TECHNISCHE
UNIVERSITÄT
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Institut für Energiesysteme und Elektrische Antriebe

DIPLOMARBEITSTHEMEN

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Herzlichst,

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Topics for Master Theses

1. A comparative analysis of energy use for mobility in tourism from economic, environmental and energetic point of view

Motivation: Tourism is an important contributor to increasing energy consumption in the transport sector. However, there are considerable differences between different transport modes such as rail, passenger cars, bicycles, busses, ships and air traffic. Over the last years, cruising ships are becoming more and more popular. They typically use heavy fuel oil in their engines, which has very high sulphur content but is more cost-effective than other fuels.

Objective: The core objective of this work is to analyze the current energy use caused by in tourism from an economic, environmental and energetic point of view. In addition, an objective is to conduct three case studies for continental trips (e.g. from Vienna to Portugal), intercontinental trips (Vienna to New York) and cruise trip. Finally, proper policies for promoting environmentally friendly tourism should be discussed.

Method of approach: Comprehensive literature review of existing transport modes (airplanes, ships, rails, busses) used in tourism, documentation of their costs and environmental performances, as well as a data collection and analysis has to be conducted using three case studies. Economic analysis should be based on total costs of use, and environmental analysis based on a comprehensive LCA (WTW, embedded emissions) assessment. A simple simulation model has to be developed in Excel.

2. An analysis of the economic performance of electric vehicles in selected countries

Motivation: Electric vehicles (EVs) are considered to contribute to more sustainable development of the transport sector. However, current economic performance of EVs is one of the major barriers for a broader market penetration. In spite of this, many countries have set a goal to increase a number of EVs. Moreover, different monetary and non-monetary measures are implemented with the goal to support use of EVs.

Objective: The core objective of this work is to analyze the economic performance of EVs compared to conventional cars in selected countries (e.g. Norway, USA, Japan, China), as well as to analyze impacts of policies on the market penetration of EVs. Of specific interest is also correlation between uptake of electric cars and GDP.

Method of approach: A comprehensive literature review as well as a data collection and analysis has to be conducted. An economic model simulating the effects of policies has to be developed in Excel.

3. A comparative analysis of alternative powertrains and fuels for public busses from economic, environmental and energetic point of view

Motivation: Public busses are in many countries still a very important means of passenger transport. However, the mostly used diesel busses are significant contributor to increasing GHG emissions and local air pollution. Environmental benign alternatives (e.g. electric busses, fuel cell busses, natural gas busses) are urgently needed worldwide. However, in many cases the total mobility costs are the major barrier for their broader use.

Objective: The core objective of this work is to analyze to what extent these alternative powertrains and fuels can contribute to the reduction of GHG emissions and local air pollutions. In addition, their economic performance in comparison to diesel busses has to be investigated. Based on technological learning the future prospects have to be analyzed. Finally, proper policies for the promotion of alternative solutions should be discussed.

Method of approach: Literature review and data collection; Market analysis of existing busses; Assessment of their costs and environmental performances based on case studies. Economic analysis should be based on total costs of use, and environmental analysis on a comprehensive LCA (WTW, embedded emissions). An economic simulation model has to be developed in Excel.

4. An analysis of the development of indicators in the passenger car transport system in selected countries

Motivation: Indicators (e.g. CO2/km driven, cars/GDP) are used to assess the efficiency and environmental benignity of the developments of energy services (e.g. mobility, heating, effects of prices, policies) in different sectors.

Objective: The core objective of this work is to conduct analyses of indicators and impact parameters on energy consumption and CO2 emissions in the passenger car transport and to analyse their dynamic development in the period 1990 to 2017 in different countries and regions.

Method of approach: A comprehensive literature review, a data collection and analysis; A database (ODYSSEE) is already available and can be used. A model has to be developed in Excel.