

# Measured greenhouse effect of CHP plant engines opens the door to tighter limits for gas-fed engines



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## Aim of this presentation

- Awareness of emission = money
- Understanding the technique of **CHP plant engines** and its methane emissions
- Importance of knowledge dissemination and your contribution to this

## Back to basics: why are we here today

- Ideal: to serve climate and to meet the need for the present without compromising the ability of future generations to meet their own need.<sup>1</sup>
- Economic perspective

## Economic perspective

- Average price of 1 ton CO<sub>2</sub> is € 15
- **1 Mton** is € 15 million
- In 2007 Netherlands emitted **215 Mton** CO<sub>2</sub>-eq.
- Total emission value NL: € 3.2 billion
- Lessons learned: annual value of emissions generally ranges from 1-3% of GDP

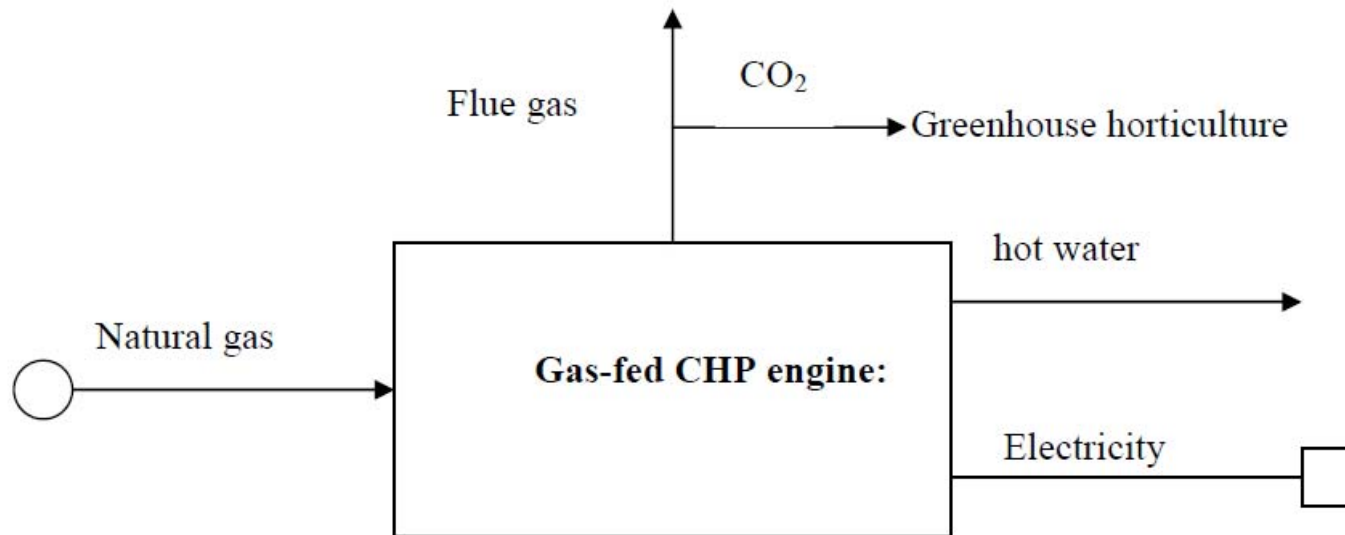
## Subconclusion

**EVERY SINGLE Mton COUNTS**

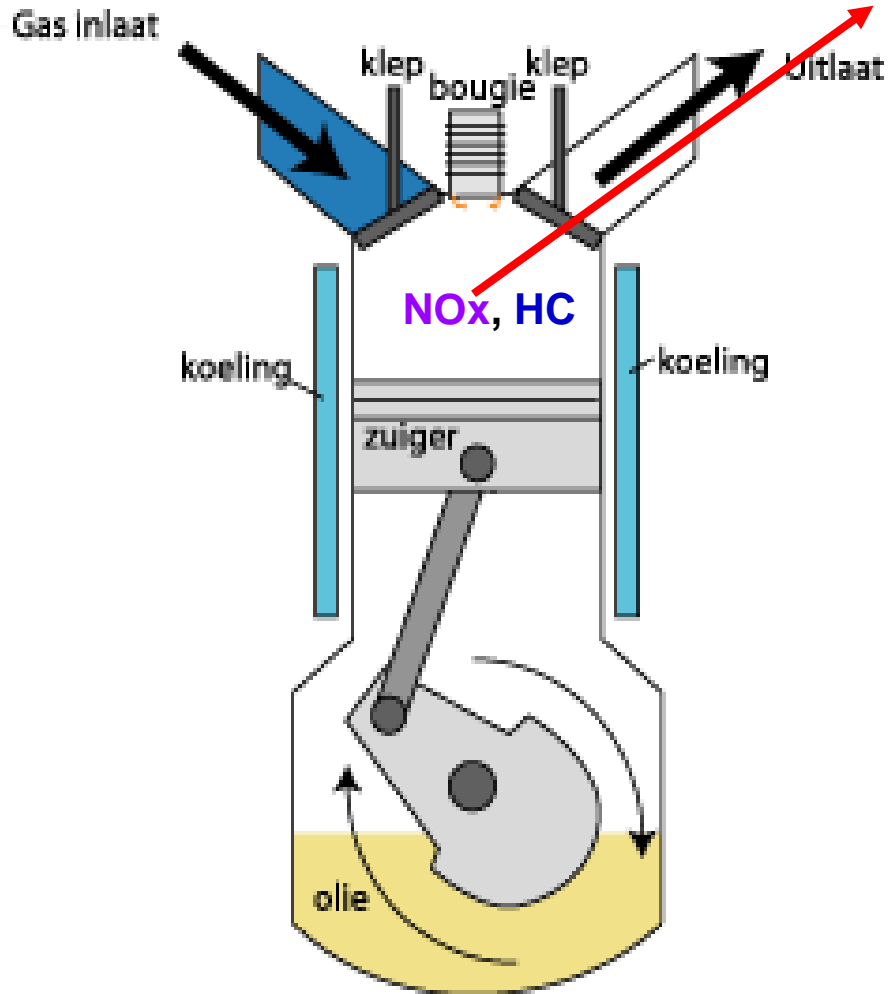
→ 1 Mton in Dutch Greenhouse Horticulture (CHP)

**What constitutes the major opportunity in the greenhouse horticulture??**

## System of CHP plant engine<sup>2</sup>



- Almost all generated electricity, heat and CO<sub>2</sub> in flue emissions are utilized
- Primary energy reduction of 15 to 40% compared to supply of electricity and heat from conventional plants



Slip of flue gas:  
•Hydrocarbons  
•Nitrogen

Image from:

[http://images.google.nl/imgres?imgurl=http://www.energiotech.info/groengas/theorie/img/vbmotormodel.gif&imgrefurl=http://www.energiotech.info/groengas/theorie/gasmotoren.htm&usq=\\_\\_fRONLvITMt7e0yjRzqEqjtaRM-M=&h=250&w=233&sz=7&hl=nl&start=3&um=1&tbnid=3tsiTLmYHihaJM:&tbnh=111&tbnw=103&prev=/images%3Fq%3Dzuigers%2Bgasmotoren%26hl%3Dnl%26um%3D1](http://images.google.nl/imgres?imgurl=http://www.energiotech.info/groengas/theorie/img/vbmotormodel.gif&imgrefurl=http://www.energiotech.info/groengas/theorie/gasmotoren.htm&usq=__fRONLvITMt7e0yjRzqEqjtaRM-M=&h=250&w=233&sz=7&hl=nl&start=3&um=1&tbnid=3tsiTLmYHihaJM:&tbnh=111&tbnw=103&prev=/images%3Fq%3Dzuigers%2Bgasmotoren%26hl%3Dnl%26um%3D1)



## measurement in

- Between 2 and 3 %
- 93% is methane (G
- CHP engine park i

Resulting in



Hydrocarbons  
) MWe in 2010)

CO<sub>2</sub>-eq a year.

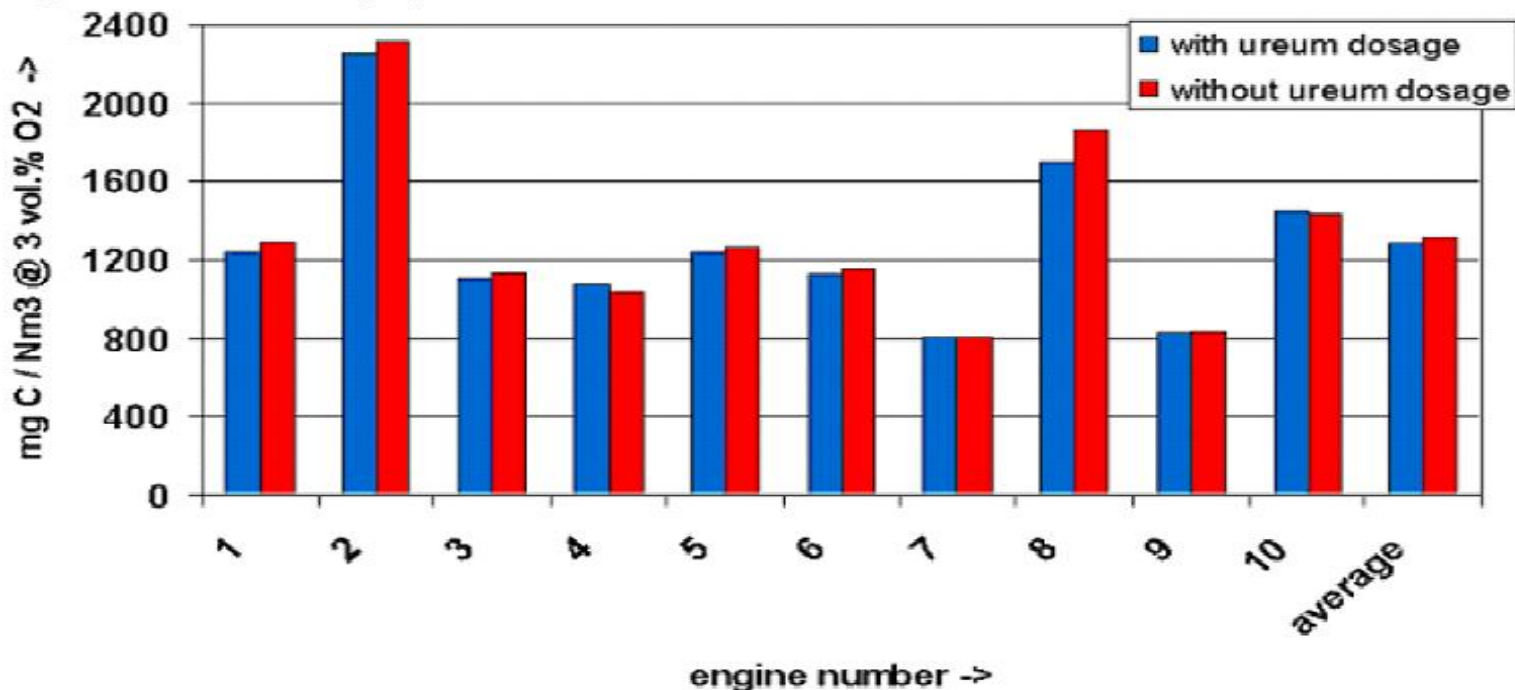
## How to grasp the €15 million

- Limited knowledge of hydrocarbon emissions from CHP plant engines
- Three-track approach:
  - 1) motor innovation
  - 2) motor management
  - 3) methane catalysts
- Knowledge dissemination
- financial programmes, communication campaigns and Legal limits

## Dutch decree on emission requirements for medium sized gas burners (Bems)

The limit of 1.500 mg/Nm<sup>3</sup> at 3 vol% O<sub>2</sub> for Hydrocarbons (indirectly 1.860 mg/Nm<sup>3</sup> for methane)

Figure 1: Overview of hydrocarbon emissions in 2007



## Limited availability of knowledge

Need for knowledge dissemination: what can we learn from each other

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