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Wind Power in China and in the EU: Comparative Analysis of Key Political Drivers

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Abstract

Although China and the EU differ vastly in their preconditions for environmental governance and investment, both have expanded their capacity for wind-power generation greatly over the past decade. The EU member-states have generally been regarded as modern and prosperous, with high and stable energy consumption and large, high-tech wind industries. China, in contrast, is an emerging economy under authoritarian rule, with rapidly-increasing energy consumption and comparatively little domestic R&D in wind turbine technology. What can explain the fast development of wind-power production capacity in the EU and in China, despite the very different political systems and basic preconditions? Applying the method of ‘most-different systems design’, this paper shows how, in both regions, large-scale investment in wind power has come about through a specific set of political motivations. These include strong governmental support policies based on similar main aims, like security of energy supply, creating future-oriented industries and employment, and reducing greenhouse gas emissions and local pollution. Combined these three factors together, broadly perceived might also explain political motivations driving rapid investment in new renewable energy sources elsewhere.

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1. Introduction

Transforming the world’s energy systems to sustainable standards will require investment in renewable energy production. Today wind energy has the potential to supply more than 20% of global electricity demand [1], and has been seen as the most mature of the new renewable technologies. Thus, investment in wind power production might

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also be viewed as a typical case to understand what drives investment in renewable energy in the world in general, provided that there is significant power potential for a renewable energy source and that the technology has reached a certain level of maturity. Wind energy production costs are reaching grid parity in an increasing number of markets, among them Argentina, Brazil, Italy, Portugal and the UK [1, 2]. Yet, only a handful of countries have invested heavily in wind power. The People’s Republic of China (hereafter China) and the European Union (EU) have enormous potentials for increasing their energy production of wind power, given their long windy coastal expanses, large mountainous areas and plains with high winds [3, 4]. Both have also made considerable investments in renewable energy more generally – and wind energy, bio energy and solar energy in particular – in the past decade [5]. Few studies have conducted causal comparative analysis of what has spurred the large-scale development of wind energy production in the EU and in China. Thus, we ask: What factors might explain why the EU and China, despite enormous differences, have had similar large-scale expansion of wind power in the past decade?

These factors will probably be the same/similar as the factors driving new renewable investments in general, as politicians generally seek to satisfy broader targets for society when they create and implement energy policies. As electricity from wind energy has been more expensive to produce than energy from for example coal, economic stimulation has been a prerequisite for wind energy deployment and innovation. Therefore, we focus on the political motivations behind the creation of support mechanisms, binding targets and other important legislative measures regarding wind power in the renewables policies of the EU (perceived as the EU + EU28) and China. Building more wind-power installations does not necessarily translate into stimulating wind turbine technology innovation, but the two are interconnected: a domestic market for wind power can nourish a domestic industry with considerable potential for learning and ultimately innovation. Such innovation drives technology prices further down, incentivizing large-scale deployment and ultimately helping to facilitate energy-system transformation.

Nomenclature

FiT	Feed-in tariff
GHG	Greenhouse gas
GW	Gigawatt
LNG	Liquefied natural gas
MW	Megawatt
TWh	Terawatt hour

2. Method and data

This paper draws on historical comparative analysis and the most-different systems design. This design singles out for comparison cases with similar outcomes on the dependent variable, but different values on all independent variables relevant to the outcome, except for one or very few. Similar values on that single (or small set of) independent variable(s) then should be able to explain, or at least shed light on, the similarities in outcome. This method is useful for minimizing the number of possible causes, since independent variables where the cases score differently can be eliminated as single causal factors (although they may still be involved in multivariate causation) [6]. In a comparative design involving China and the EU, for example, the presence of a democracy, or a high level of economic development, can be excluded as necessary causal factors, as these do not apply to the case of China. The scope for generalization in the present study is global: the causal relationship under scrutiny is deemed valid across different regime types, levels of development, etc. If we can isolate an operative cause of wind-power expansion in both the EU (e.g. EU policies + the EU28s policies) and China, that cause might thus be expected to apply to other political systems elsewhere at the country and international regional levels. The time scope spans from around 1980 until 2014; it is in this period that modern wind turbine industries were established in European countries and in China and, wind turbine technology reaching technological maturity, started producing energy in

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