# Report on progress made following the Kaunas Workshop – Results of the ForFITS report for Lithuania and Kaunas

*Note by the secretariat*

## I. Background

1. The seventh workshop in THE PEP relay race, on Improvement of Sustainable Urban Mobility for Better Health and Environment: Move to Improve was held on 24 and 25 September 2014 in Kaunas, Lithuania. It was organized by the Kaunas City Municipality in cooperation with the Ministry of Health, Ministry of Transport and Communications and Ministry of Environment of Lithuania and THE PEP Secretariat. The Workshop brought together over 150 participants from national and municipal authorities, civil society and academia, and discussed ways of improving urban transport towards more sustainable and healthy mobility.

2. During the workshop, UNECE presented its transport initiatives on For Future Inland Transport Systems (ForFITS), which can make a solid contribution to the implementation of the Paris Declaration and actively contribute to addressing climate change and promoting sustainable transport at the local, national and international level, as enshrined in clauses 14 and 15 of the Paris Declaration..

3. ForFITS is a tool developed by UNECE to evaluate transport activity, energy use, and CO2 emissions in a range of possible policy contexts. Sustainable transport can be assessed in ForFITS by creating simulations of policy choices which take into account the expected evolution of relevant macroeconomic parameters. Fuel taxation schemes, subsidies for cleaner vehicle technologies, road pricing, modal shift assessment, structural changes in the transport system and introduction of sustainable biofuels are only some of the policy options that are addressed by ForFITS. The tool allows users to easily visualize and compare the results of multiple runs of the model.

4. The ForFITS tool was applied for the first time within THE PEP framework at the local (Kaunas) and national (Lithuania) levels as part of the 2014 annual THE PEP Workshop (relay race) that was organized by the Kaunas City Municipality in cooperation with the Ministry of Health, Ministry of Transport and Communications and Ministry of Environment of Lithuania

and THE PEP Secretariat. The Workshop itself was the first implementation activity of the Paris Declaration.

5. Certain aspects of the final two reports that are discussed in this note provide estimations of the changes in projections of transport sector $CO_2$ emissions compared to the baseline scenario under alternative scenarios.

6. The full reports provide a general description of the ForFITS model and an overview of the current transportation status of Kaunas today in terms of road infrastructure and public transport infrastructure as well as clarifying geographical and socio-economic realities (not reflected in this note).

## I. Case study I: ForFITS and Lithuania

*Alternative scenarios based on future policies*

7. In 2011, the European Commission's White Paper (COM (2011) 144)[1] set a target of reducing greenhouse gas emissions from the transport sector by 60 percent in 2050 (compared to 1990). However, in Lithuania the transport sector continues to be entirely dependent on fossil fuel and road transport $CO_2$ emissions are rapidly increasing. The number of road vehicles doubled between 1995 and 2012. The stock of vehicles is increasing due to the increasing and improving economic status of the population, but also of the number of polluting vehicles grows fast due to their unlimited use. Thus, Lithuania's energy efficiency policies include the transport sector as well.

8. Lithuania has identified the necessity of coordinating the development of all transport modes, giving priority to environmentally friendly transport modes, increasing the energy efficiency of the transport sector, using more vehicles with alternative fuel and overall less polluting fuel and developing a more cost-effective transport system. Considering the aforementioned, Lithuania will develop electric vehicle charging points in cities and will support planning and implementation of sustainable urban mobility plans.

9. To quantify the effect of future urban policies in Lithuania, ForFITS was used for projections of transportation activity and $CO_2$ emissions. The following three alternative scenarios were analyzed:

- ***Transport shift*** – In line with the goal of encouraging sustainable transport systems, this scenario projects that Lithuania further develops its public transport infrastructure in a way which results in an network that is 20 percent closer in density (both in terms of population and infrastructure) to the most highly integrated countries in the world by 2040. To simulate this change, the ForFITS passenger transport system index[2] was modified. This index was

[1] More information available at ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm

[2] An index of 0 is associated with a share of pkm on personal vehicles that tends to 1 (100%) when GDP per capita increases, reflecting high shares of the average vehicle travel of personal vehicles. An index of 1 is associated with an evolution of the share of pkm on collective passenger transport vehicles of 100%, while pkm on personal vehicles is reduced to 0%. This is an extreme case where the transport system fully

specifically developed to help understand the changes in the passenger transport system associated with shifts to/from private vehicles from/to public transport.

- ***Culture shift*** – Related to the transport shift scenario, this scenario projects that residents of the city will develop a "greener" attitude to the extent that alternative modes of transportation such as walking and bicycling will be used to a greater extent and longer trips will also be avoided. This scenario represents the ideal result of the implementation of public awareness campaigns described in points 3 and 4 of the Programme. To simulate this change, the ForFITS environmental culture index[3] was modified.
- ***Shift to Electric*** **–** To achieve the goal of limiting the increase in consumption of petrol and diesel, Lithuania has proposed to promote alternative sources of energy. The scenario based on this action projects that by 2040 (a) almost 50 percent of two-wheelers will be electric; (b) almost one third of LDVs will be electric-petrol (or diesel) hybrids; (c) almost two thirds of buses will hybrids; (d) rail vehicles will shift to approximately 40 percent hybrid and 60 percent electric; and (e) approximately 13 percent of large road freight vehicles will be hybrids. These projections are based on a general technical change scenario developed by the UNECE in support to its pilot studies.

10. In addition to these three scenarios, one additional scenario projects the joint effect of all alternative scenarios. This is included as each of the three scenarios are related and if the Programme is implemented as planned all would jointly occur over the next two decades.

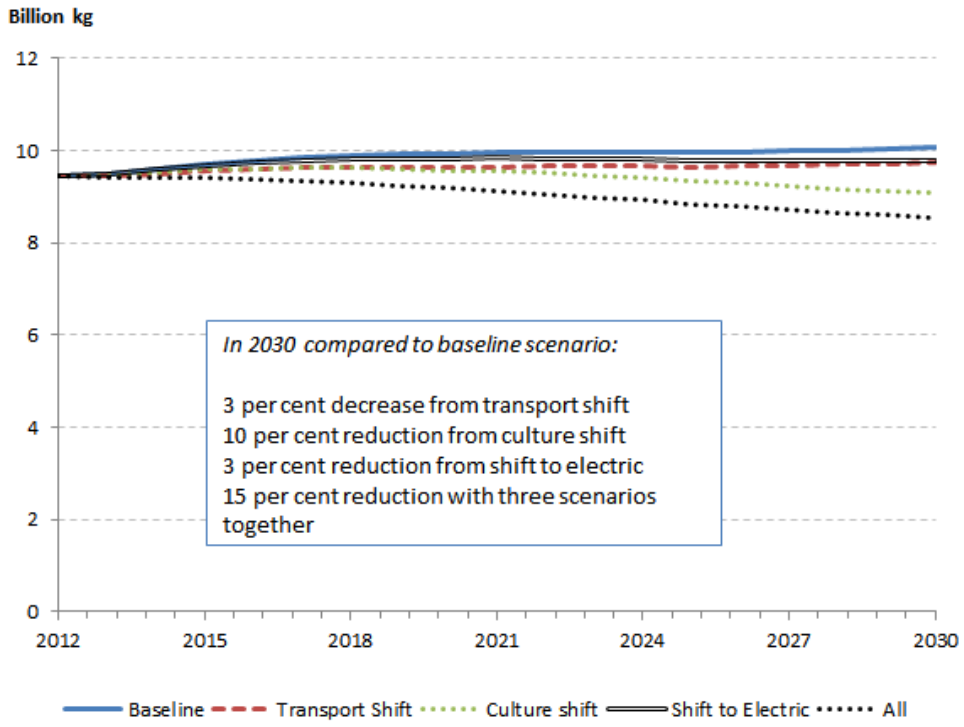
*Alternative scenario projections*

11. Figure 1 shows projected $CO_2$ emissions from the passenger transport sector under the baseline scenario, the three alternative scenarios and a combination of the alternative scenarios. **The largest decreases in emissions (10 percent decrease compared to the baseline scenario) are achieved with the culture shift scenario, showing that "greener" attitudes favouring active mobility, such as walking and cycling, can have a very big impact.** Transport shift and Shift to electric scenarios contributed 3 percent reductions. The cumulative effect by 2030 of the three scenarios taken in parallel results to 15 percent decreases.

operates on public transport. According to historical data, a high value of the passenger transport system index is close to 0.7. More information available at www.unece.org/fileadmin/DAM/trans/doc/themes/ForFITS/A_-_Coverage__methodology_and_data_requirements.pdf

[3] This index ranges from 0 (culture of low environmental concern) to 1 (culture of high environmental concern). 0.5 is used as a default value.

**Figure 1.** Lithuania Well to Wheel (WTW) $CO_2$ emissions from passenger transport under different scenarios: 2012-2030




*Conclusions and recommendations for Lithuania*

12. Projections of future emissions levels depend most strongly on population and GDP changes, but policy decisions are clearly relevant as well. Lithuania is taking positive steps toward reducing climate impact through its National Programme on the Development of Transport and Communications for 2014–2022, but faces obstacles in the continuing increase in preference for private vehicles by its residents and in the growing demand for freight transportation as a result of economic gains.

13. The estimated wheel to well (WTW) $CO_2$ emissions in 2012 from the transport sector for Lithuania show that emissions from passenger vehicles are almost double than those from freight vehicles (9.4 billion kg vs 4.7 billion kg). For freight vehicles, trucks are estimated to be responsible for the majority of $CO_2$ emissions (54 percent) while for passenger vehicles, passenger light duty vehicles (LDVs) are estimated to be the main emitter of $CO_2$ (71 percent).

14. Projections of $CO_2$ emissions from the transport sector in Lithuania show an overall increase of almost 35 percent by 2030. However, the freight and passenger sectors have very different projections. Emissions from the passenger sector are projected to increase by approximately 7 percent by 2030 versus nearly 90 percent for the freight sector. This smaller increase can be largely explained by the projected decline in population over this time period in contrast with the projected economic growth. Varying population trend shows a stronger effect

of this variable on passenger activity. Conversely, varying projected economic growth in Lithuania results in larger changes in freight activity.

15. Using the ForFITS tool, the potential impact of reversing the trend toward sprawl through improved public transport infrastructure and programmes to raise awareness of climate change issues can be observed.

## II. Case study II: ForFITS and the city of Kaunas

*Alternative scenarios based on future policies*

16. To quantify the effect of future urban policies in Kaunas, ForFITS was used for projections of transportation activity and $CO_2$ emissions. The following three alternative scenarios were analysed:

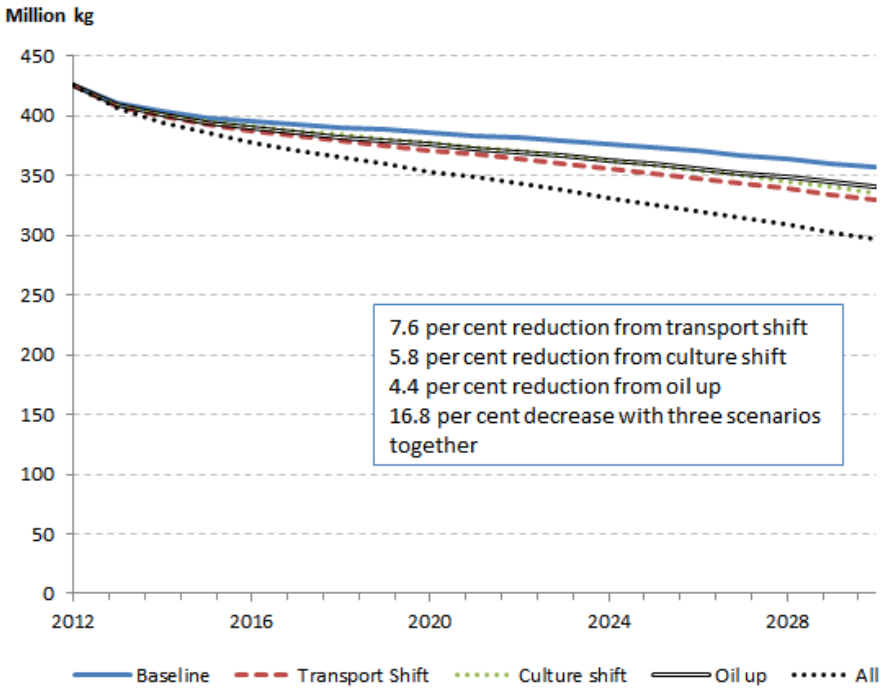
- ***Transport shift*** – The development of the trolley bus network in Kaunas and its acquisition of additional buses and trolleybuses could contribute to a transport shift in modes of transportation in the future. This scenario projects that Kaunas city further develops its public transport infrastructure in a way which results in an urban network that is 20 per cent closer in density (both in terms of population and infrastructure) to the most highly integrated cities in the world by 2030.
- ***Culture shift*** – Policies such as the development and promotion of bicycle paths in Kaunas, the bicycle parades, the campaigns with several events and the participation to different project such as the "SMOOTH" project could contribute to such a change in culture. Related to the transport shift scenario, this scenario projects that residents of the city will develop a "greener" attitude and those alternative modes of transportation such as walking and bicycling will be used to a greater extent and longer trips will also be avoided.
- ***Oil up*** – The final scenario projects that oil prices will double in real terms by 2030. This scenario is included despite recent drops in oil price to show also the indirect effect of prices on emission levels.

17. In addition to these three scenarios, one additional scenario projects the joint effect of all alternative scenarios. It is not unlikely that all alternative scenarios could jointly occur over the next two decades.

*Alternative scenario projections*

18. Figure 2 shows projected $CO_2$ emissions from the passenger transport sector under the baseline scenario, the three alternative scenarios and a combination of the alternative scenarios. Each scenario is projected to result in a reduction of emissions with the transport shift scenario projected to result in the largest decrease by 2030 compared to the baseline scenario (7.6 per cent). The same comparison shows a decrease of 16.8 per cent in 2030 compared to the baseline scenario when all three alternative scenarios are taken parallel.

**Figure 2** Kaunas City wheel-to-well (WtW) $CO_2$ emissions from passenger transport Under Different Scenarios




*Conclusions and recommendations for Kaunas*

19. Future emissions levels are projected to depend most strongly on population and GDP changes, but policy decisions are clearly relevant as well. Kaunas is taking positive steps toward reducing climate impact, but faces obstacles in the recent shifts in the transportation preferences of its residents toward those of a city characterized by urban sprawl. Infrastructure for public transportation appears to be an area of particular importance given the room for improvement shown in recent surveys of resident satisfaction with the current system.

20. Using the ForFITS tool, the potential impact of reversing the trend toward urban sprawl through improved public transport infrastructure and programmes to raise awareness of climate change issues can be observed. Since these are areas that can be influenced by public policy, ForFITS can help to show the potential impact of these types of measures and thus enable their continued or even expanded implementation.

21. More generally, the Kaunas study illustrates the potential uses of the ForFITS tool within the context of THE PEP in the implementation of the Paris Declaration. The ForFITS model is able to provide a robust and transparent framework to evaluate the potential impact of certain policies in reducing $CO_2$ emissions before these policies are implemented at city/local or national level.

22. Such types of policies for urban passenger transport could include congestion charges, traffic guidance systems, solutions related to Intelligent Transport Systems (ITS), travel and access restrictions for specific vehicle categories, parking policies (including charges and restrictions), the integration of transport in spatial and land-use planning (e.g. to promote transit-oriented urban development), infrastructure measures for the development of transport networks

(e.g. for public transport, including ITS), solutions improving the urban environment to make non-motorized modes of transport such as walking and cycling more attractive, as well as the improvement or restructuring of the urban public transport regulatory framework.