



Global renewable energy value chains: Opportunities for European firms and economies in combating the climate change

Mario Glowik

Berlin School of Economics and Law,
Germany

Agnieszka Chwialkowska

University of West Georgia, USA

Waheed Akbar Bhatti

Aalborg University, Denmark

2021, December 2nd



Why this topic?

- We are confronted with the consequences of an ongoing climate change
- Fossil energy (e.g., gas, oil) is not necessarily stable in terms of supply and prices (contributes to current inflation)
- European economies become fragile and dependent on fossil energies
- Therefore, we need an utilization of renewable energy resources securing cleanliness, eco-friendliness, and sustainability (wto.org, 2018; Aslani and Mohaghar, 2013)



Why wind power energy?

- Wind power energy together with solar photovoltaic and hydro energy are the leading technologies within renewable energy generation. All these technologies are essential in fighting global climate diseases (Nghiem et al., 2017)
- Wind power projects are comparatively complex with major value-added activities such as engineering and commercial businesses, consulting, research and development, wind turbine manufacturing, electric grid infrastructure planning, and regional turbine assembly (Alfaro, L. et al. 2015)



The literature

- Industry network publications have mainly focused on manufacturing (Verdu, Gómez-Gras and Martínez-Mateo, 2012) and high-technology industries (Salavisa, Sousa and Fontes, 2012)
- Publications targeting renewable wind energy networks remain comparatively marginal which is caused by its relative novelty in the academic arena (Gosens et al., 2017)
- There are several calls on more empirical evidence on the evolution of networks (Bembom and Schwens, 2018), “bridging the dualism of location- and firm-centric views” (Cano-Kollmann et al., 2016, p. 259) and the role of relationships in the development of wind energy clusters (Bauwens et al., 2016).



The literature

- There is currently more research available concerning wind energy in China than for Europe (e.g., Lam et al. 2017; Sahu 2018)
- The literature on renewables in China discusses the role of governmental policies in the adoption of wind power technologies (Wang et al. 2012; Gosens et al. 2017; Sahu 2018) or industry value chains (Zhao et al. 2014; Lam et al. 2017)



Research gap and study aim

Limited
research on
renewables
(wind power)

Narrow focus
on China

Climate
change

Energy
supply and
economic
prosperity

Call for
research on
networks



**Understanding and interpretation of global value chains within
global renewable (wind energy) business networks**

“Open the black box” through industry network cluster analysis



Method

- As recommended by Turkina et al. (2020) we study **horizontal relationship** ties of wind turbine manufacturing firms established to gain complementary resources within their value chain activities (e.g., wind turbine component assembly, engineering expertise)
- We also aim to explore **vertical relationships** established to get access to research and development (e.g., upstream ties with universities and research laboratories) or distribution channels (downstream links with local electricity providers or infrastructure development entities)



Method

- As Zhao et al. (2014) recommended we apply the industry chain model to endeavor **firm cluster structures** according to their bilateral firm relationships within relevant value-adding processes in the wind power industry
- The cluster analysis aims to investigate relationship preferences in course of contract partner selection processes within a business network (Ronen and Shenkar, 2013)
- Our data set consist of 326 business relationships covering a period 2007-2021
- Data are gained through secondary analysis (e.g. annual reports, press releases, industry surveys) and categorized in a matrix using UCINET network analysis software

Results of cluster analysis

(UCINET)



Hochschule für
Wirtschaft und Recht Berlin
Berlin School of Economics and Law

| Region | Country |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Europe | Belgium, Bulgaria, Denmark, France, Germany, Greece, Italy, Ireland, Lithuania, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Turkey, Ukraine, United Kingdom |
| America | Argentina, Brazil, Canada, Chile, Mexico, USA |
| Asia | China, India, Kazakhstan, Pakistan, South Korea, Vietnam |
| Africa | Ethiopia, Kenya, Morocco, South Africa |
| Oceania | Australia |

Table 1: Demand side: Main Wind Power Investment Target Countries (2007-2021)



Results of cluster analysis.

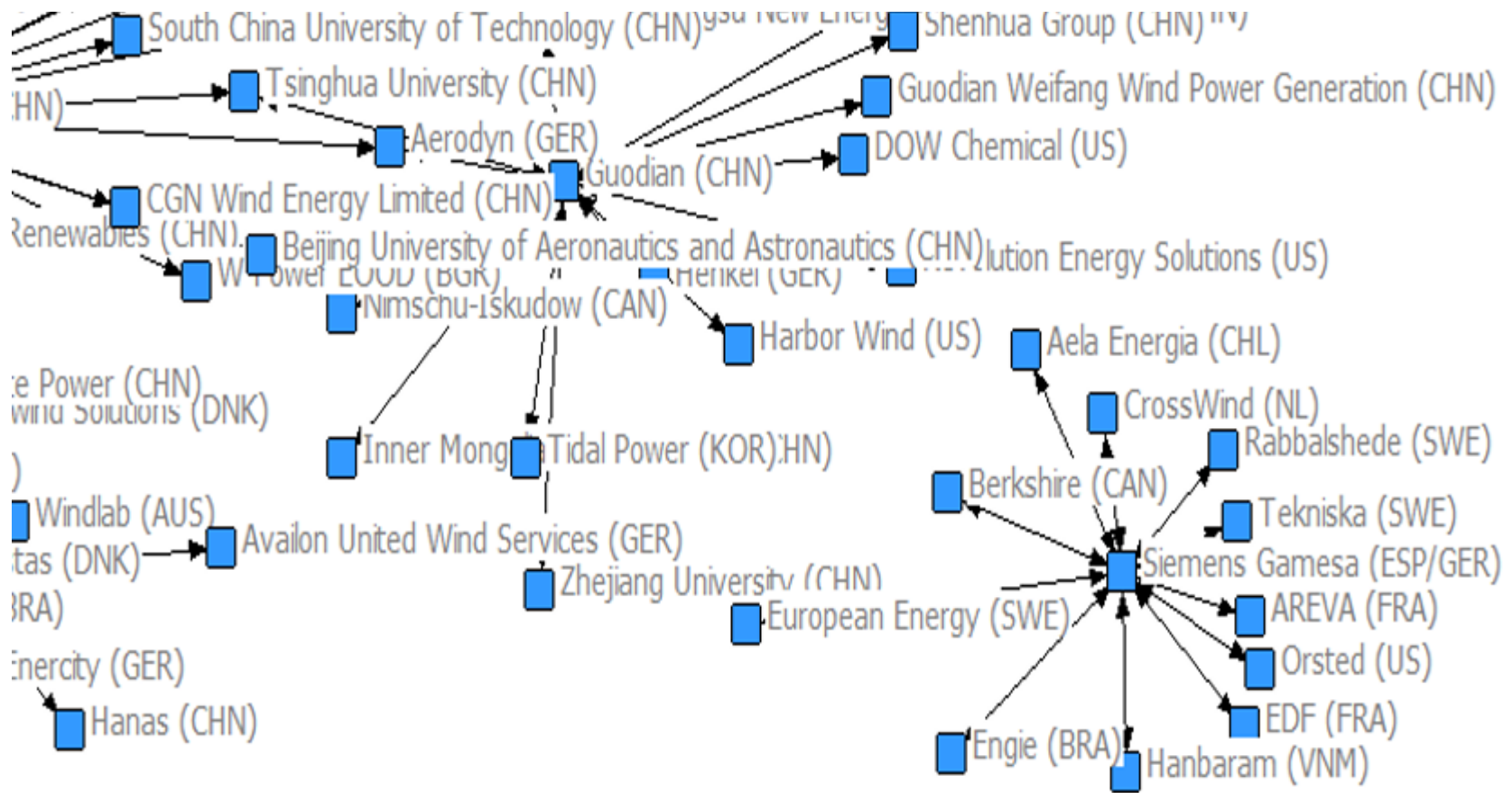
One example cluster (UCINET)

| Cluster Group | Cluster Members (Country Code) | Cluster Characteristics |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 <i>(out of totally eight cluster groups)</i> | Siemens Gamesa (ESP/GER), AREVA (FRA), Rabbalshede (SWE), CrossWind (NL), EDF (FRA), Tekniska (SWE), Aela Energia (CHL), Berkshire (CAN), Orsted (US), European Energy (SWE), Hanbaram (VNM), Engie (BRA) | European Cluster led by Siemens-Gamesa (belongs to the top three of global market leaders) International downstream links with local electricity providers or infrastructure development entities in America and Europe Makes use of Siemens organizational structure, its global business activities and financial power (inhouse network) |

Table 2: Cluster Analysis of Main Wind Power Investment Target Countries (2007-2021)

Network cluster analysis

(UCINET)





Summary

- Theoretical contribution: To the network literature / renewable research. We endeavor important wind energy value chains within eight global industry clusters. For each cluster we describe major characteristics based on horizontal and vertical firm relationships
- Managerial implications: Developing renewables industries are more than important in these days, thus we target to shed light on business and research potentials for European entrepreneurs and economies in course of combating the climate change
- May help to promote jobs and welfare in Europe (and to avoid value chain re-configurations towards China as it was the case of the solar-photovoltaic industry after the Lehman Brothers collapse / global financial crisis)



References

- Alfaro, L., Antràs, P. Chor, D. and Conconi, P. (2015) 'Internalising Global Value Chains: A Firm-Level Analysis', Harvard Business School Working Paper (16-028), pp. 1–59.
- Aslani, A. and Mohaghar, A. (2013) 'Business structure in renewable energy industry: Key areas', *Renewable and Sustainable Energy Reviews*, 27, pp. 569–575. doi: 10.1016/j.rser.2013.07.021
- Bauwens, T., Gotchev, B. and Holstenkamp, L. (2016) 'What drives the development of community energy in Europe? The case of wind power cooperatives', *Energy Research & Social Science*, 13, pp. 136–147. doi: 10.1016/j.erss.2015.12.016
- Bembom, M. and Schwens, C. (2018) 'The role of networks in early internationalising firms: A systematic review and future research agenda - The-role-of-networks-in-early-internationalizing-firms--_2018_European-Manag.pdf', *European Management Journal*, 36, pp. 679–694. doi: 10.1016/j.emj.2018.03.003
- Cano-Kollmann, M. et al. (2016) 'Knowledge connectivity: An agenda for innovation research in international business', *Journal of International Business Studies*, 47(3), pp. 255–262. doi: 10.1057/jibs.2016.8
- Gosens, J., Kåberger, T. and Wang, Y. (2017) 'China's next renewable energy revolution: goals and mechanisms in the 13th Five Year Plan for energy', *Energy Science & Engineering*, 5(3), pp. 141–155. doi: 10.1002/ese3.161
- Lam, L.T., Branstetter, L. and Azevedo, I.M. (2017) 'China's wind industry: Leading in deployment, lagging in innovation', *Energy Policy*, 106, pp. 588–599. doi: 10.1016/j.enpol.2017.03.023



References

Nghiem, A. et al. (2017) Wind Energy Outlook (Accessed: May 3 2018)

Ronen, S. and Shenkar, O. (2013) 'Mapping world cultures: Cluster formation, sources and implications', *Journal of International Business Studies*, 44(9), pp. 867–897. DOI: 10.1057/jibs.2013.42

Sahu, B.K. (2018) 'Wind energy developments and policies in China: A short review', *Renewable and Sustainable Energy Reviews*, 81, pp. 1393–1405. doi: 10.1016/j.rser.2017.05.183

Turkina, E., van Assche, A. and Doloreux, D. (2020) 'How do firms in co-located clusters interact? Evidence from Greater Montreal', *Journal of Economic Geography*, (00), pp. 1–22. doi: 10.1093/jeg/lbaa019

Wang, Z., Qin, H. and Lewis, J.I. (2012) 'China's wind power industry: Policy support, technological achievements, and emerging challenges', *Energy Policy*, 51, pp. 80–88. doi: 10.1016/j.enpol.2012.06.067

www.wto.org/english/res_e/publications_e/sdg_e.htm (2018), July 24 (Accessed: March 3 2021).

Zhao, Z.Y., Tian, Y. and Zillante, G. (2014) 'Modeling and evaluation of the wind power industry chain: A China study', *Renewable and Sustainable Energy Reviews*, 31 (2014), p. 10 (Accessed: February 16 2018).

Thank you!



Hochschule für
Wirtschaft und Recht Berlin
Berlin School of Economics and Law

Global renewable energy value chains: Opportunities for European firms and economies in combating the climate change

Mario Glowik

mario.glowik@hwr-berlin.de

Berlin School of Economics and Law
Germany

Agnieszka Chwialkowska

achwialk@westga.edu

University of West Georgia, USA

Waheed Akbar Bhatti

wab@business.aau.dk

Aalborg University, Denmark

Keywords

Renewable energy, wind turbine, cluster analysis, value chains, B-2-B relationships



Thank you!

mario.glowik@hwr-berlin.de

https://www.youtube.com/results?search_query=mario+glowik

<https://www.researchgate.net/profile/Mario-Glowik>