NTM Status and strategy report regarding methods, December 2015

Standardization of methods and supporting tools for assessment of emissions and energy use from transport

Summary

This paper gives a general overview of the environmental challenges that the transport system and their actors are facing and must resolve in order to provide ecologically sustainable transport solutions.

The environmental challenges will require an immense development and improvement work that must be based on a solid asessment methods yhat enables monitoring of present situation. The methods must also provide an ability to monitor the effects of implemented improvement measures. Overall these methods must be robust, credible and commonly accepted. They must also ensure validity and reliability of all data used.

Based on common accepted stringent methods including valid and reliable data, supportive and simplifying assessment tools can be developed. These tools will enable various actors in the transport system, without specialist knowledge, to assess their transports´s environmental performance. Methods and tools should also include the ability to monitor effects of carried out improvement measures.

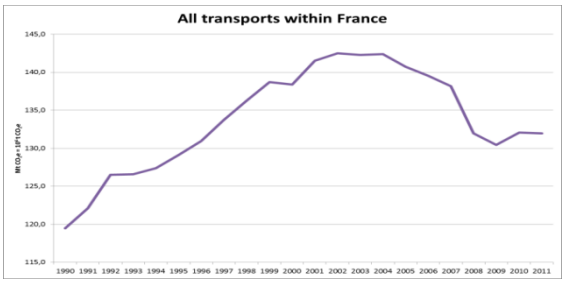
Finally, this document describes briefly how the European Union is driving these issues towards more green transport.

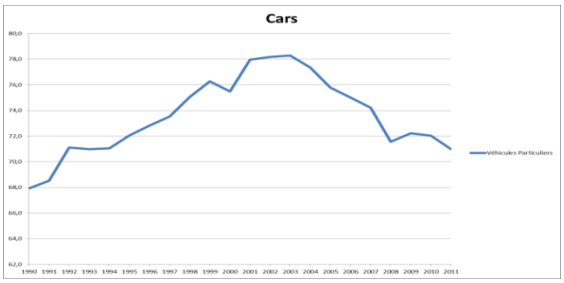
Background

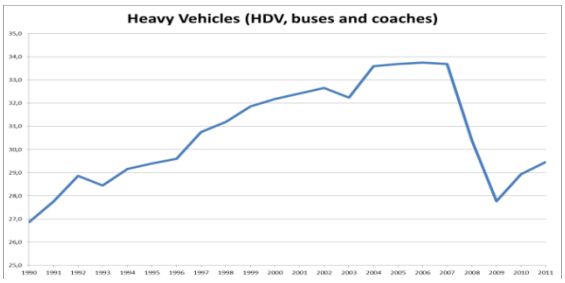
Still today, there are geographical areas where air quality due to dense traffic and other factors is a major and not neglectable health problem. Hence this requires implementation of clean traffic solutions. Negative impact on nature regarding acidification, overfertilization and ground level ozone are other, still remaining challenges linked to transport activities. Another transport linked aspect is the growing global consensus and concern for severe climate changes due to human generated greenhouse gas emissions.

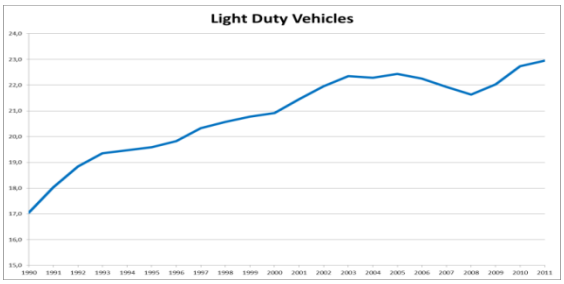
The fuel consumption and related emissions of green house gases from traffic increases and represents globally aproximately one fifth of the total GHG emissions. These emisions are dominated by road transport.

The climate challenges related to transport industry will require bold decissions by front runners, including an urgent need to adopt and implement totally new traffic and transport solutions. Reducing climate impact requires a radically increase of the energy efficiency in the transport system. At the same time transportation also needs to alter to usage of renewable fuels at large scale. Today, transport is approximately 95% depent on fossil fuels on a global basis.









Trend of GHG emissions of transport, example France – from 1990 to 2011 (Mt CO2e), not in line with French legal objective of being back to 1990 level in 2020 for the whole transport sector

There are some major global and local front runners within the areas of transport and logistics that pushes the development towards transport services that emits less air pollutants, green house gases and strives towards using more renewable fuels. The front runners consists of national, regional and local policy makers, shippers in various industries and transport service providers within all traffic modes. In addition there are front runners among infrastructure holders, providers of renewable fuels and manufacturers of vehicles and vessels. Overall the numbers of front runners for ecologically sustainable transport seem to increase, but at the same time they all have to act cautiosly in order to not create severe competitive disadvantages for their own business or their regions´ development.

Objective

The overall target is that emissions and use of resources from transport should not exceed scientifically established sustainable levels, meet legislative requirements and fulfill market expectations. This is not the present situation, thus improvement measures are needed. The aim to reduce the negative environmental impact from transport requires common, robust and credible methods. These methods must be accompanied by solid data which togheter forms a common platform providing the ability to monitor environmental performance and improvements.

General development

Lately the focus in the field of emission calculation methods have developed towards a strong focus on solely climate impact, but the recent debate on diesel cars and nitrogen oxides may pull the development back somewhat and reintroduce air pollutants.

This may be further emphasized as particulate matters, on top of its negative health impact is a green house gas (black carbon). Overall the long term expectancy is however towards reduced emissions of air pollutants through technical development within combustion and after treatment of fumes in combinaton with cleaner fuels.

For the different traffic modes there is a common challenge to move towards more renewable fuels but in addition they have each individual weak spots to attend. Road transport contributes significantly to poor urban air quality and dominates the use of fossil fuels and emissions of green house gases.

Sea transport still faces global challenges on sulphur oxides and port emissions of particulate matters. Within air transport there are some parties claiming that high altitude emissions leads to a higher green house effect. This area requires further analysis and potentially further development of methods, data and corresponding measures. For rail transport the division between electric and diesel train is an issue as well as the electricity generation is an issue if based on fossil fuels or nuclear power. Another hot spot linked to the introduction of renewable fuels is their actual benefit on green house gas reduction as this may depend on analyzed system boundary and corresponding scope. Finally there is a general need to use robust allocation methods since transport services is often based on shared traffic and transport resources, i.e. the potential risk of excluding emissions or a risk of double counting emissions.

Even though there are obvious challenges in the field of transport and environment, huge improvement steps forward has been taken since 1993 when NTM were formed. Today the common knowledge and understanding among key stakeholders is sigfinicantly better. Thereby the opportunities for real progress is strong.

At present there is an intense international development work going on in the field of harmonization of methods for environmental calculations. This progress is primarily oriented towards carbon dioxide and to a certain extent green house gases. These efforts are carried out through various national and international activities where NTM (Sweden) actively participates or observes progress.

Below some on-going initiatives are described:

- Specific autonomous methodologies are still developed by various organizations and calculation tools. NTM have as an example developed and published methods since 1997.

- World Resource Institute has through their Green House Protocol published a report that clarifies how transport can be included within scope 3 emissions.

- The European standard EN 16 258, where NTM took an active part in its development is in full operation since December 2012 and is continouosly being tested in many different transport solutions. Several practical handbooks and casestudies for its implementation have also been published in for example, Germany, The Netherlands and Denmark.

- Legislation in France from October 2013 regarding reporting of emissions of carbon dioxide from transport is implemented including its methods. (Article L. 1431-3 of the Transport Code/Decree n° 2011-1336 - 24th October 2011/ Orders - 10th April 2012.

- The international standardization organization ISO have developed a number of standards within this field:
  - ISO/TS 14067:2013 describes climate impact from products. It did however not reach the status of a regular standard as negotiations stranded two years ago. Therefore this is only a technical specification (TS). Transport is indirectly included as input to products. There are discussions going on to restart to work.
  - ISO 14 040 for life cycle assessment can be used for transport.
  - ISO 14 025 for environmental labelling and declarations is another path forward in accordance with "Type III environmental declarations - Principles and procedures"
  - International Workshop agreement, IWA recently carried out in 2014 lead by the EU-project Cofret with the aim to assess weaknesses and improvement possibilities in the existing EN 16 258.

- In the EU, several mandatory intitives on CO_2 reporting and monitoring from different mode of traffic has been initiated. Some examples are:
  - EU ETS, Emission Trading Scheme initially including aviation within and to and from the EU. The initiative was strongly oposed by primarilly USA and China, arguing that air traffic must be handled according to international regulations. Therefore the system only includes air traffic within the EU and a prolonged period of measuring a baseline until the end of 2016 whereby ICAO (International Civil Aviation Organization) is given additional time to develop an alternative global mechanism to hamper air traffic emissions.
  - The Monitoring reporting and verification (MRV) of sea transport emissions within the EU states that all ships calling ports within the EU from 2018 shall declare their emissions of CO2-emissions.
  - At present the EU develops a method for heavy duty vehicles to declare their CO_2 emissions and fuelconsumption. This procedure is not connected to existing emission standards.

- Shippers and transport service providers are presently striving to jointly develop internationally harmonized methods throught the initiative Global Logistics Emission Council, GLEC where various organizarions participate also including NTM.

General challenges within development of methods and reporting

NTM will continue to act and push development in this field in order to accomplish and ensure robust and internationally established methods and norms for emission calculations. NTM will ensure development of methods covering impact on climate as well as nature and health.

A major challenge when assessing transport environmental performance is access to credible data regarding operation and environment. In order to establish performance of transport chains there is commonly a need to use a mix of:

- Model (activity) based data
- Operational based data (fuel consumption, fuel quality, engine type, load factors etc.)

In order to ensure comparability and benchmarking there is a need to declare data quality including validation based on a clear system boundary description and allocation principles used.

Furthermore, monitoring performance regarding air pollutants, greenhouse gases and energy use (fossil/renewable) should include absolute and relative numbers as this is a more full covering declaration.

General aspects of tools and calculations

As standards and legislation have evolved there are today several tools on the market enabling transport service environmental performance calculations. Most of them calculate CO_2 emissions based on fuel used. Below is a table that on a general basis describes various calculators' abilities and delimitations.

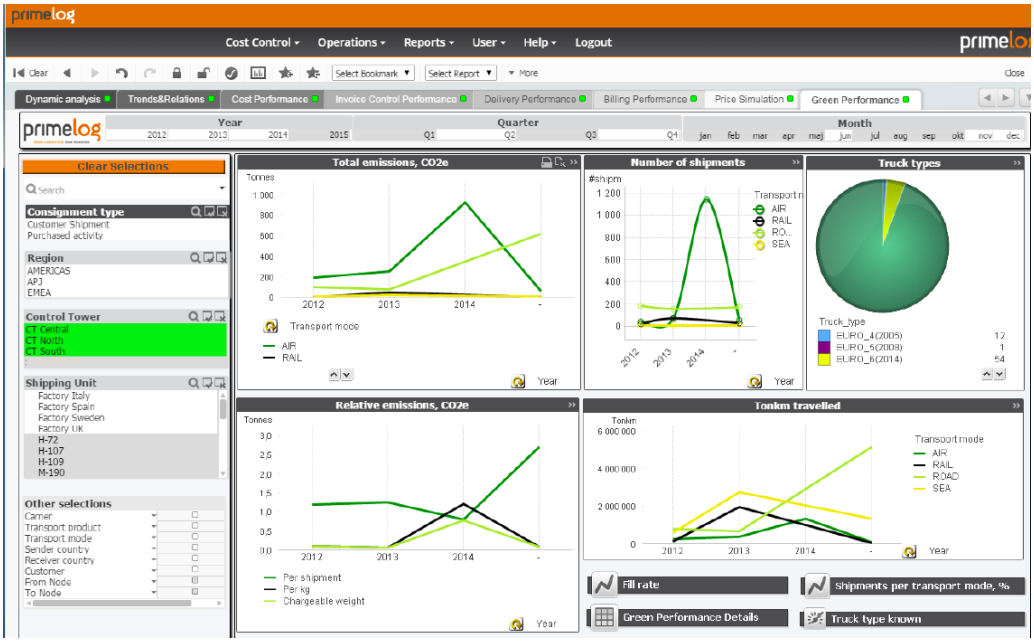
Calculation output	Calculation based on fuel content & combustion [1]	Calculation based fuel content
NOx [2]	Yes	No
HC	Yes	No
CO	Yes	No
SO_2	Yes	Yes/No [3]
PM (also black carbon) [4]	Yes	No
CO_2 [4]	Yes	Yes
N_2O [4]	Yes	No
CH_4 [4]	Yes	No
Energy use	Yes	Yes

1) Includes after treatment of fumes
2) Emissions of NOx can be reduced through lower combustion temperature, which leads to increased fuel consumption. In order to avoid this effect and still meet emissions standards various after treatment solutions are used. Implementation of Euro 5 and Euro 6 requires selective catalytic reduction, SCR i.e. adding UREA to the fumes.
3) If scrubber is included in technical configuration, the fuel based calculation is insufficient.
4) Required for assessing the greenhouse gas emissions. It should however be noted that the EN 16 258 provides general default CO_2e values based on solely fuels.

Implementation of emissions calculations

At present most calculation tools are providing support as stand-alone software where the user makes their calculations manually. The most common solution is thereafter probably to use Excel for assessing performance based on output data from the stand-alone calculation tool.

A very likely development within calculators is an increasing use of embedded tools linked to present existing business administrative systems where business data and environmental data enables smooth and more automatic assessment of performance. This should reduce the risk of human errors and be substantially more resource efficient. Thereby, this can give some relief on assessment work in favour of more actual improvement work.



Primelog´s transport Management System where sophisticated environmental calculations and analysis is provided as an integrated service through web service connection to NTMCalc.

Ambitions within the EU

During 2013 and 2014 the European commission (DG MOVE) organized the study "Introduction of a standardized carbon footprint methodology[1] " aiming:

- To provide an overview of the state of the art of carbon footprint calculators and methodologies
- To define and validate the main problems as well as general and operational objectives with regard of promoting a harmonized carbon footprint methodology
- To develop relevant policy options to meet these objectives

[1] Carried out by CE Delft, Frauenhofer IML, TRT and Conlogic

The study summarized some of the general problems as:

- Methodologies are incomparable and inconsistent
  - Type of fuel consumption data varies: use of real world data vs. default data.
  - Coverage of phases of the energy life cycle varies: WTW emissions or just TTW emissions (20% difference in case of diesel)
  - Scope of activities varies: coverage of logistical chain, warehousing, offices, transhipment.
  - Unclear allocation principles to various parties (particularly for groupage transport). Various options used.
  - Accounting of empty running varies: the shipper is not always willing to take responsibility for empty runs.
  - No or weak alignment with other existing standards
  - Declaration of type of data used and traffic choices not declared

Problems related to GHG reporting:

- Complex transport systems - many parties active (shipper, LSP, operators)
- ICT investments/personnel costs/administrative burden hamper development
- Necessary input contains sensitive business information
- Improved GHG efficiency may lead to commercial discussions on price and other conditions
- The business sensitivity seems presently mainly include goods volumes and load factors (previously was the fuel consumption a common hinder in this discussion).
- Official reporting exists with EU ETS and MRV that is presently discussed must be taken into consideration.
- Transport companies are not motivated to calculate/produce data as there is:
- A limited request from shippers/customers
- Financial/logistical considerations has a higher priority

Policy options suggested and discussed during the project were:

- Reporting can be:
- Voluntary
- Mandatory

- Type of harmonization intervention can be:
- Voluntary choice of method
- Support development of harmonized guidelines
- Mandatory use of specified methodology

- Type of methodology that can be selected:
- Level 1: Default performance based emission factors (GHG/tkm).
- Level 2: Default vehicle emission factors (GHG/vkm).
- Level 3: Measured vehicle fuel consumption converted to GHG.

Overall the recommendation of the study was to initially aim for voluntary reporting based on the mandatory Level 3 methodology (using real-world company-specific fuel consumption data) that significantly would improve the accuracy and reliability of the information provided.

Moving forward in the EU

Based on the above referred to study and other input the EC presently launch a call within the Horizon 2020 *MG-5.3-2016. Promoting the deployment of green transport, towards Eco-labels for logistics*. The rationale for this call is:

"Encourage business-based GHG certification schemes and develop common EU standards in order to estimate the carbon footprint of each passenger and freight journey with versions adapted to different users such as companies and individuals. This will allow better choices and easier marketing of cleaner transport solutions."

In brief the call states:

- At the moment, the existence of different standards, initiatives and calculation tools, each with its own underlying methodology and data, makes carbon footprints practically incomparable thus hampering potential efficiency gains that would result from this measure.
- The specific challenge is the establishment of a co-ordinated network, gathering regional, national and international activities and fostering communication, collaboration and consensus-building on harmonised methodologies for carbon footprint calculation along the transport supply chain.
- The work should consider the CEN 16258 standard

NTM will through participation in a larger collaboration apply for the funding in this call.