ADVANCED MOTOR FUELS

IEA-AMF

AMF

IMPLEMENTING AGREEMENT FOR ADVANCED MOTOR FUELS

Assessing Fuel and Vehicle Performance in a Well-to-Wheel Perspective

A3PS Conference

Vienna 17-18.10.2016

Nils-Olof Nylund, Research Professor, VTT

iea Energy Technology Network

Technology Collaboration Programmes

IEA Technology Collaboration Programmes (TCPs)

Technology Collaboration Programmes: Highlights and outcomes

The breadth of the analytical expertise in the IEA Technology Collaboration Programmes (TCPs) is a unique asset to the global transition to a cleaner energy future.

The year 2015 marked the 40th anniversary of these groups of experts. The IEA compendium book *Technology Collaboration Programmes: Highlights and Outcomes* is a collection of the significant recent outcomes of the 39 TCPs operating today, including updated statistics of participation worldwide.

To date, participants in the TCPs have examined more than 1 900 energy-related topics, and carried out projects on socio-economic aspects of technology deployment, research to reduce greenhouse gas emissions, advancing demonstration of innovative energy technologies, contributing to benchmarks and international standards, and sharing information through hundreds of expert stakeholder events.

The TCPs involve over 6 000 experts worldwide who represent nearly 300 public and private organisations located in 51 countries, including a large participation by IEA partner countries, such as China, India, Mexico and Brazil.

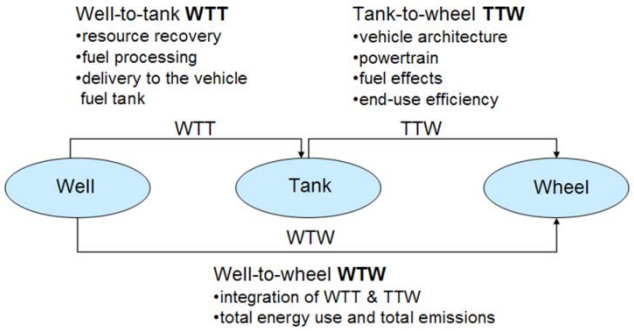
Scope of the
IEA Advanced Motor Fuels TCP

- AMF TCP works on the entire spectrum of fuels from feedstock, through fuel processing, distribution, and, finally, end use in vehicles.
- Advanced motor fuels are fuels that fulfill one or more of the following criteria:
  - Reduces GHG emissions
  - Improves life-cycle efficiency
  - Has high energy efficiency
  - Has low toxic emissions
  - Enables fuels for new propulsion systems
  - Contributes to security of supply

AMF through the years

- Long-standing agreement
  - 1984-1989 Alcohols as Motor Fuels
  - 1990-1998 Alternative Motor Fuels
  - 1999- today Advanced Motor Fuels
- Current term 2015 - 2019
- The Advanced Motor Fuels TCP (AMF) is a very active and successful program
  - The number of participating countries has grown from 4 countries in 1984 to 18 countries in 2016
  - 53 annexes (projects) have been initiated by the program since its beginning

What does well-to-wheel analysis mean?



- Wells-to-wheels energy use and emissions take into account the production and distribution of the fuel
- It allows the comparison of different energy carriers on a fair ”apple-to-apple” basis (petroleum fuels, biofuels, electricity, hydrogen)
- A well-to-wheel analysis tracks energy use and emissions across two stages: well-to-tank and tank-to-wheels
- The well-to-tank stage begins with the fuel feedstock recovery, followed by fuel production, and ends with the fuel available in the fuel tank of the vehicle
- The pump-to-wheels stage simply represents the vehicle’s operation

- Also energy use and emissions from vehicle manufacturing and recycling can be included in assessments

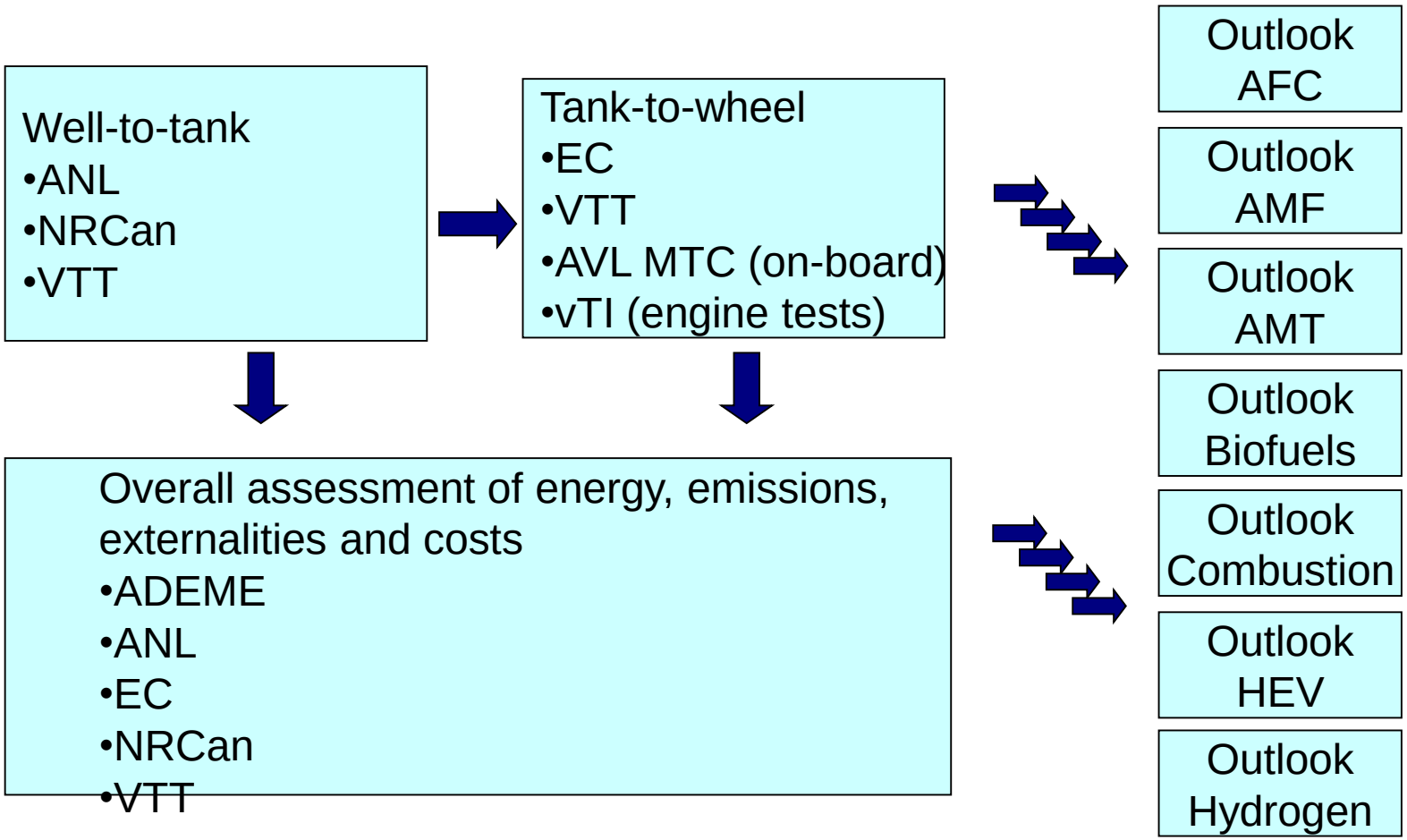
Challenges

- Well-to-tank figures are always based on assumptions whereas tank-to-wheel performance (vehicle performance) can be measured exactly

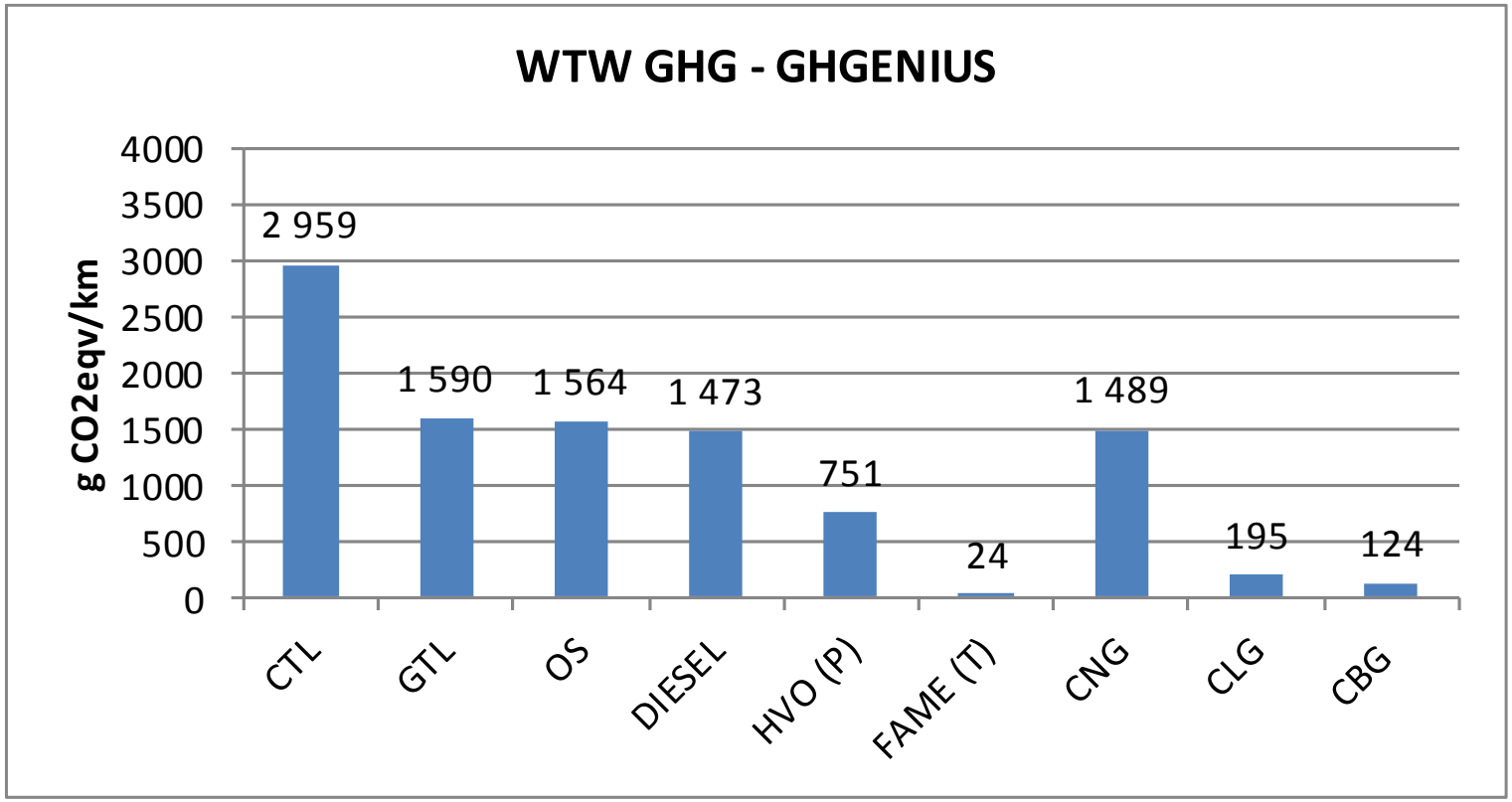
Three AMF Annexes (Projects) with WTW assessments

- Annex 37:
  - Fuel and Technology Alternatives for Buses
- Annex 43:
  - Performance Evaluation of Passenger Car Fuel and Powerplant Options (CARPO)
- Annex 49:
  - Fuel and Technology Alternatives for Commercial Vehicles (COMVEC)
- These projects:
  - Generated new firsthand AMF data on vehicle performance
  - Involved laboratories in several countries for doing this
  - Were aimed to provide solid data for decision making

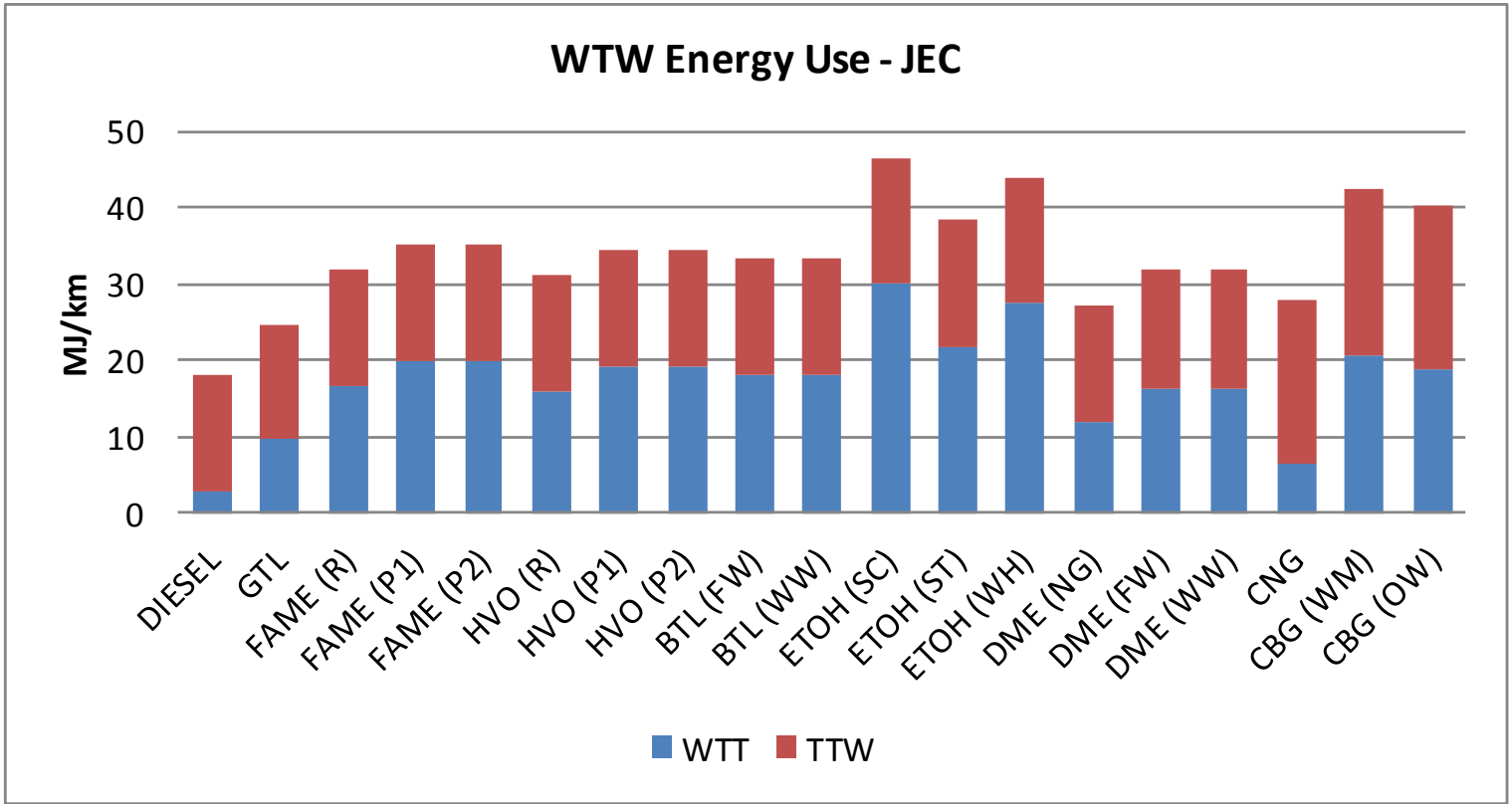
Elements of Annex 37



WTW GHG emissions
Canadian GHGenius model



WTW energy use



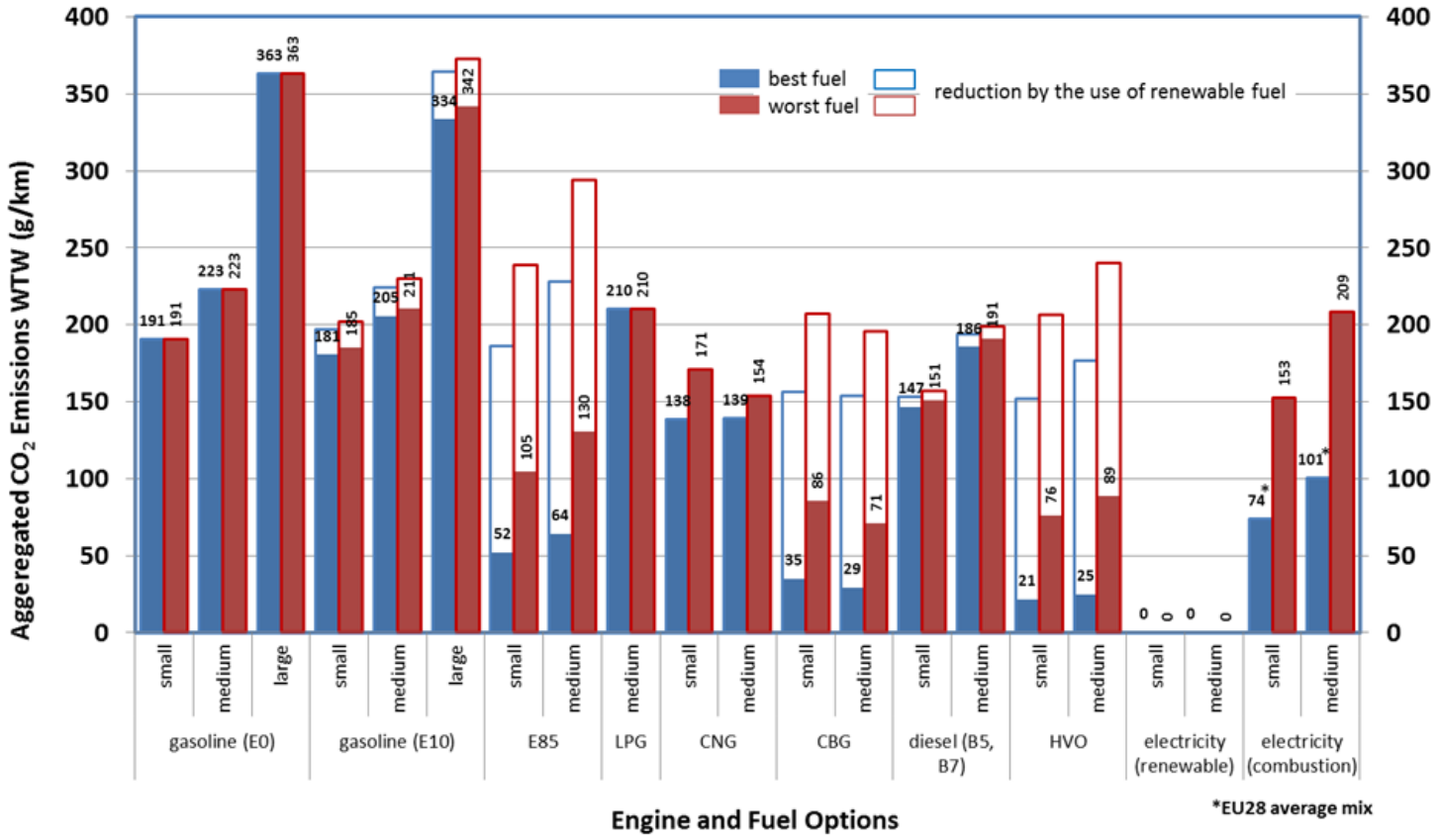
Annex 43

Performance Evaluation of Passenger Car, Fuel and Powerplant Options

Annex Progress Report
AMF ExCo 51, May 3, 2016 – ANL, USA

Juhani Laurikko

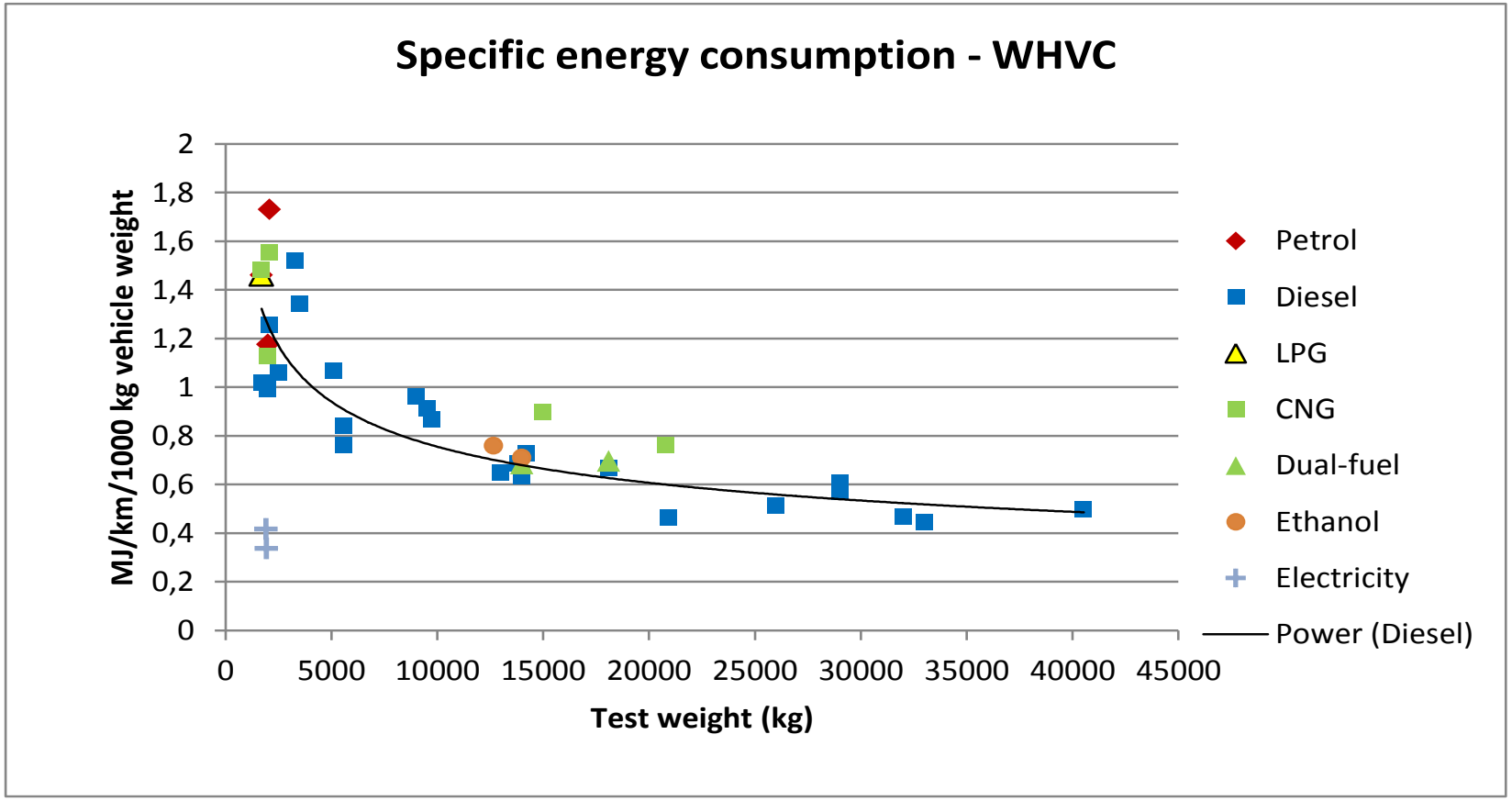
Full fuel cycle CO_2 emissions (NEDC)



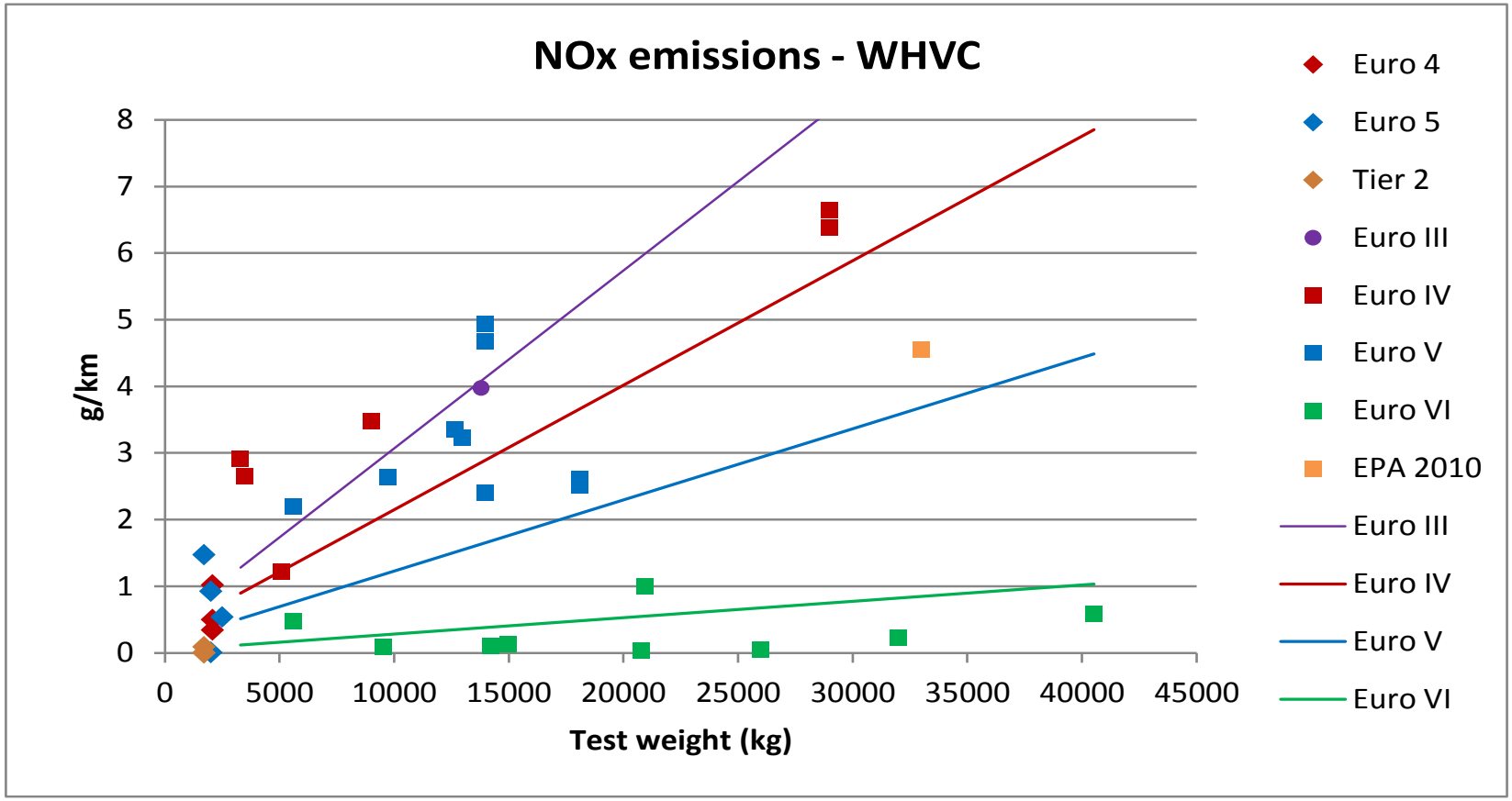
Annex 49 “COMVEC”: Fuel and Technology Alternatives for Commercial Vehicles

Annex Progress Report
AMF ExCo 51, 2-5.5.2016, Argonne, IL, USA
Nils-Olof Nylund (VTT)

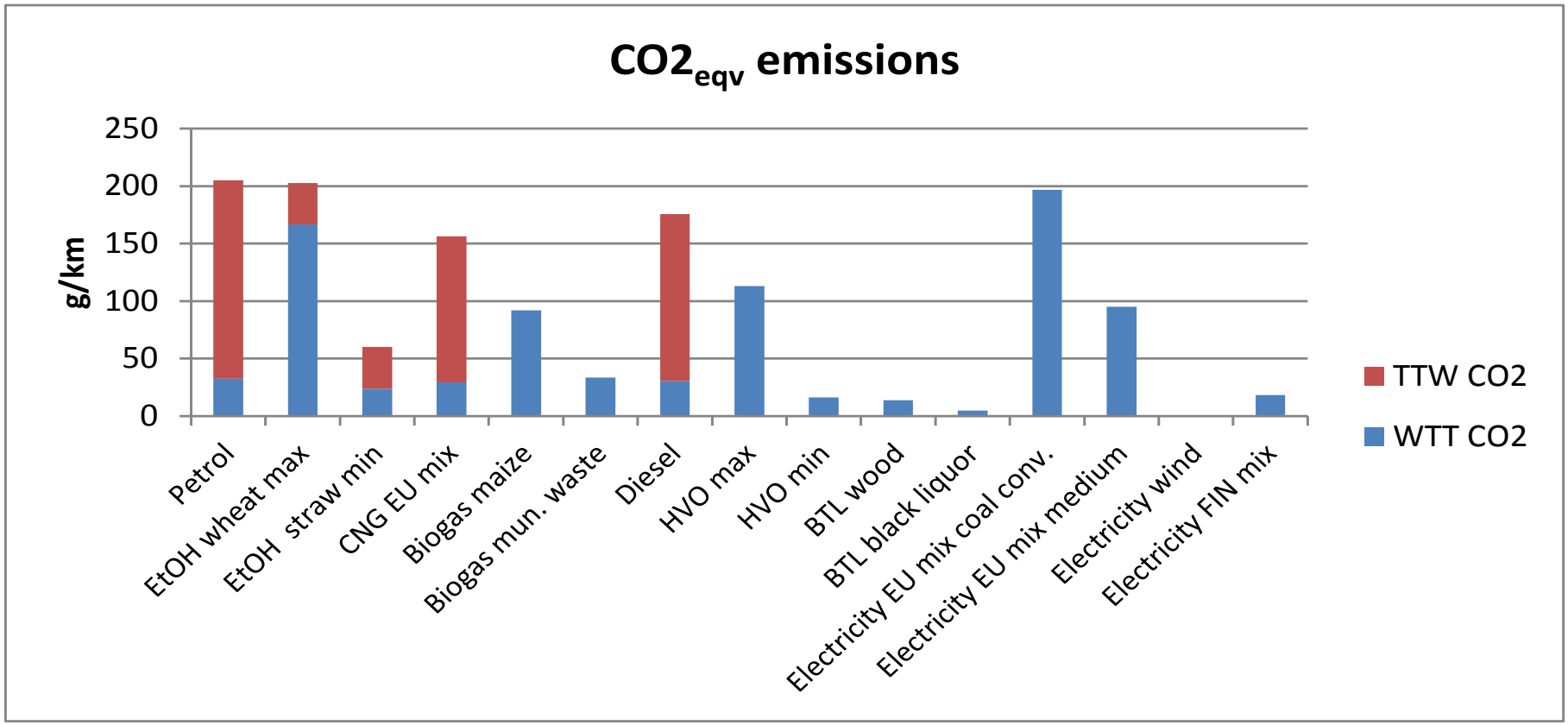
Key results – specific energy consumption



Key results – NO_x emissions



WTW CO_2 emissions for Category 1 vehicles (vans)



Key messages from Annex 49

- If you really want to reduce regulated emissions from commercial vehicles, don't go from Euro II or Euro III to Euro IV or Euro V, leapfrog directly to Euro VI or US 2010 to get real-life low emissions
- **The regulated emissions of a vehicle are first and foremost determined by the emission control technology, not the fuel**
- **The carbon intensity of the fuel or the energy carrier is decisive for well-to-wheel CO_2 emissions, not vehicle technology**
- **CO_2 assessment should be carried out on a well-to-wheel basis, not looking at tailpipe CO_2 emissions only**
- Electrification with low-carbon electricity is a good option for local emissions as well as WTW CO_2 emissions
  - one should keep in mind that all applications are not suitable for electrification
- Euro VI (alternatively US 2010) in combination with a renewable fuel is a good option for the local environment as well as the climate

AMF Contacts

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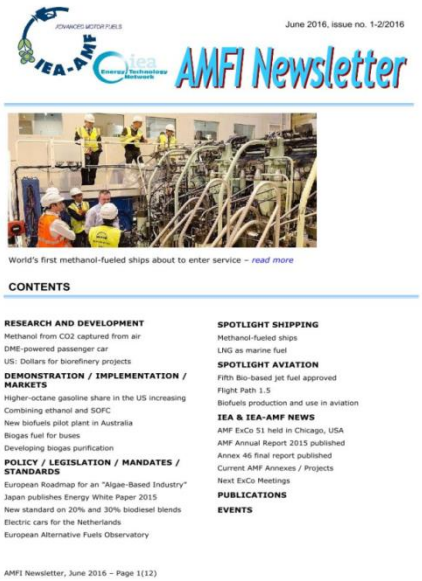
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AMFI Newsletter

World's first methanol-fueled ships about to enter service – *read more*

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