

Annex 57: Heavy-Duty Vehicle Performance Evaluation

Project Duration	October 2018–October 2020
Participants	Canada, Chile, Finland, Republic of Korea, Sweden No cost sharing
Task sharing	
Cost sharing	
Total Budget	~€510,000 (~\$580,000 US)
Operating Agent	Petri Söderena VTT Technical Research Centre of Finland petri.soderena@vtt.fi

Purpose, Objectives and Key Question

The purpose and objective of this project are to demonstrate and predict the progress in energy efficiency of heavy-duty vehicles, thus generating information to be used by transport companies, those procuring transport services, and those forming transport policy. The project will encompass the newest diesel technologies on different markets, but also alternative-fueled vehicles and advanced powertrain configurations.

The methodology to be used comprises laboratory and on-the-road testing as well as simulation of energy consumption of various types of heavy-duty vehicles. The participating laboratories will use common test protocols for actual vehicle testing to ensure comparability of the results. The actual testing will measure both energy consumption and tailpipe emissions. Energy efficiency and carbon dioxide (CO₂) emissions will be evaluated on a well-to-wheel basis.

This project will form a basis for (1) understanding the performance of best available diesel and alternative-fueled vehicles and (2) estimating development toward 2030. The proposed overall activity will thus cover three time dimensions:

- Legacy vehicles and a reference backward through completed AMF annexes,
- A current snapshot of the performance of the current best-available technology heavy-duty vehicles using conventional and alternative fuels (focal point of this activity), and
- A projection into the future of how energy efficiency and emissions can develop (this projection will rely on input from combustion TCP as well as modelling by the AMF TCP for estimating the effects of alternative vehicle and powertrain configurations).

Activities

The project consists of nine work packages:

- WP 0: Collection and consolidation of the existing data
- WP 1: Agreement on common test procedures and protocols
- WP 2: Vehicle chassis dynamometer testing
 - Contemporary diesel vehicles as well as alternative fuel and vehicle technologies in different vehicle categories
 - Parameters to be varied in chassis dynamometer: fuel composition, driving cycle, payload (50% and 100%)
- WP 3: Vehicle on-road testing with Portable Emissions Measurement System (PEMS)
 - Contemporary diesel vehicles as well as alternative fuel and vehicle technologies in different vehicle categories
 - Parameters to be varied on road: fuel composition, driving cycle, payload (50% and 100%), ambient conditions (summer and winter)
- WP 4: Vehicle on-road emissions and fuel consumption monitoring
 - Contemporary diesel vehicles as well as alternative fuel and vehicle technologies in different vehicle categories
 - Operation in real driving and ambient conditions
 - Nitrogen oxide concentration and fuel consumption variation during a long monitoring period
- WP 5: Heavy-duty vehicle simulation
 - Assessment of current and proposed simulation methods for CO₂ assessment
 - Model that accounts different fuel options for fuel consumption evaluation
 - Parameters to be varied in case studies: fuel, chassis structure, vehicle overall mass
- WP 6: Regional information on transportation sector energy options (originally a WP in COMVEC but still valid)
 - Information from project participants on regional challenges and opportunities that drive the development of energy options in transportation sectors and effects on the available fuel selection; this regional information will also shed light on various alternative technology options potential in different regions.
- WP 7: Analysis and comparison of chassis dynamometer, on-road testing, and simulation

2 ONGOING AMF TCP ANNEXES

- Recommendation for improving test methods and modelling
- WP 8: Cooperation with combustion TCP
 - Data and information exchange considering on-road emissions and energy consumption
 - Information and data exchange considering future internal combustion engine concepts (fuels and technology) and their emissions and energy consumption
 - AMF delivery of time-resolved vehicle data to combustion TCP
 - Combustion TCP to assist in projecting future improvements in internal combustion engine technology
- WP 9: Coordination of the project, synthesis, and reporting
 - Administrative coordination, communication with the International Energy Agency AMF Executive Committee, synthesis of the data, compilation of the final report, and dissemination of the results

Currently, the annex members are in the testing, data collection, and data-handling phase. Results have not been shared at this time.

Key Findings

Analyzed data are not yet available.

Main Conclusions

Analyzed data are not yet available

Publications

Publications are not yet available.

Schedule

The results of this project will be reported at the IEA AMF Executive Committee meeting in 2020. Figure 1 shows the Annex timeline, including the timeline for its participants.

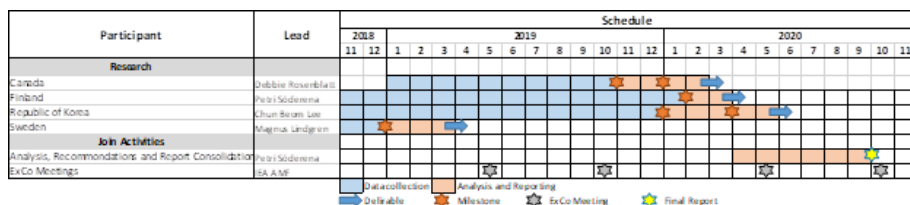


Fig. 1 Schedule for Annex 57 and Its Participants