

# Experiences in Sweden & Lessons learned from the CLEO research programme

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# Disposition

- Short description of current focus in the Environmental Quality Objective Investigation
- Measures studied
- Results and Conclusions
- CLEO results of relevance for co-benefits / trade-offs
- A final remark

# Focus of the Environmental Quality Objective Investigation

- ➔ Almost full focus on long lived greenhouse gases
- ➔ Air pollution focus is on NO<sub>x</sub> and NMVOC
- ➔ Only sector aspects is of concern
  - Air pollution from power plants is more or less considered to be a problem solved, and industrial processes emissions not in focus
- ➔ IVL was asked to calculate impacts on emissions and costs from a pre-prepared list of potential measures for mobile sources and small scale wood combustion
- ➔ The analysis was a rudimentary cost efficiency analysis of possible outcomes of a policy instrument

## The sector specific baseline emissions by 2030

Projected emissions in 2030	NO <sub>x</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>
	thousand tons	thousand tons	million tons
Road transport	14	2	14
Large Non-Road Mobile Machinery	5.5	0.4	2.5
Small scale wood combustion	2.3	3.2	0
% of national total	26%	28%	38%

# Measures studied

## Road transport:

- Increased mandated quota of biofuels in road transport
- Bonus-malus differentiated tax for passenger vehicles
- Premium for low emitting trucks/busses
- Analysis of the impact on air pollution in the climate scenario developed by the Swedish Road Administration

## Large Non-Road Mobile Machinery:

- Premium for purchase of low emitting vehicles

## Small scale wood combustion:

- Earlier introduction of the EU Eco-design standards
- Ban on installation of equipment that doesn't meet Eco-design standards
- Scrapping premium for equipment with poor environmental performance

# Potential impact on emissions and annual abatement costs by 2030

**(EMBARGO UNTIL 15 JUNE 2016)**

			Changes in emissions		Abatement costs	
<u>Road Transport</u>	NO <sub>x</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	million € <sub>2010</sub>		
	Kiloton	kiloton	Megaton	Low	High	
Increased biofuel quotas	0	0	-3	~710	~760	
Bonus-malus max	-3	0	-3	n.a.	n.a.	
Premium heavy vehicles	-3	0	0		~7	
Climate scenario	-9	-1	-11	n.a.		
<u>Large Non-Road Mobile Machinery</u>	NO <sub>x</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	million € <sub>2010</sub>		
	Kiloton	kiloton	Megaton			
Premium NRMM	-0.3	0.0	n.a.	~90		
Premium NRMM – no old	-4.1	-0.3	n.a.	~115		
<u>Small scale wood combustion</u>	NO <sub>x</sub>	PM <sub>2.5</sub>	CO <sub>2</sub>	million € <sub>2010</sub>		
	kiloton	kiloton	Megaton			
Early introduction of eco-design		-0.1		~4		
Ban on high emitting units		-0.6		~25		
Scrapping premium		-1.4		~55		

# Key messages to the climate policy community

- ➔ Electrification and large-scale conversion of the transport system might have substantial impacts on air pollution emissions
- ➔ Bio fuel climate measures in the transport sector will not be certain to provide co-benefits between climate change and air pollution
- ➔ The air pollution impact of a premium for purchasing new vehicles will be determined by the impact of the premium on the scrapping rate of old vehicles

## CLEO results of relevance for TFIAM

- ➔ Ozone exposure has important impact on forest growth – with adverse effects on the production of biofuels and carbon storage in forests
- ➔ In Sweden today there exists climate policies that miss the chance of ensuring co-benefits between climate change and air pollution
  - Electricity certificate system
  - Bio fuel quotas in the transport system



# Is it time to improve consideration of New Technologies & Innovation?

- ➔ The Iron & Steel industry is doing applied research on:
  - Bio-coke to replace fossile coke
    - Would reduce SO2 emissions from Iron & steel processes
  - High temperature blast furnaces, no need for coke (Hisana pilot plant)
    - Would potentially reduce CO2 emissions from a systems perspective via reduced energy demand in the entire process
    - Would reduce SO2 emissions from Iron & Steel processes

# Thank you

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