 340
NOx	1 360
NMVOC	890
NH_3	530

Possible NECs are subject to Government review - CoBoard

- Improved data
- Sectoral uncertainties inherent to emissions inventory & projections
  - Electricity, Industry, Transport
- Stakeholder interests
- Allowance for the effects of economic growth beyond 2025

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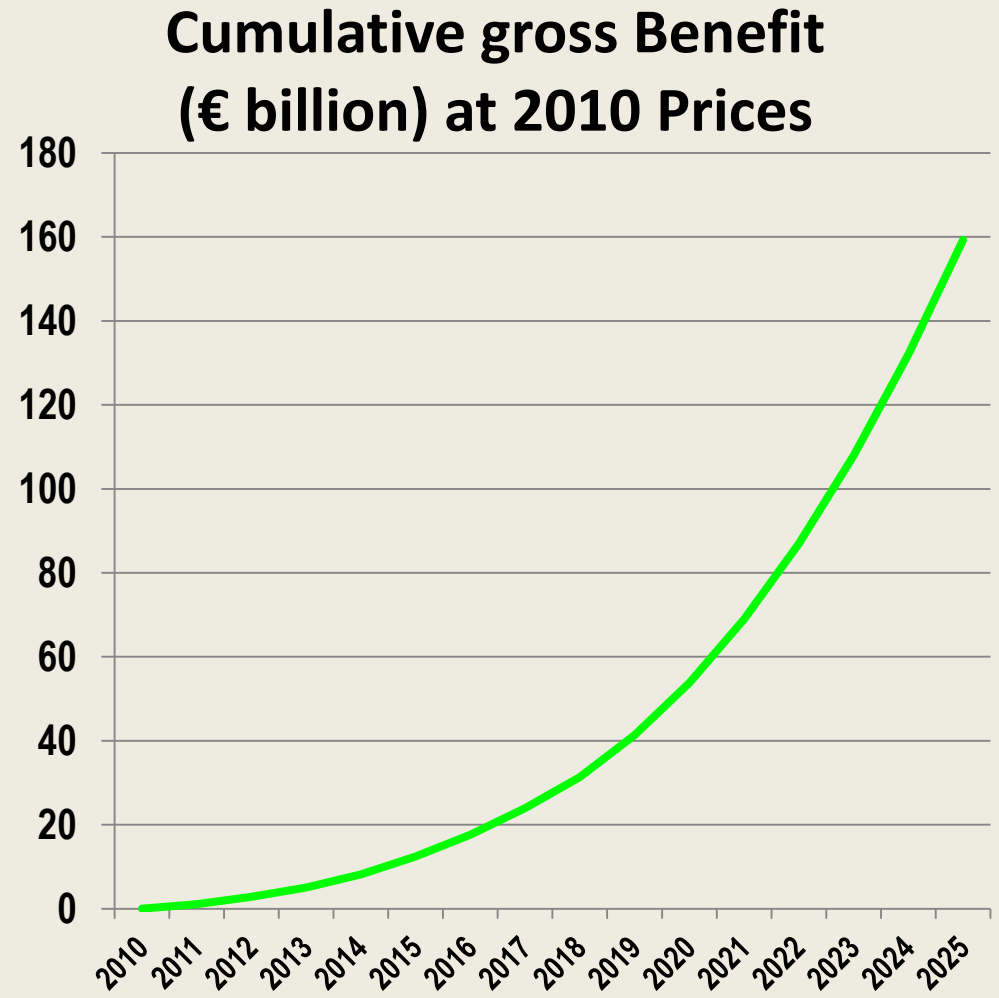
Impact Assessment WaM vs WoM



- Cumulative emissions control costs in all sectors ≈ €15–20 billion
- NECD implementation should be beneficial for Turkey and its people
- Emission reductions in electricity sector offer the greatest benefits
  - Most costs will be borne by this sector

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Affordability of Emissions Control - Electricity Generation

- Most of the financial costs will be incurred by the electricity sector and its customers
- Are these costs affordable
  - At a national level, relative to the size of the economy?
  - By households?
  - By Industry ?

- Annual cash expenditure (on capital investment and operating costs) is estimated to peak at ≈0.2% of GDP in the 2020s
- Price increases over the projection period are estimated to be about 3% to 5%
- Electricity sector costs ought to be affordable

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Summary & Recommendations

- Possible NECs have been identified
- Implementation of the NECD should be affordable and provide significant benefits to Turkey
- However, the NECs do need to be reviewed
  - MoEU and other Ministries through the mechanism of the Coordination Board
  - The emissions inventory and projections should be updated using the Guidelines prepared in the project
  - Government may then propose draft NECs for negotiation with their international partners

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Thank You for Your Attention