

Switching from oil to alternative fuels: far-off dream or reality research propos...

[Engineering](#), [Aviation](#)



Background of Research:

How quickly is society moving towards the depletion of oil? The particular question, with huge political and financial, communal and cultural implications, is one of those causing intense controversy. Oil-producing countries and oil companies are reassuring when insisting that the depletion of oil is not visible in the near future. The counterargument, which incorporates the main part of the so-called theory of oil- peak (Peak Oil), argues that, even if it is not directly visible, the depletion of the main at the moment energy source of the world is uncertain, that almost half the oil resources have been consumed and that the time of the end of cheap oil is a fact (Craft, 2013).

One of the potential solutions to escape the negative impacts of oil depletion is the replacement of oil with alternative fuels. Sophisticated biofuels amongst other alternative fuels are beginning to comprise cost-competitive solutions against oil, thus, suggesting that their actual application is more likely than ever; the interest of such fuels has multiplied during the past few decades due to the increased fear of the exhaustion of oil, and due to their ability of being obtained locally, thus, providing energy supply security and independence on conventional hydrocarbons (Energy Institute, 2013).

Nonetheless, a range of different parameters will be decisive on whether alternative fuels can be utilised broadly by different industrial sectors, whether their technological advances have reached the level of large applications, and whether they can be employed by all types of industries.

Efforts have been made to progress alternative fuels' technology in order for them to be able to energy support vehicles and airplanes; but will their

application guarantee oil independence, while at the same time provide proper satisfaction and effective service of these two means of transport users? (Energy Institute, 2013).

The subject of the present dissertation is directly associated to the problematic dilemma stated above, and is entitled " Switching from oil to alternative fuels: far-off dream or reality?". More specifically, via the present research, the researcher is in search of whether or not alternative fuels can practically substitute oil based on the investigation of their present development. The researcher will concurrently examine if alternative fuels can be utilised explicitly by two different UK industrial sectors, that of aviation and that of vehicles.

The importance of this subject lies on the fact that this particular research is the attempt to in depth document the progress of technology regarding alternative fuels as a whole, as research on this particular matter has not yet been completely presented by previous research, according to the research conducted; however, the research will not be restricted to a general documenting of alternative fuels' application but will proceed one step further by attempting to produce a financial statistical analysis of their impact in respect to two prominent energy consumers, i. e. the aviation and the vehicle industry. This way, final conclusions on the actual potential of replacing oil will be extracted, while via a pooled examination of possible positive financial effects on both industrial sectors vital results will be produced; consequently, the impacts, deficits and strengths of alternative fuels will be concentrated creating a hopefully detailed and comprehensive alternative fuel application guidance.

The debate, between the oil companies supporting the fact that oil will not be exhausted and the Peak Oil supporters arguing oils' replacement by alternative fuels, is the main ground by which the present dissertation will be unfolded; should it become a solid conclusion that alternative fuels do indeed provide modern societies with the ability to move beyond oil and towards a less environmentally hazardous and energy adequate future, then the existent literature of oil reliance will be verified as a minor issue, while alternative fuels will represent a near and actual prospect.

In order for all above issues to be successfully addressed, and for the alternative fuels' evaluation in terms of their economic impact to the aviation and vehicle industry to be meticulously assessed, the utilisation of several financial and scientific journals is the most probable requirement. Journals such as the Financial Times, the Bloomberg, The New York Times, Time and The Independent will be employed to guarantee the collection of as many as possible data. The financial speculators used to convey an attempt to create a reasoned analysis, providing the dissertation with balanced secondary opinions to ensure the foundation of the argument remains unbiased.

Various finance blog experts will be also used to provide the questions posed a thorough analysis, leaving no sources un-interpreted.

The limitations or gaps associated with analysing this particular type of topic mainly concern the collection of data to be used in the statistical analysis; the researcher expects to find chorological gaps, missing data referring the present cost of both oil and alternative fuels, and data corresponding to the same region, i. e. that of United States, in terms of currency, technological achievements and uniformity.

It has to be noted that this must not be the first time the topic of the present dissertation has preoccupied academic research. Conducted research, has proved that studies regarding the usage of alternative fuels has been conducted both concerning aviation and vehicles. Indicative of such research constitute the 2011 International Air Transport Association's report on alternative fuels, and the EPA's presentation of the positive effect alternative fuels have on vehicles; such and analogous literature will be amongst the totality of academic papers explored, examined, correlated, and finally utilised by the present dissertation as a means of successfully addressing the topic of the present research.

Industry Background:

As already mentioned the topic of the present dissertation is " Switching from oil to alternative fuels: far-off dream or reality?". This issue of high importance should one consider the whole Oil Peak theory, and thus, must be investigated in order to clarify whether or not alternative fuels are able to provide a readily solution; however, the topic is quite general and consequently is has to become more specific in order to constitute a research of valuable results. This is the reason why the present research is limited into examining the alternative fuels' potential usage in only two different industrial sectors. This is also the reason why it is restricted into analysing the alternative fuels' potential usage by the United States; an attempt to study their use on global scale would possibly be feasible, but it would not be able to include the financial parameter of alternative fuels application on aviation and vehicles; lack of financial data consistencies,

issues concerning different oil and alternative fuels' prices in respect to different regions, and currency dissimilarities regarding already undertaken studies from which the data of the present dissertation will be extracted may prove prohibitive factors for a world level financial analysis.

Research aim, research questions, hypotheses and objectives:

Research Aim:

The present dissertation will be involved with the investigation of the potential and probability of replacing oil with alternative fuels; this replacement will be focused on the two major industrial sectors of aviation and vehicles, which are considered as responsible of massive oil consumptions in modern societies; more specifically this matter will be concentrated in UK and its replacement of oil by alternative fuels possibility in the industrial sectors of aviation and vehicles. Through the conducted research the researcher is hoping to unravel whether such replacement can be actually realised, via which whether or not investments should be after all taken by these two industrial sectors in terms of moving pass both their current oil economic dependency towards the possibly less costly and certainly more environmentally friendly alternative fuels.

Research Objectives:

The main objectives of the present dissertation are summarised below:

- Thorough presentation and illustration of the existent alternative to oil fossil fuels; issues such as, which are the prominent alternative fossil fuels of the present time, how were they initiated, how have they progressed

technologically since their initial development, and to which industrial sectors are they applicable will be investigated.

- Examination of the impact the application of fossil fuels will have on different industrial sectors in respect to the former usage of oil; Issues such as the benefits arising by applying alternative fuels on different industrial sectors on the environment, which is the primary reasoning of their usage, and on the economics of these sectors, which is the actual reasoning behind industrial investors' preferences will be assessed.

- Explicit and meticulous investigation of these alternative fuels' financial application in two different industrial sectors, i. e. the aviation and the transportation sector in the country of the United States; the issue regarding whether or not the replacement oil by alternative fuels constitutes a profitable solution for both industries will be tested.

Research Questions and Hypothesis:

The questions that will be answered will regard how and with what grounds the replacement of oil by alternative fuels can become a reality in modern society. To investigate such an issue the present dissertation moves forward from simply and in a general manner addressing this issue into the thorough investigation of the financial impact of oil's substitute by alternative fuels on two of the current regarded as most energy demanding industrial sectors, i. e. the aviation and the vehicles industry. The questions concerning this particular research will progress from more general to more specific, as depicted below:

- The first question refers to the actual replacement of oil by alternative

fuels. Is this substitute a concrete possibility or are alternative fuels still not developed as necessary in order to be able to effectively and without severe impacts employed globally to serve the energy requirements of modern society?

- The second question, and in an effort for the whole research to move towards deeper issues of the general concept of switching from oil to alternative fuels, refers to a more solid and tangible enquiry; Is the replacement of oil by alternative fuels a financially viable solution for the aviation and vehicle industries so as for both industries to decide on becoming energy independent from oil?

The researcher, based on a preliminary research in respect to alternative fuels and the potential of their application in a variety of different industrial sectors, assumes that alternatives fuels may as well constitute an actual solution to the oil replacement, and thus, facilitate modern societies independency to oil, and concurrently evolution pass the whole crisis caused by the expected oil resources depletion.

In respect to the second question, referring to whether or not the alternative fuels' application to the aviation and vehicle industrial sectors will prove to be financially beneficial or not, the researcher believes that though initial funding for their usage may in present times seem costly, their overall benefits in terms of future savings will lead both industries towards their final implementation.

In order for all above hypotheses to be effectively either confirmed or contradicted literature review, questionnaires and personal interviews will be conducted.

Methodology:

The objective of the present dissertation is to explain whether or not switching from oil to alternative fuels can be realized, and the impact this shifting will have; moreover, the particular prospective of oil replacement by alternative fuels in the two major oil consumption sectors of aviation and vehicles will be examined, and whether this scenario's economically feasibility and profitability will be decided on. The strategy followed to address such an objective is evolving in two directions.

More specifically, one part of the dissertation is purely theoretical the alternative fuels, their development, and progress stage, and their potential superiority against oil; the focus of all above will then be placed on the aviation, and vehicle industry. Moreover, their impact on the economics of different industrial sectors will be investigated in a scrupulous manner; the research will be then focused on the economic viability of alternative fuels on the aviation, and the vehicle industry. A range of different sources, such as books, magazines, reports, and online literature on safety issues of the construction industry will be investigated as a means of collecting the appropriate secondary data. Thus, qualitative research will used to collect the necessary secondary data that will depict all above investigated issues. Through the study, the analysis and presentation of this secondary data it will become obvious is the utilisation of alternative fuels is financially feasible or not, and whether it can be applied at the aviation industry. However, the real challenge lies in the field of recognizing and deciding on the suitable means of assessing the value of alternative fuels, in order to make a decision whether a potential investing of the aviation and vehicle

industry on alternative fuels is a move worthy of doing. And certainly the recognition of these suitable means requires additional qualitative research, which is presented during the present dissertation development.

The other part of the dissertation includes a quantitative research in order to collect the data necessary to comprehend the extent of the aviation and vehicle industry's investing in alternative fuels. For this to become feasible, and after the collection of data regarding the economics of utilising oil or alternative fuels is conducted, statistical analysis of the data will have to be undertaken.

The statistical analysis will refer mainly on the examination of the additional initial costs necessary to apply alternative fossil fuels and the savings made by a potential oil replacement; the payback period of the initial costs of investing on alternative fuels will also be examined to further determine the costs-savings comparison. The savings will be based on analysis of two different variables, i. e. an oil-alternative fuel price comparison, and an investigation of the savings due to the minimization of environmental impacts, i. e. savings due to the minimization of fines paid by both industries as a result of CO₂ emissions, other greenhouse gases, and all other environmental disastrous effects. Each industry costs and savings will be separately calculated as means of finally establishing if alternative fuels posses a potential for each of them.

The produced data will be presented in tables and charts in order to become fully understandable and effectively depicted. As soon as all data has been collected, they will be prepared for analysis; they will be organised via a statistical program, which depending on the type of the data available, will

be either Microsoft Excel or SPSS; this program will facilitate the present dissertation's examination needs, and will efficiently provide the organizing of the data. All data will be entered in the same format and an equivalent database in order to prevent perplexity issues or complexity in terms of the following statistical analysis; moreover, all data entered in the statistical program will be cross-examined for their accuracy via search, detection, and correction of potential inconsistencies (Vanderbilt Kennedy Center, 2013).

Resources:

Books, journals, and on - line sources for an in depth understanding of the whether or not replacing oil with alternative fuels is feasible; buying of specialist books for the subject that might not be available in the library or are not available for the time needed; final print and bind cost of the dissertation copies.

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