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Poul Alberg Østergaard* and Rasmus Magni Johannsen

Department of Planning, Aalborg University, Rendsburggade 14, 9000 Aalborg, Denmark

ABSTRACT

This editorial introduces the main findings from the 30th Volume of the International Journal of Sustainable Energy Planning and Management. This volume probes into analyses of the technical interactions between multi-energy carrier energy hubs and the role and feasibility of cogeneration of heat and power in a Portuguese context. It moves on to analyse the framework for implementing photo voltaic technology and decision processes for implementing PV technology. Lastly, it presents work on the role of renewable energy sources in meeting carbon dioxide emission reduction goals in Iran.

Keywords

Energy hubs;
Cogeneration of heat and power;
Implementation of photo voltaics;
Emission reductions;

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1. Technology transition

In their work on multi hubs in the article *Planning of multi-hub energy system by considering competition issue* [1], Farshidian et al. investigate the interplay between series of connected multi-carrier energy systems. This is in line with Kienberger's work published in this journal [2]. In their work, Farshidian and co-authors focus on the methodological development of an assessment framework based on Karush–Kuhn–Tucker conditions.

Ferreira et al. investigate the prospects of cogeneration of heat and power (CHP) in their work *Application of a cost-benefit model to evaluate the investment viability of the small-scale cogeneration systems in the Portuguese context* [3]. The authors follow up on an IJSEPM focus area of Iberian energy system transition [4–7] as well as on studies on district heating [8–10] and cogeneration of heat and power [11–13]. In this work, Ferreira et al. analyse different types of CHP in buildings,

finding that economic viability requires subsidies for energy-efficient electricity production in the Portuguese context.

2. Systems for implementation

Based on a PESTLE (Political, Economic, Social, Technological, Legal, and Environmental factors) framework, Schaefer & Siluk assess the potential implementation of PV technology based on network analyses of the players in their article *An Algorithm-based Approach to Map the Players' Network for Photovoltaic Energy Businesses* [14]. Among other conclusions, Schaefer & Silluk find that there is a need to establish clear business models representing all technical aspects along with all interrelations between players, and establishing governance of the sector facilitating both coordination and standardization.

Miraj & Berawi analyse PV investment decision processes in their work *Multi-Criteria Decision Making for*

*Corresponding author - e-mail: poul@plan.aau.dk

Photovoltaic Alternatives: A Case Study in Hot Climate Country [15]. Using an Indonesian case-study and factoring in a range of criteria from the cost of energy, via CO₂ emissions to operation and maintenance established through a respondent survey, the authors continue to investigate optimal decisions. This follows up on previous work published in the IJSEPM on decision-support systems [13,16,17].

3. Country scenarios

Godarzi and Maleki analyse *Optimal Electrical Energy Supply to Meet Emissions Pledge Under Paris Climate Accord* [18]. Based on a non-linear model of the Iranian energy system, the authors find that Iran can meet its CO₂-emission reduction pledge through a 25 USD/t carbon tax, 10–20 % renewable energy and conversion of combined cycle power generation. This follows up on previous studies on Iran [17,19,20] published in the IJSEPM, focusing on photo voltaics/wind power, desalination and policy issues as well as other studies investigating strategies to meet Paris Agreement commitments [21–23].

4. Special section

Lastly, the this issue contains a contribution from the European Conference on Renewable Energy Systems held in Istanbul, August 2020. In this contribution Karipoğlu and coauthors investigates site selection methods and cases for wind power development in Turkey [24].

References

- [1] Farshidian B, Rajabi-Ghahnavieh A, Hagi E. Planning of multi-hub energy system by considering competition issue. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.6190>
- [2] Kienberger T, Traupman A, Sejkora C, Kriechbaum L, Greiml M, Böckl B. Modelling, designing and operation of grid-based multi-energy systems. *Int J Sustain Energy Plan Manag* 2020;29. <http://doi.org/10.5278/ijsepm.3598>
- [3] Ferreira AC, Teixeira S, Teixeira JCF, Nebra SA. Application of a cost-benefit model to evaluate the investment viability of the small-scale cogeneration systems in the Portuguese context. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.5400>
- [4] Østergaard PA, Soares I, Ferreira P. Energy efficiency and renewable energy systems in Portugal and Brazil. *Int J Sustain Energy Plan Manag* 2014;2. <http://doi.org/10.5278/ijsepm.2014.2.1>
- [5] da Silva RR, Dias MF, Madaleno M. Iberian Electricity Market spot and futures prices: comovement and lead-lag relationship analysis. *Int J Sustain Energy Plan Manag* 2019;19. <http://doi.org/http://dx.doi.org/10.5278/ijsepm.2019.19.6>
- [6] Figueiredo NC, da Silva PP. The price of wind power generation in Iberia and the merit-order effect. *Int J Sustain Energy Plan Manag* 2018;15. <http://doi.org/10.5278/ijsepm.2018.15.4>
- [7] Teixeira JCF, Østergaard PA. Development in efficiency, cost, optimization, simulation and environmental impact of energy systems. *Int J Sustain Energy Plan Manag* 2019;22. <http://doi.org/10.5278/ijsepm.3359>
- [8] Margaritis N, Rakopoulos D, Mylona E, Grammelis P. Introduction of renewable energy sources in the district heating system of Greece. *Int J Sustain Energy Plan Manag* 2014;4:43–55. <http://doi.org/10.5278/ijsepm.2014.4.5>
- [9] Zhang J, Lucia L Di. A transition perspective on alternatives to coal in Chinese district heating. *Int J Sustain Energy Plan Manag* 2015;6:49–69. <http://doi.org/10.5278/ijsepm.2015.6.5>
- [10] Büchele R, Kranzl L, Müller A, Hummel M, Hartner M, Deng Y, et al. Comprehensive Assessment of the Potential for Efficient District Heating and Cooling and for High-Efficient Cogeneration in Austria. *Int J Sustain Energy Plan Manag* 2016. <http://doi.org/10.5278/ijsepm.2016.10.2>
- [11] Ferreira AC, Nunes ML, Teixeira S, Martins LB. Technical-economic evaluation of a cogeneration technology considering carbon emission savings. *Int J Sustain Energy Plan Manag* 2014;2:33–46. <http://doi.org/10.5278/ijsepm.2014.2.4>
- [12] Sorknæs P, Lund H, Andersen AN, Ritter P. Small-scale combined heat and power as a balancing reserve for wind – the case of participation in the German secondary control reserve. *Int J Sustain Energy Plan Manag* 2014;4. <http://doi.org/10.5278/ijsepm.2014.4.4>
- [13] Zugno M, Morales JM, Madsen H. Decision support tools for electricity retailers, wind power and CHP plants using probabilistic forecasts. *Int J Sustain Energy Plan Manag* 2015;7:19–36. <http://doi.org/10.5278/ijsepm.2015.7.3>
- [14] Schaefer JL, Siluk JCM. An Algorithm-based Approach to Map the Players' Network for Photovoltaic Energy Businesses. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.5889>
- [15] Miraj P, Berawi MA. Multi-Criteria Decision Making for Photovoltaic Alternatives: A Case Study in Hot Climate Country. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.5897>
- [16] Brange L, Sernhed K, Thern M. Decision-making process for addressing bottleneck problems in district heating networks. *Int J Sustain Energy Plan Manag* 2019;20. <http://doi.org/10.5278/ijsepm.2019.20.4>

- [17] Saleki S. Introducing Multi-Stage Qualification for Micro-Level Decision-Making (MSQMLDM) Method in the Energy Sector – A case study of Photovoltaic and Wind Power in Tehran. *Int J Sustain Energy Plan Manag* 2018;17. <http://doi.org/10.5278/ijsepm.2018.17.6>
- [18] Godarzi AA, Maleki A. Optimal Electrical Energy Supply to Meet Emissions Pledge Under Paris Climate Accord. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.5896>
- [19] Caldera U, Bogdanov D, Fasihi M, Aghahosseini A. Securing future water supply for Iran through 100% renewable energy powered desalination. *Int J Sustain Energy Plan Manag* 2019;23. <http://doi.org/10.5278/ijsepm.3305>
- [20] Godarzi AA, Maleki A. Policy Framework for Iran to Attain 20% Share of Non-Fossil Fuel Power Plants in Iran's Electricity Supply System by 2030. *Int J Sustain Energy Plan Manag* 2020;29. <http://doi.org/10.5278/ijsepm.5692>
- [21] Osorio-Aravena JC, Aghahosseini A, Bogdanov D, Caldera U, Muñoz-Cerón E, Breyer C. Transition toward a fully renewable-based energy system in Chile by 2050 across power, heat, transport and desalination sectors. *Int J Sustain Energy Plan Manag* 2020;25. <http://doi.org/10.5278/ijsepm.3385>
- [22] Singh MK. A planning perspective on Hydropower Development in the Indian Himalayan Region. *Int J Sustain Energy Plan Manag* 2020;28. <http://doi.org/10.5278/ijsepm.4304>
- [23] Momodu AS. Energy Use: Electricity System in West Africa and Climate Change Impact. *Int J Sustain Energy Plan Manag* 2017;14. <http://doi.org/10.5278/ijsepm.2017.14.3>
- [24] Karipoğlu F, Genç MS, Koca K. Determination of the most appropriate site selection of wind power plants based Geographic Information System and Multi-Criteria Decision-Making approach in Develi, Turkey. *Int J Sustain Energy Plan Manag* 2021;30. <http://doi.org/10.5278/ijsepm.6242>

