

Supplementary material:

Social-related data

As described in Section 2, to shape the agents' societal attributes in our ABM, we used Hofstede's social dimensions theory, and World Value Survey [1] was used to extract the data related to the calculation of Hofstede's dimensions for our case studies. This data is shown in figure 4.

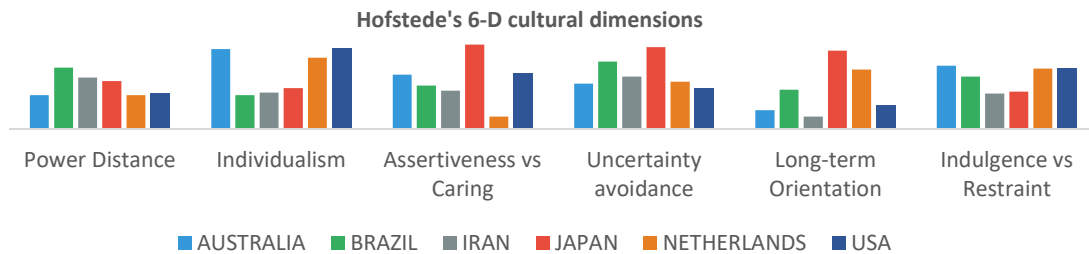


Figure 1: Hofstede's values related to our case studies

Economy-related data

According to our model concept, economic data such as *mean grid tariff*, *RE installation costs*, *RE maintenance costs*, and *discount rates* were needed to be collected. We used data from the Power Generation Costs by the International Renewable Energy Agency (IRENA) 2018 [2] to determine the RE installation and maintenance costs. Figures 5 and 6 show the installation costs of RE parks among our cases.

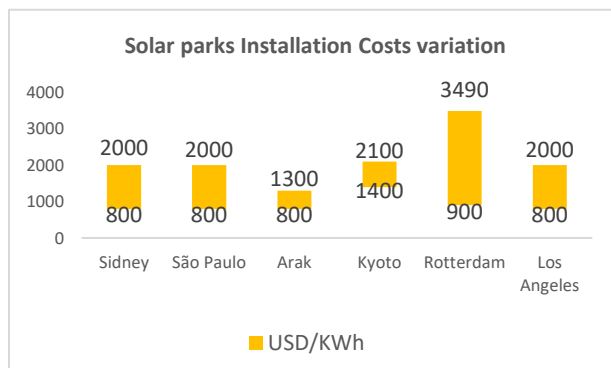


Figure 2: Solar park installation costs

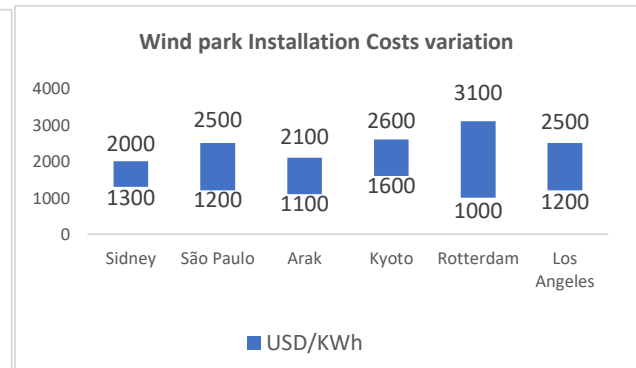


Figure 3: Wind park installation costs

For grid energy tariffs, they were collected from several different sources. Australia [3], Brazil [4], and the United States [5] were collected directly from the energy regulator or its statistics branch. The Netherlands' grid tariff came from the European Union Statistics agency [6]. Iran's grid tariff came from a World Bank report [7], and finally, Japan's grid tariff came from a UK Ministerial report on Asian tariffs [8]. Finally, those values in currencies different than US dollars were converted to USD using the currency rate of 31-Dec-2018. The grid tariff variation is shown in figure 7.

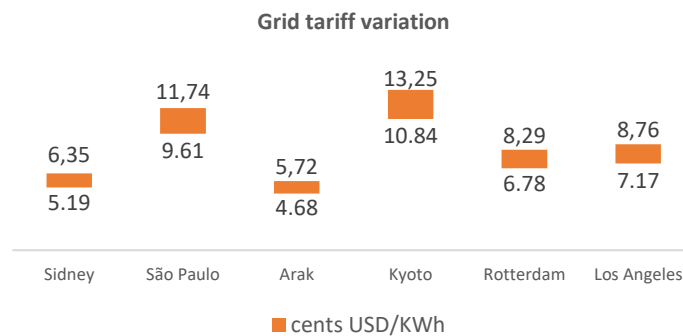


Figure 4: Grid tariff variation among our cases

Weather-related data

To determine how much electricity can be generated per year in our case studies, we needed to access weather-related data such as the distribution of wind speed throughout the year and total yearly sunshine hours. We used the open data website *windfinder.com* [9], which collects and presents statistics over wind collected in several weather stations worldwide to collect the data related to wind energy. Another data source that could provide data for several locations was the United Nations Database [10]. From this website, it was possible to collect the total yearly sunshine hours regarding our selected cases. These data are shown in figure 8.

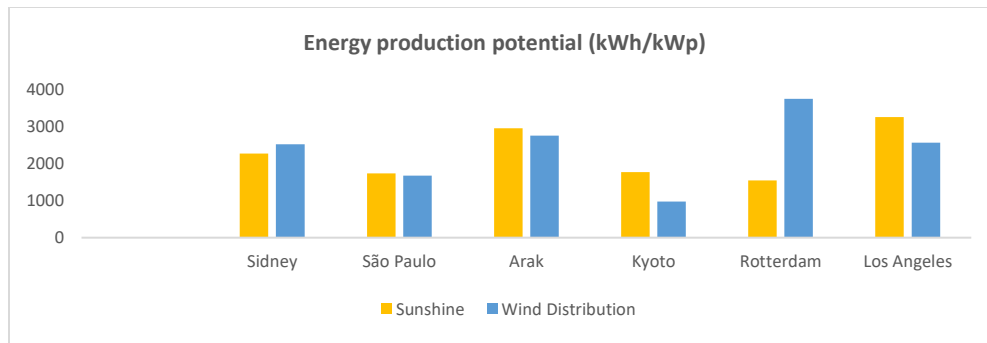


Figure 5: RE generation potential

Appendix 2.

Below is the exact definition of each of the social dimensions introduced in Hofstede's Culture Dimension theory [11].

Power Distance

Power Distance is defined as the extent to which the less powerful members of institutions and organisations accept that power is distributed unequally. People in societies exhibiting a large degree of Power Distance accept a hierarchical order in which everybody has a place, with no further justification. In societies with low Power Distance, people strive to equalise the distribution of power and demand justification for inequalities of power.

Individualism vs. Collectivism

Individualism stands for a society in which the ties between individuals are loose: a person is expected to look after himself or herself and his or her immediate family only. Collectivism stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which continue to protect them throughout their lifetime in exchange for unquestioning loyalty. The higher the score, the more individualist the country is.

Assertiveness vs. Caring

Assertiveness (or masculinity in the original publication) stands for a society in which social gender roles are distinct: men are supposed to be assertive, tough, and focused on material success; women are supposed to be more caring, tender, and concerned with the quality of life. The Assertiveness side (higher score) of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Its opposite, Caring, stands for a preference for cooperation, modesty, caring for the weak, and quality of life.

Uncertainty avoidance

The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles.

Long-term orientation

Every society has to maintain some links with its past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently. Long Term Orientation stands for a society that fosters virtues oriented towards future rewards, in particular adaptation and perseverance. Short-term orientation stands for a society that fosters virtues related to the past and present, in particular, respect for tradition and fulfilling social obligations.

Indulgence vs. restraint

Indulgence stands for a society that allows relatively free gratification of some desires and feelings, especially those that have to do with leisure and consumption. Its opposite Restraint stands for a society which controls such gratification, and where people feel less able to enjoy their lives.

REFERENCES

- [1] R. Inglehart, C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E.P.& B. Puranen, World Values Survey: Round Six - Country-Pooled Datafile, Madrid, 2014.
- [2] IRENA, Renewable Power Generation Costs in 2018, 2019.
https://doi.org/10.1007/SpringerReference_7300.
- [3] Australian Energy Regulator, Australian Energy Price, Energy Regul. (2019).
- [4] Aneel, Tarifas eléctricas, (2019).
- [5] US Energy Information Agency, Electricity Data, (2019).
- [6] European Union, European energy statistics, (2019).
- [7] World Bank, Economy Profile of Iran, Islamic Rep. Doing Business 2020 Indicators, 2019.
- [8] UK BEIS, Industrial electricity prices in the IEA, London, 2019.
- [9] Windfinder, Windfinder.com, (2019).
- [10] United Nations, UNdata, (2019).
- [11] G. Hofstede, L422Rd, Online Readings Psychol. Cult. 2 (2011) 1–26.
<https://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1014&context=orpc>.