



Advanced Energy Technologies and Systems I pp 91–115 | Cite as

Alternative Vehicle Fuels Management: Energy, Environmental and Economic Aspects

Valerii Havrysh  Vitalii Nitsenko, Iryna Perevozova, Tetiana Kulyk & Oksana Vasylk

Chapter | First Online: 14 November 2021

147 Accesses | 4 Citations

Part of the *Studies in Systems, Decision and Control* book series (SSDC, volume 395)

Abstract

Oil derived vehicle fuels are mainly consumed by land transport. The transport sector of economy must currently get round a number of challenges caused by the following: a tendency of oil derived fuel price rise, uneven allocation of fossil fuels, their exhaustibility, and climate change caused by carbon dioxide emissions. The above forces to look for solutions of the above mentioned problems. One of the ways out is the use of alternative vehicle fuels. They must be renewable or have more reserves compared to crude oil, and environmentally friendly. The purpose of this study is to give tools to management of transport companies to be able to make appropriate decisions. The goal of alternative vehicle fuel management is to maximize profit and improve ecological indicators. To reach the above it is necessary to choose an alternative fuel, determine its consumption, reduce fuel consumed costs, and cut down harmful emissions mainly carbon dioxide.

Keywords

Vehicle Management Fuel Alternative fuel Fossil fuel Energy market Environmental issues Greenhouse gas Emission

This is a preview of subscription content. [access via your institution](#)

References

1. Syrydenko, D., Stovpets, O.: Cultural and economic strategies of modern China: in search of the cooperation models across the global world. *Future Hum. Image* **13**, 102–112. <https://doi.org/10.29202/fhi/13/11> (2020)
2. Kyianysia, L.L.: The one belt one road initiative as a new silk road: the (potential) place of Ukraine. *Ukrainian Policymaker*, **4**, 21–26. <https://doi.org/10.29202/up/4/3> (2019)
3. Mikhno, I., Koval, V., Shvets, G., Garmatiuk, O., Tamošiūnienė, R.: Discussion: green economy in sustainable development and improvement of resource efficiency. *Central Eur. Bus. Rev.* **10**(XX), 1–15. <https://doi.org/10.18267/cebr.252> (2021)
4. Bazaluk, O., Havrysh, V., Nitsenko, V.: Energy and environmental assessment of straw production for power generation. *E3S Web Conf.* **228**, 01010. <https://doi.org/10.1051/e3sconf/202122801010> (2021)
5. Piliaiev, I.: The value Dichotomy curse of Ukraine's modernization: to break, or not to be. *Ukrainian Policymaker*, **5**, 68–76. <https://doi.org/10.29202/up/5/8> (2019)
6. Koval, V., Sribna, Y., Mykolenko, O., Vdovenko, N.: Environmental concept of energy security solutions of local communities based on energy logistics. 19th International Multidisciplinary Scientific GeoConference SGEM 2019 **19**(5.3), 283–290. <https://doi.org/10.5593/sgem2019/5.3/S21.036> (2019)
7. Havrysh, V.I., Nitsenko, V.S.: Current state of world alternative motor fuels market. *Actual Prod. Econ.* **7**(181), 41–52 (2016)

[Google Scholar](#)

8. Andreichenko, A., Andreichenko, S., Smentyna, N. (2021). Ensuring biosphere balance in the context of agricultural waste management. *Philos. Cosmol.* **26**, 46–61. <https://doi.org/10.29202/phil-cosm/26/4>
9. BP Statistical Review of World Energy. June 2018. Access mode: <https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review/bp-stats-review-2018-full-report.pdf>

[Google Scholar](#)

10. Koval, V., Mikhno, I., Hajduga, G., Gaska, K.: Economic efficiency of biogas generation from food product waste. *E3S Web Conf.* **100**, 00039. <https://doi.org/10.1051/e3sconf/201910000039> (2019)
11. Nitsenko, V., Mardani, A., Streimikis, J., Shkrabak, I., Klopov, I., Novomlynets, O., Podolska, O.: Criteria for evaluation of efficiency of energy transformation based on renewable energy sources. *Montenegrin J. Econ.* **14**(4), 253–263. <https://doi.org/10.14254/1800-5845/2018.14-4.17> (2018)

[Google Scholar](#)

12. Bilan, Y., Nitsenko, V., Havrysh, V.: Energy aspect of vertical integration in agriculture. *Rynok Energii* **5**(132), 98–110 (2017)

[Google Scholar](#)

13. BP Energy Outlook. 2018 Edition. Access mode: <https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/energy-outlook/bp-energy-outlook-2018.pdf>

[Google Scholar](#)

14. Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Minx, C.J., Farahani, E., Kadner, S., Seyboth, K., Adler, A., Baum, I., Brunner, S., et al. (eds.): Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Intergovernmental Panel on Climate Change, Cambridge, UK New York, NY, USA (2014)

[Google Scholar](#)

15. Goncharuk, A.G., Havrysh, V.I., Nitsenko, V.S. (2018). National features for alternative motor fuels market. *Int. J. Energy Technol Policy* **14**(2/3), 226–249. <https://doi.org/10.1504/IJETP.2018.10010075>

[Google Scholar](#)

16. Bazaluk, O., Havrysh, V., Nitsenko, V., Baležentis, T., Streimikiene, D., Tarkhanova, E.A. (2020). Assessment of green methanol production potential and related economic and environmental benefits: the case of China. *Energies* **13**, 3113. <https://doi.org/10.3390/en13123113>

[Google Scholar](#)

17. Deffeyes, K.S.: Hubbert's Peak: The Impending World Oil Shortage. Princeton University press, pp. 1–13 (2001)

[Google Scholar](#)

18. ICE Brent Crude Oil Futures Price. WTRG Economics. <http://wtrg.com/daily/brentcrudeoilprice.html>

[Google Scholar](#)

19. Statistical yearbook Ukraine 2019. State statistic service of Ukraine. Kyiv (2020). http://www.ukrstat.gov.ua/druk/publ/cat_u/2020/zb/11/zb_yearbook_2019.pdf

[Google Scholar](#)

20. Géraldine, K.: Industry development of sugarcane ethanol in South America. September 19th, 2018 Advanced Biofuels Conference, Sweden (2018). https://bioenergyinternational.com/app/uploads/2018/09/1Ge%CC%81raldine_Kutas.pdf

[Google Scholar](#)

21. Andriushchenko, K., Kovtun, V., Shergina, L., Rozhko, O., Yefimenko, L.: Agro-based clusters: a tool for effective management of regional development in the ERA of globalisation. *TEM J.* **9**(1), 198–204 (2020). <https://doi.org/10.18421/ITEM91-28>

[Google Scholar](#)

22. Ma, B.: Value shaping of ecological man: external standard and internal idea. *Future Hum. Image* **13**, 57–65. <https://doi.org/10.29202/fhi/13/6> (2020)

[Google Scholar](#)

23. Atamanyuk, I.P.: Algorithm of extrapolation of a nonlinear random process on the basis of its canonical decomposition. *J. Kibernetika i Sistemnyi Analiz* **2**, 131–138 (2005)

[MathSciNet](#) [MATH](#) [Google Scholar](#)

24. Atamanyuk, I.P.: Polynomial algorithm of optimal extrapolation of stochastic system parameters. *J. Upravlyayushchie Sistemy i Mashiny* **1**, 16–19 (2002)

[Google Scholar](#)

25. Wang, X., Lei, Y., Ge, J., Wu, S.: Production forecast of China's rare earths based on the Generalized Weng model and policy recommendations. *Res. Policy* **43**, 11–18 (2015). <https://doi.org/10.1016/j.respol.2014.11.002>

[CrossRef](#) [Google Scholar](#)

26. Jing, C., Gaoming, Y., Yunhong, X.: The solving method of generalized Weng model parameters based on curve fitting. *J. Chem. Pharm. Res.* **6**(12), 734–737 (2014)

[Google Scholar](#)

27. Soroka, L.: Modern challenges to establishing global law on sustainable development of space activities. *Adv. Space Law* **6**, 64–78 (2020). <https://doi.org/10.29202/asl/6/7> (2020)

[Google Scholar](#)

28. Stocker, T., Qin, D., Plattner, G.K., Tignor, M., Allen, S., Boschung, J., Nauels, A., Xia, Y., Bex, V., Midgley, P., (eds.): Climate change 2013: The Physical Scientific Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Intergovernmental Panel on Climate Change, Cambridge, UK New York, NY, USA (2013)

[Google Scholar](#)

29. Annual Arctic Sea Ice Minimum 1979–2015 with Area Graph (2016). <https://svs.gsfc.nasa.gov/4435>

[Google Scholar](#)

30. Mock, P.: 2020–2030 CO₂ standards for new cars and light-commercial vehicles in the European Union. Washington, DC: The International Council for Clean Transportation (2017)

[Google Scholar](#)

31. European Environment Agency: National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism. Directorate-General for Environment, United Nations Framework Convention on Climate Change (2017)

[Google Scholar](#)

32. Kalinichenko, A., Havrysh, V.: Environmentally friendly fuel usage: economic margin of feasibility. *Ecol. Chem. Eng. S.* **26**(2), 241–254 (2019). <https://doi.org/10.1515/eces-2019-0030>

[CrossRef](#) [Google Scholar](#)

33. How To Develop A Sustainable Energy Action Plan (SEAP)—Guidebook. Luxembourg: Publications Office of the European Union, (2010)

[Google Scholar](#)

34. Havrysh, V., Kalinichenko, A., Mentel, G., Mentel, U., Vasileva, D.G.: Husk energy supply systems for sunflower oil mills. *Energies* **13**, 361. <https://doi.org/10.3390/en13020361>

[Google Scholar](#)

35. Eriksson, M., Ahlgren, S.: LCAs of petrol and diesel a literature review. Report 2013:058. ISSN 1654-9406. Uppsala (2013)

[Google Scholar](#)

36. Pacheco, R., Silva, C.: Global warming potential of biomass-to-ethanol: review and sensitivity analysis through a case study. *Energies* **12**, 2535. <https://doi.org/10.3390/en12132535> (2019)

[Google Scholar](#)

37. Life Cycle Analysis of Natural Gas Extraction and Power Generation. Technical Report (2019). <https://doi.org/10.2172/1529553>

[CrossRef](#) [Google Scholar](#)

38. Zaporojets, A.O.: Correlation analysis between the components of energy balance and pollutant emissions. *Water Air Soil Pollut.* **232**, 114 (2021). <https://doi.org/10.1007/s11270-021-05048-9>

[CrossRef](#) [Google Scholar](#)

39. Koval, V., Sribna, Y., Gaska, K. (2019). Energy cooperation Ukraine–Poland to strengthen energy security. *E3S Web Conf.* **132**, 01009. <https://doi.org/10.1051/e3sconf/201913201009>

[Google Scholar](#)

40. Andriushchenko, K., Lavruk, V., Ulianets, S., Kovtun, V., Matviienko, H.: Reputation risk management companies based on competence approach. *TEM J.* **8**(2), 516–524. <https://doi.org/10.18421/ITEM91-28>

[Google Scholar](#)

41. Reva, N.: Logic, reasoning, decision-making. *Future Hum. Image* **10**, 76–84. <https://doi.org/10.29202/fhi/10/8> (2018)

[Google Scholar</](#)