

## Using Germany as a Model for a Comprehensive Energy Transition

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### Introduction:

The Energiewende, or energy transition, is the transition of Germany's power system to renewable energies. The transition sets ambitious goals for the percent of market share that will be comprised of renewables. Germany hopes to reach 35% by 2020, 65% by 2040, and 80% by 2050. Germany is in an excellent position to be a model for other countries also trying to implement a comprehensive energy transition. Germany has become the testing ground for many new policy measures and technological developments. This makes it the ideal country to learn from as the need for renewable energies is growing worldwide. One of the key pieces of information to learn from Germany is how to pay for an energy transition. This paper focuses on the design and effectiveness of the German support scheme, the incentive program to stimulate the growth of renewable energy, and how the support scheme can cause change for the future.

### Methods:

I conducted a literature review of the German Feed-in Tariff. I analyzed Germany's strategy and its policy framework for the Energiewende. I compared and analyzed several other countries including Spain and Denmark. I used these comparisons to determine the funding strategies that each country used to achieve its energy transition. From this, I drew conclusions about the best strategies for moving forward with a comprehensive energy transition.

### The German System:

Germany has implemented a feed-in tariff to fund the costs of the energy transition. A feed-in tariff is a policy that stimulates the growth of investment in renewable energy projects. There are three main sections of the German feed-in tariff:

- ◆ A fixed tariff rate
  - ◇ Determines a certain price at which the electricity will be sold
- ◆ A purchase obligation
  - ◇ Mandates that all renewable energy generated will be sold
- ◆ A long payment duration
  - ◇ Defines the period that the tariff will be available to energy producers

The three sections combine to offer increased investment security to renewable energy project investors. The feed-in tariff has been successful in Germany and is the preferred system in other countries as well (Table 1).

### Lessons from the German Experience:

Germany has become the unofficial testing ground for renewable energy transitions. Many lessons can be taken from the German experience. Most importantly, the government needs to implement a support scheme to help pay for the costs of the transition. The support scheme needs to be easily adaptable to prevent high consumer electricity prices and to provide maintenance and upgrades to the grid and other infrastructure. Germany has also shown that mandatory programs are more successful than voluntary agreements as in the cases of Spain and Denmark.

	Feed-in systems	Quota systems
Austria	▲	
Belgium <sup>a</sup>		▲
Bulgaria	▲	
Cyprus	▲	
Czech Rep.	▲	
Denmark	▲	
Estonia	▲	
Finland	▲	
France	▲	
Germany	▲	
Greece	▲	
Hungary	▲	
Ireland <sup>b</sup>		▲
Italy		▲
Latvia	▲	
Lithuania	▲	
Luxemburg	▲	
Malta	▲	
Netherlands	▲	
Poland		▲
Portugal	▲	
Romania		▲
Slovenia	▲	
Slovakia	▲	
Spain	▲	
Sweden		▲
United Kingdom		▲

<sup>a</sup> Belgium cannot be counted as a 100% TGC country since the Flanders region uses a FIT mechanism for PV promotion.  
<sup>b</sup> Ireland had for many years a tendering and quota mechanisms (AER programme) and changed to FIT in 2006.

Table 1. Overview of the different support mechanisms per country. (Fouquet, 4086).

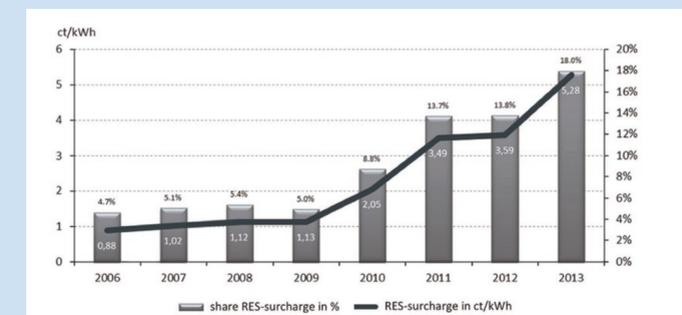


Fig. 1 Increase in renewable energy surcharge in Euro ct/kWh based on feed-in tariff and increasing percentage of share of renewable energy among the electricity mix in Germany (Nordensvard, 160).

### Conclusion:

There are many factors that contribute to a successful energy transition. Germany is currently on track to meet its renewable energy benchmark goal for 2020. There is so much to learn from Germany and its experience with transitioning to renewable energy sources. The economic policies in Germany are unprecedented and they sometimes react unexpectedly. This is causing problems for the German government as it goes forward with the Energiewende. So far, Germany has successfully financed its energy transition, but the world will be watching every decision made by Germany.



The feed-in tariff in Germany mainly benefits wind as the primary energy source for the transition. Development in both onshore and offshore wind farms is greatly increasing.

### Sources:

Fouquet, D., and T. B. Johansson. "European Renewable Energy Policy at Crossroads-Focus on Electricity Support Mechanisms." *Energy Policy* 36, no. 11 (Nov 2008): 4079-92.  
 Nordensvard, J., and F. Urban. "The Stuttering Energy Transition in Germany: Wind Energy Policy and Feed-in Tariff Lock-In." *Energy Policy* 82 (Jul 2015): 156-65.