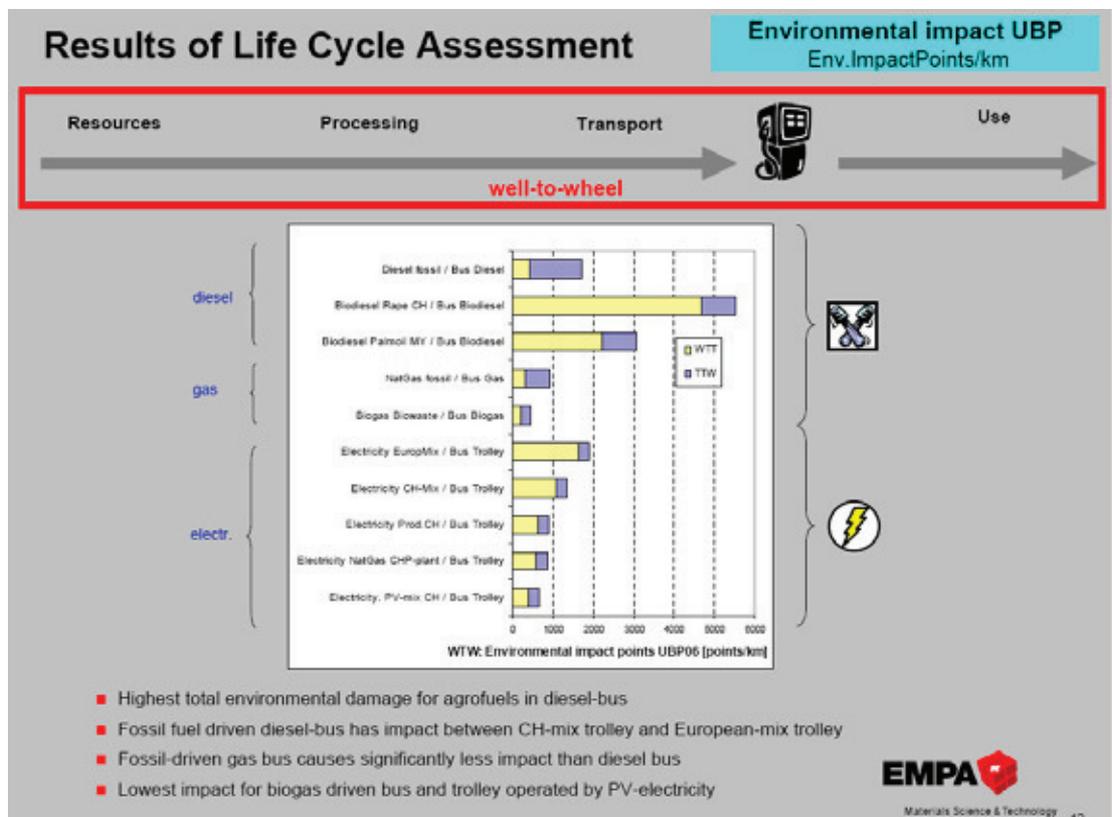


Picture E-22a: Environmental impact of fuel alternatives (well-to-tank/tank-to-wheel) (Source: EMPA)



Picture E-22b: Environmental impact of fuel alternatives (well-to-wheel) (Source: EMPA)

F. Transfer of experience to Bergen conditions

As easily visible from chapters A-E a huge amount of studies and other relevant information is available from different European countries but also from the US. This chapter aims to elaborate which experience is both transferable and most valid for the Bergen case.

As pointed out already in the introduction, there is not just a trolley discussion questioning whether the trolley should stay or become replaced by other technologies but there is also the question which bus technology might be best suited for all other parts of the Bergen network which are and will be outside trolley scope, even if the trolley network could be expanded.

Energy sources, availability and use

Norway generally and also Bergen benefit from the local production of electric energy from water power on one hand and oil / natural gas on the other. This is certainly for the time being eliminating any dependence on imports as it is used as a criterion elsewhere but it is certainly not eliminating the medium-term availability concern regarding fossil fuel.

Whether biogas as a sustainable replacement of natural gas is or will be available in quantities required for operating the CNG-buses which are operated at the moment or even allowing for replacement of larger fleet shares needs further investigation. The availability of biogas in required quantities has been a major argument for decisions in a number of cities.

Picture F-1 illustrates the energy use in Norway for different societal and industrial sectors. The dominating role of electricity is evident for all sectors but not for transport which is the only sector being dominated by petroleum products. Gas is being used so far mainly for energy demanding industries and only for a rather small part in the service and household area (not to speak of transport where the small amount of gas bus consumption is not even visible in the diagram!). This means also that there no real gas tradition like in other countries which is easing application in other areas as e.g. transport and may influence safety discussions. Bioenergy is being used to quite some extent both for industrial and household applications which should allow a positive perception for increased bioenergy use e.g. in the transport area.