

Bölüm 13

ENERJİ POLİTİKALARI VE STRATEJİLER

Chapter 13
ENERGY POLICIES AND STRATEGIES

Adnan MİDİLLİ

BÖLÜM İÇERİĞİ

- 13.1. Giriş
- 13.2. Temel Bilgiler
- 13.3. Temel Yaklaşımlar
- 13.4. Kavramsal Tasarım ve Analiz
- 13.5. Bulgular
- 13.6. Tartışma
- 13.7. Geleceğe Yönelik Beklentiler
- 13.8. Sonuçlar
- 13.9. Kaynaklar

YAZAR HAKKINDA / ABOUT AUTHOR

Prof. Dr. Adnan Midilli / Yıldız Teknik Üniversitesi / midilli[at]yildiz.edu.tr / ORCID: 0000-0001-9541-5409

Adnan Midilli (ORCID NO: 0000-0001-9541-5409), Yıldız Teknik Üniversitesi Makine Mühendisliği Bölümünde profesör olarak çalışmaktadır. Recep Tayyip Erdoğan Üniversitesi Mühendislik Fakültesi Kurucu Dekanıdır ve aynı üniversitede araştırma, inovasyon ve ticarileştirmeden sorumlu rektör yardımcısı olarak çalışmıştır. Araştırmaları, termodinamik tasarım ve analiz, yenilenebilir enerji teknolojileri, politikaları ve stratejileri, kurutma teknolojileri, atık su damıtma, gazlaştırma teknolojileri, biyoyakıt üretimi, hidrojen üretimi ve depolama, enerji sürdürülebilirliği konularında yoğunlaşmıştır. Dr. Midilli, bazı önemli enerji kitaplarının yazımına katkı sağlamıştır, patent sahibidir, çok sayıda kitap bölümü, makale, konferans yayını üretmiştir. Ulusal ve uluslararası projelerde çalışmıştır. Doktora ve yüksek lisans öğrencileri yetiştirmiştir. Dr. Midilli, 2005 yılında TÜBİTAK genç araştırmacı teşvik ödülüne, 2006 yılında ODTÜ Prof. Dr. Mustafa Parlar Eğitim ve Araştırma Vakfı genç araştırmacı teşvik ödülüne, 2018 yılında SARES (Uluslararası Sürdürülebilir havacılık ve Enerji Araştırmaları Topluluğu) Bilim Ödülüne layık görülmüştür.

Prof. Dr. Adnan Midilli / Yıldız Technical University / midilli[at]yildiz.edu.tr / ORCID: 0000-0001-9541-5409

Adnan Midilli (ORCID: 0000-0001-9541-5409) is Professor in Mechanical Engineering Department at Yıldız Technical University, Turkey. He is the founding Dean of Engineering Faculty at Recep Tayyip Erdogan University, Rize, Turkey, where he worked as vice rector for research, innovation and commercialization. His research focuses on thermodynamic design and analysis, renewable energy technologies, policies and strategies, drying technologies, wastewater distillation, gasification technologies, biofuel production, hydrogen production and storage, energy sustainability. He contributed to write some energy books, and produced patent, many book chapters, journal papers and conference papers, and worked on many national / international research / commercial projects. He trained MSc and PhD students. He received young scientist award from The Scientific and Technological Research Council (TUBITAK) in 2005, and the young researcher award from METU Prof. Mustafa N. Parlar Education and Research Foundation in 2006, and the SARES Science Award from International Sustainable Aviation and Energy Research Society (SARES) in 2018 in Turkey.

Özet

Bu çalışmanın temel amacı, enerji politikaları ve stratejileri kapsamında bir stratejik enerji sistemi geliştirmek ve bu enerji sistemi için gerekli temel kriterleri ortaya koymaktır. Bu bağlamda, kapsamlı bir çalışma gerçekleştirilmiştir. Şöyle ki, enerji alanında karşılaşılan temel zorluklar, enerji kaynaklarını etkileyen faktörler, enerji politikalarını etkileyen sebepler, enerji politikalarının ve stratejilerinin kavramsal çerçevesi, enerji politikalarında ve stratejilerinde meydana gelen tutarsızlıkların nedenleri ayrıntılı olarak tartışılmıştır. Ayrıca, geliştirilen stratejik enerji sisteminin ve yenilenebilir hidrojen enerji sisteminin kavramsal tasarımını ve kavramsal analizini yapmak için stratejik enerji sistem tasarım gereklilikleri, kaynak etkileşimi, kavramsal tasarım nitelikleri, kavramsal parametrelerin etkileşimi, hidrojen enerji sistemin JeoPoliEnerjetik kararlılık adımları geliştirilmiştir. Bunlardan başka, stratejik enerji sistemlerinin değerlendirmesini yapmak için Geo-PEaCES yaklaşımı ve bu yaklaşım kapsamında, "JeoPoliEnerjetik kararlılık" adıyla yeni bir kavramsal indikatör geliştirilmiştir. Bu çerçevede, sürdürülebilir bir enerji yol haritası oluşturulmuştur. Sonuç olarak; etkin ve verimli enerji politikaları ve stratejileri geliştirmek ve uygulamak için enerji politikalarının ve stratejilerinin sahip olması gereken kriterlerin dikkate alınması önemli olduğu sonucuna varılmıştır.

Anahtar Kelimeler

Enerji Politikası, Enerji Stratejisi, Enerji Sistemi, Enerji Yol Haritası, Jeoenerjetik, Hidrojen, Enerji Verimliliği, Kavramsal Tasarım, JeoPoliEnerjetik kararlılık, Geo-PEaCES Yaklaşımı, Temiz Kömür.

Abstract

The main objective of this study is to develop a strategic energy system within the scope of energy policies, strategies and education and to set out the basic criteria for this energy system. In this context, a comprehensive study has been conducted and the followings have been discussed in detail, which are i) the main difficulties encountered in the field of energy, ii) the factors affecting energy resources, iii) the reasons affecting energy policies, iv) the conceptual framework of energy policies and strategies, v) the causes of inconsistencies in energy policies and strategies. In addition, the followings have been developed, including i) the conceptual design and conceptual analysis of strategic energy system and renewable hydrogen energy system, ii) the design requirements, the source interaction, the conceptual design characteristics of strategic energy system, iii) the interaction of conceptual parameters, and iv) the GeoPolyEnergetic stability steps of hydrogen energy system. Moreover, the Geo-PEaCES Approach has been developed to evaluate the strategic energy systems and a new conceptual indicator called "GeoPoliEnergetic Stability" has been evolved. In this regard, a sustainable energy road map has been also developed. Accordingly, in order to develop and implement effective and efficient energy policies and strategies, it is important to take into consideration the criteria that energy policies and strategies should have.

Keywords

Energy Policy, Energy Strategy, Energy System, Energy Road Map, Geoenergetic, Hydrogen, Energy Efficiency, Conceptual Design, GeoPoliEnergetic Stability, Geo-PEaCES Approach, Clean Coal.

13.9. KAYNAKLAR / REFERENCES

- [1] A. Midilli, M. Dogru, C.R. Howarth, T. Ayhan, Hydrogen production from hazelnut shell by applying air-blown downdraft gasification technique, *Int J Hydrogen Energy*, 26 (2001) 29-37.
- [2] A. Midilli, M. Ay, I. Dincer, M. A. Rosen, On hydrogen and hydrogen energy strategies: I: current status and needs, *Renewable and Sustainable Energy Reviews*, 9(3) (2005) 255-271.
- [3] A. Midilli, M. Ay, I. Dincer, MA. Rosen, On hydrogen and hydrogen energy strategies II: future projections affecting global stability and unrest, *Renewable and Sustainable Energy Reviews*, 9(3) (2005) 273-287.
- [4] A. Midilli, I. Dincer, M. Ay, Green energy strategies for sustainable development, *Energy Policy*, 34(18) (2006) 3623-3633.
- [5] A. Midilli, I. Dincer, M.A. Rosen, The role and future benefits of green energy, *International Journal of Green Energy*, 4 (2007) 1-23.
- [6] A. Midilli, Green hydrogen energy system: a policy on reducing petroleum-based global unrest, *International Journal of Global Warming*, 10 (2016) 354-370.
- [7] A. Midilli, M. Ay, A. Kale, T.N. Veziroglu, A parametric investigation of hydrogen energy potential based on H₂S in Black Sea deep waters, *International Journal of Hydrogen Energy*, 32(1) (2007) 117-124.
- [8] A. Midilli, I. Dincer, Key strategies of hydrogen energy systems for sustainability, *International Journal of Hydrogen Energy*, 32(5) (2007) 511-524.
- [9] A. Midilli, I. Dincer, Hydrogen as a renewable and sustainable solution in reducing global fossil fuel consumption, *International Journal of Hydrogen Energy*, 33 (2008) 4209-4222.
- [10] E. Bozoglan, A. Midilli, A. Hepbasli, Sustainable assessment of solar hydrogen production techniques, *Energy*, 46(1) (2012) 85-93.
- [11] International Energy Agency (IEA), World Energy Outlook, <https://www.iea.org/reports/world-energy-outlook-2018>, 2018 (accessed 12.10.2019).
- [12] K. Y. Foo, A vision on the opportunities, policies and coping strategies for the energy security and green energy development in Malaysia, *Renewable and Sustainable Energy Reviews*, 51 (2015) 1477-1498.
- [13] D.J. Hess, H. Gentry, 100% renewable energy policies in U.S. cities: strategies, recommendations, and implementation challenges, *Sustainability: Science, Practice and Policy*, 15:1 (2019) 45-61.
- [14] N.C. Hope, J. Li. (2007). Chinese Energy strategy and policy: fiscal implications for the ministry of finance. landau economics building, Room 153 Stanford, CA 94305-6015.
- [15] I. Dyner, Energy modelling platforms for policy and strategy support, *The Journal of the Operational Research Society*, 51(2) (2000) 136-144.
- [16] A. Z. Aktaş, A review and comparison of renewable energy strategies or policies of some countries. 4th International Conference on Renewable Energy Research and Applications, 2015.
- [17] K. Friedmana, A. Cookea, City versus national energy use: implications for urban energy policy and strategies, *Procedia Engineering*, 21 (2011) 464-472.
- [18] A.C. Chaoa, L. Hongba, Corporate social responsibility strategy, environment and energy policy, *Structural Change and Economic Dynamics*, 51 (2019) 311-317.
- [19] N. Finnerty, R. Sterling, S. Contreras, D. Coakley, M. M. Keane, Defining corporate energy policy and strategy to achieve carbon emissions reduction targets via energy management in non-energy intensive multi-site manufacturing organizations, *Energy*, 151 (2018) 913-929.
- [20] R. Singh, A.D. Setiawan, Biomass energy policies and strategies: Harvesting potential in India and Indonesia, *Renewable and Sustainable Energy Reviews*, 22(2013) 332-345.
- [21] T.M. Do, D. Sharma, Vietnam's energy sector: A review of current energy policies and strategies, *Energy Policy*, 39(10) (2011) 5770-5777.
- [22] J.K. Strakos, J.A. Quintanilla, J.R. Huscroft, Department of defense energy policy and research: A framework to support strategy, *Energy Policy*, 92 (2016) 83-91.
- [23] P. Shipkovs, U. Pelite, G. Kashkarova, K. Lebedeva, L. Migla, J. Shipkovs. (2011). Policy and strategy aspects for renewable energy sources use in Latvia. *World Renewable Energy Congress*, Sweden.
- [24] C. Taeran, Long term energy strategies and policies: Challenges, *Procedia Technology*, 19 (2015) 631-636.

- [25] M.O. Agboola, P.O. Agboola, Africa energization: alternative energy capacity building strategies and policies, Proceedings of the World Congress on Engineering, Vol II, 2016.
- [26] J. Al-Amir, B. Abu-Hijleh, Strategies and policies from promoting the use of renewable energy resource in the UAE, Renewable and Sustainable Energy Reviews, 26 (2013) 660-667.
- [27] BP Energy Outlook 2019-chart data pack, <https://www.bp.com/xlsx/energy-economics>, (accessed 10.11.2019).
- [28] I. Vidakis, G. Baltos, J. Balodis, Geopolitics of energy versus geoenergy of politics, Social sciences bulletin; Вестник Социальных Наук, 2 (25) (2017) 38-55, Retrieved from Cadmus, European University Institute Research Repository, at: <http://hdl.handle.net/1814/51504>.
- [29] M. Jefferson, Energy Policies for Sustainable Development, <https://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Sustainable%20Energy/wea%202000/chapter12.pdf>, (accessed 20.12.2019)

Önerilen Kaynaklar

Kitaplar

- [1] T.R. Lakshmanan, (Ed.). Economic, Environmental, Energy Interactions: Modeling and Policy Analysis, (Vol. 17). Springer Science & Business Media, 1980.
- [2] A.B. Lovins, L.H. Lovins, Brittle Power: Energy Strategy for National Security, Andover, Ma, 1982.
- [3] J.B. Lesourd, J. Percebois, F. Valette, (Eds.), Models for Energy Policy, Routledge, 1995.
- [4] F. McGowan, (Ed.). European Energy Policies in A Changing Environment, (Vol. 1). Heidelberg: Physica-Verlag, 1996.
- [5] K. Mallon, (Ed.). Renewable Energy Policy And Politics: A Handbook For Decision-Making, Earthscan, 2006.
- [6] National Research Council, Coal: Research and Development to Support National Energy policy. National Academies Press, 2007.
- [7] D.Y. Goswami, F. Kreith, Handbook Of Energy Efficiency And Renewable Energy, Crc Press, 2007.
- [8] J. Randolph, G.M. Masters, Energy for Sustainability: Technology, Planning, Policy, Island Press, 2008.
- [9] R. Youngs, Energy Security: Europe's New Foreign Policy Challenge, Routledge, 2009.
- [10] U. Aswathanarayana, T. Harikrishnan, T.S. Kadher-Mohien, (Eds.). Green Energy: Technology, Economics and Policy, Crc Press, 2010.
- [11] M. Jarvela, S. Juhola, (Eds.), Energy, Policy, And The Environment: Modeling, Sustainable Development for The North, (Vol. 6). Springer Science & Business Media, 2011.
- [12] F.L. Toth, (Ed.), Energy for Development: Resources, Technologies, Environment, (Vol. 54). Springer Science & Business Media, 2012.
- [13] H. Qudrat-Ullah, (Ed.), Energy Policy Modeling in The 21st Century, Springer, 2013.
- [14] M. Munasinghe, Energy Analysis and Policy: Selected Works, Butterworth-Heinemann, 2013.
- [15] S. Yao, M.J.H. Talamantes, (Eds.), Energy Security and Sustainable Economic Growth in China, Springer, 2014.
- [16] R. Redlinger, P. Andersen, P. Morthorst, Wind Energy in The 21st Century: Economics, Policy, Technology and The Changing Electricity Industry. Springer, 2016.

Önerilen Websayfaları

- [1] National Energy Policy and Strategy <http://www.euei-pdf.org/en/seads/policy-strategy-and-regulation/national-energy-policy-and-strategy>, (accessed 11.11.2019).
- [2] Energy Policy & Strategy, <http://www.nef.org.uk/service/existing-buildings/energy-management/energy-policy-strategy>, (accessed 12.11.2019).
- [3] Energy policy & New National Energy Strategy in Japan, <https://ieeexplore.ieee.org/document/4569510>. (accessed 21.12.2019).
- [4] Energy strategy and policy, <https://www.eeca.govt.nz/energy-use-in-new-zealand/energy-strategy-and-policy>. (accessed 12.10.2019).

- [5] EU Policy - Energy strategy, low carbon technology and buildings, <http://www.smart-er.eu/content/eu-policy-energy-strategy-low-carbon-technology-and-buildings>. (accessed 20.12.2019).
- [6] Indonesia's Energy Policy Strategy: Towards Modern & Green Economy, <https://aseanenergy.org/indonesias-energy-policy-strategy-towards-modern-green-economy>. (accessed 13.09.2019).
- [7] Turkey's Energy Strategy: Synchronizing Geopolitics and Foreign Policy with Energy Security, <https://www.insightturkey.com/articles/turkeys-energy-strategy-synchronizing-geopolitics-and-foreign-policy-with-energy-security>. (11.10.2019).
- [8] Policy briefing: New draft energy (read oil, gas and coal) strategy at the EBRD, <https://bankwatch.org/publication/policy-briefing-new-draft-energy-read-oil-gas-and-coal-strategy-at-the-ebrd>. (accessed 23.11.2019).
- [9] South Korea Energy Policy: New Strategy Announced, <https://opentoexport.com/article/south-korea-energy-policy-new-strategy-announced>. (accessed 11.12.2019).
- [10] Secure our Future: Towards a European Energy Strategy, <https://onlinelibrary.wiley.com/doi/full/10.1111/1758-5899.12150>. (accessed 22.11.2019).
- [11] Energy Strategy, <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union>. (accessed 21.10.2019).
- [12] Energy Policy: General principles, <http://www.europarl.europa.eu/factsheets/en/sheet/68/energy-policy-general-principles>. (accessed 12.10.2019).
- [13] Energy policy of the European Union, https://en.wikipedia.org/wiki/Energy_policy_of_the_European_Union. (accessed 09.11.2019).
- [14] Turkey's Energy Profile and Strategy, <http://www.mfa.gov.tr/turkeys-energy-strategy.en.mfa>. (accessed 23.10.2019).
- [15] Caribbean Development Bank, Energy sector policy and strategy. <https://www.caribank.org/sites/default/files/publication-resources/EnergySectorPolicyandStrategy.pdf>, 2015 (accessed 06.8.2019).
- [16] Olade, Energy Policy: Practical Guide Book, <http://biblioteca.olade.org/opac-tmpl/Documentos/old0359.pdf>, 2016 (accessed 21.12.2019).
- [17] Energy Star, Guidelines for Energy Management, https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/EM%20Guidelines%20Eng%20Mar_27_2019.pdf. 2019 (accessed 17.12.2019)