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Expanding Entrepreneurship as the Energy Transition Advances

Insights from green start-ups in Britain, France and Germany

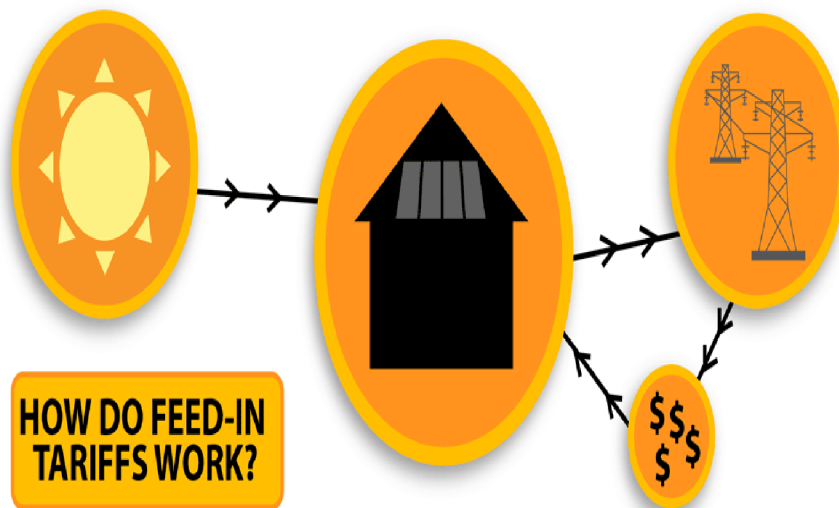
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Restructuring of power generation system

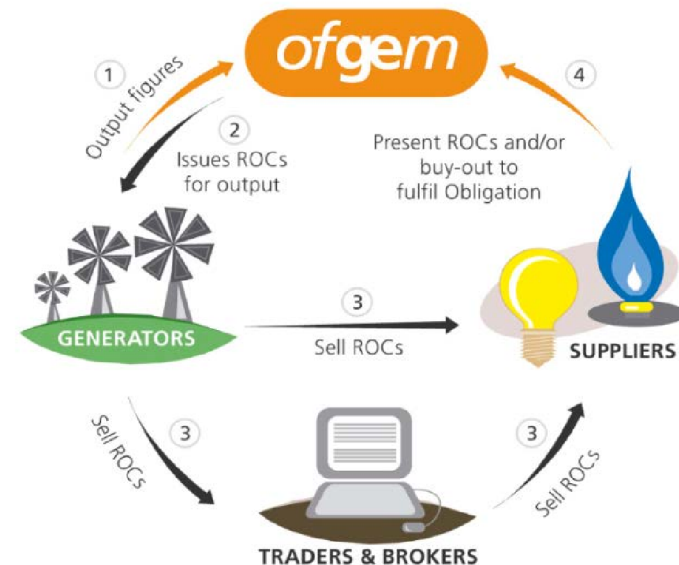
- Decline in centralised, fossil fuel-based generation
- Growth in decentralised generation from renewables
- SMEs & prosumers engaged in energy market; previously impossible
- Much more pronounced shift in Germany compared to France and the UK

Protected space for green start-ups (Jacobsson & Bergek 2004)

Support Mechanisms



Feed-in tariffs (UK, France and Germany)



Quantity-based systems for green energy

Emergence of new actors



***Reduction in entry barriers:
certainty & confidence***

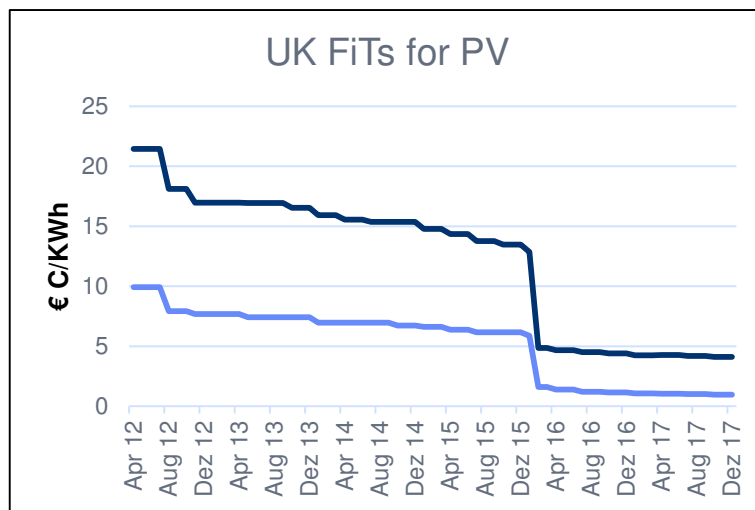


***Alleviation of environmental
market failure (Ball & Kittler,
2017)***

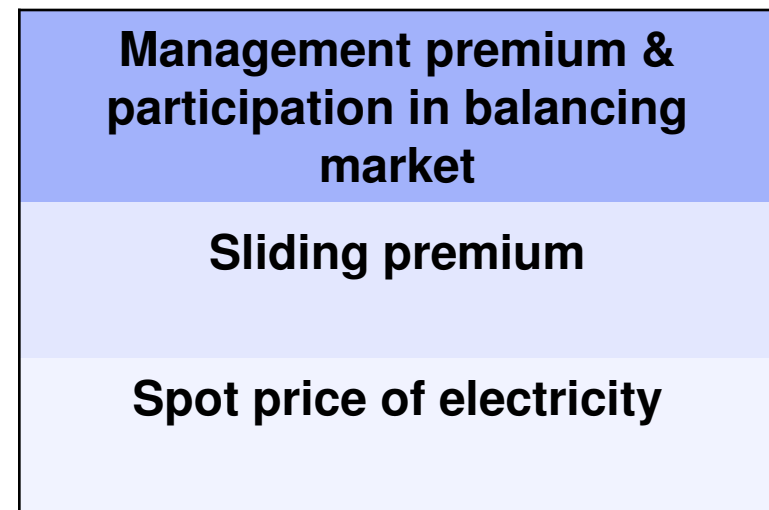
Institute of Energy and Climate
Research IEK-STE: Systems Analysis
and Technology Evaluation

Shift in the support mechanisms

Technology costs had fallen & there was a need to better coordinate supply with demand



Sharp reduction in feed-in tariffs



Move to less certain, market-orientated support

Goals of this paper

- What does shift in support framework mean for entrepreneurial actors in the renewable energy sector?
- What is the reaction of entrepreneurial actors to this shift?
- What is the role of entrepreneurship in the continuing Energy Transition? What future business models are likely?

Is the feed-in tariff still necessary?

The technology, the efficiency is improving all the time...if you've got an industry that's almost hooked on subsidies...you've really got to get to this sort of grid parity as soon as possible..."
(B3)

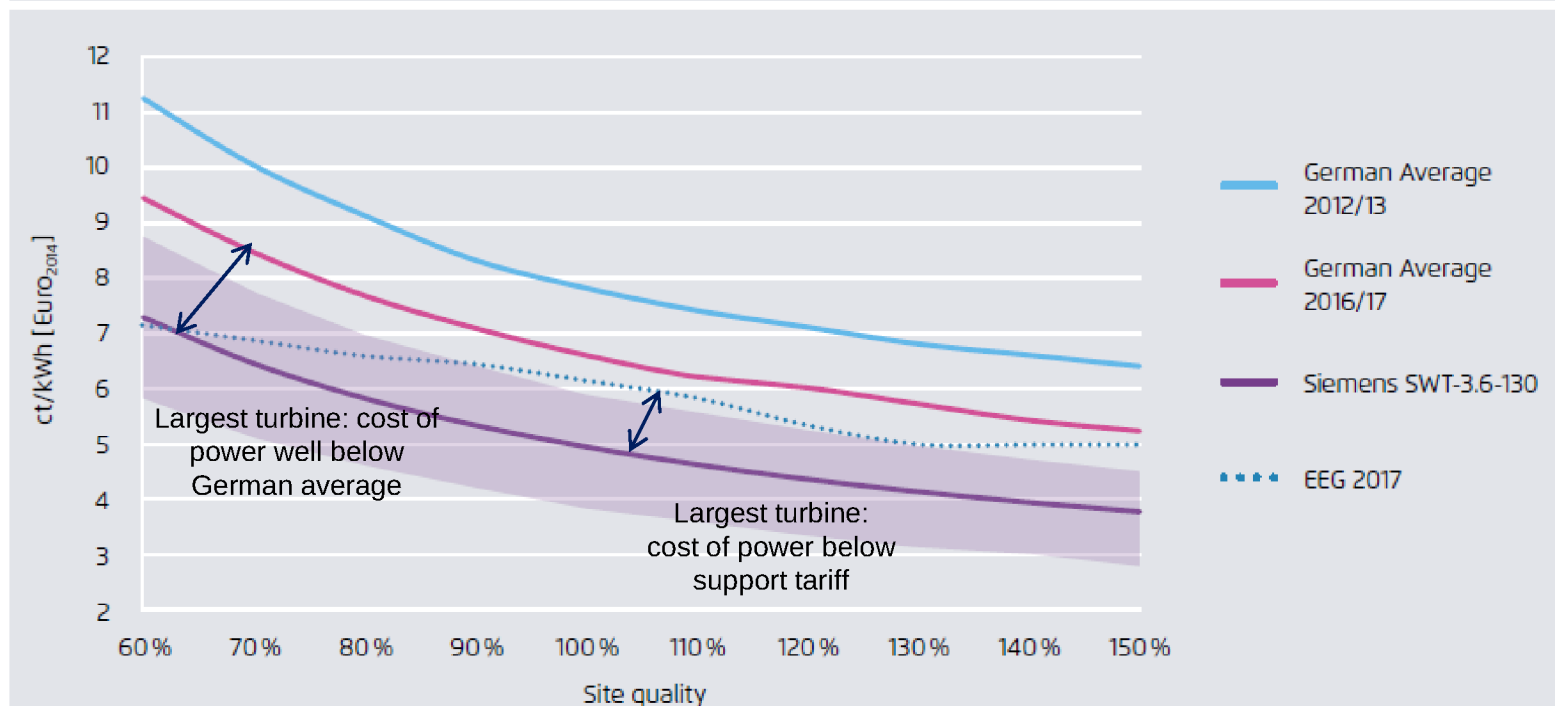
"...they're busily trying to renegotiate some of that (feed-in tariff) without appearing to disincentivise people" (B1)

"The reforms are not slowing down the branch, they are killing it. Of the four biggest operators in Germany, two are already bankrupt" (G6)

Costs of renewables have plummeted

Electricity generation costs for projects in Germany in 2012/13 and 2016/17 and for the Siemens SWT 3.6-130, as well as the EEG 2017 pay rates

Figure 4

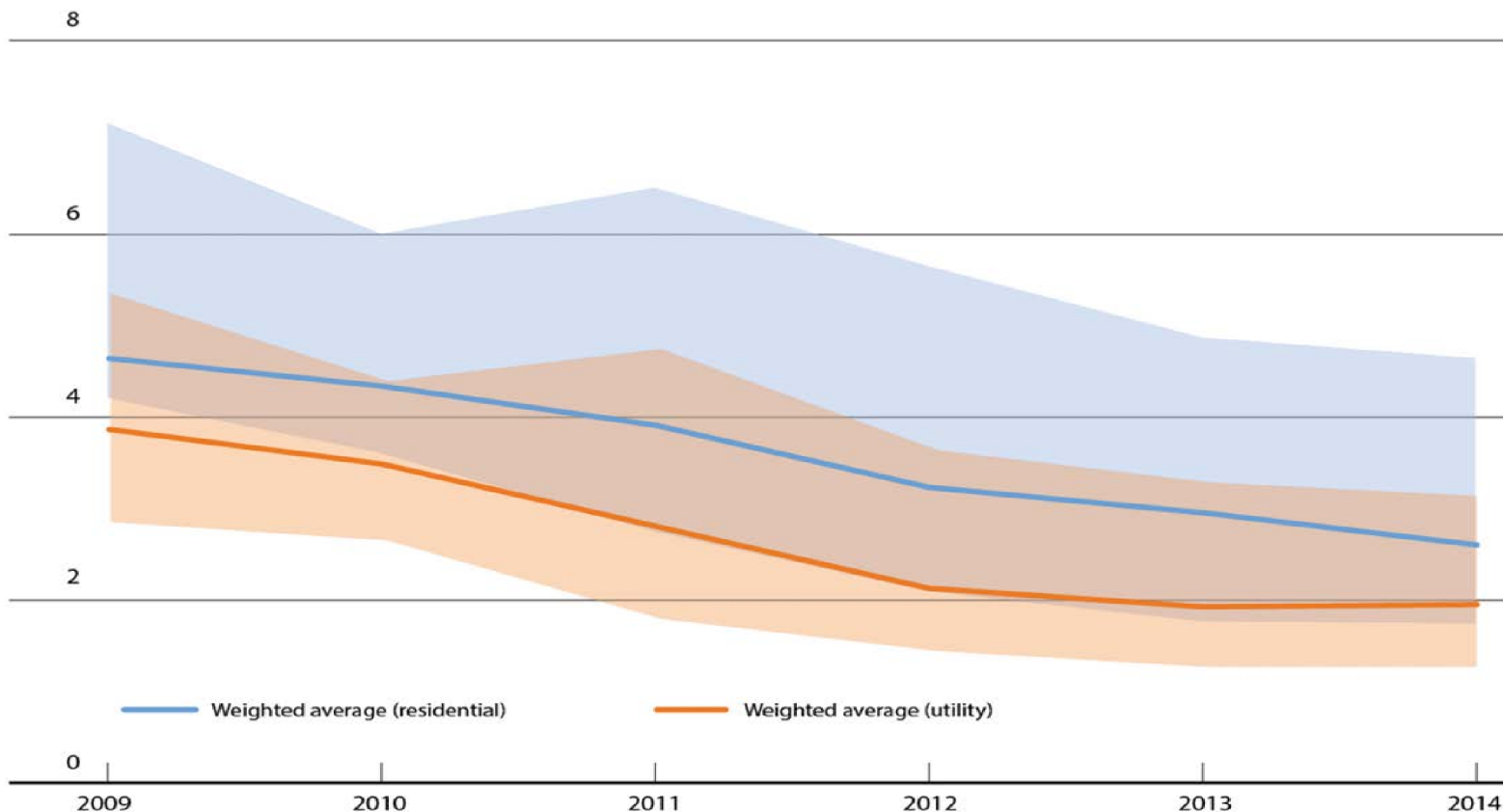


From Agora Energiewende (2017, P.13)

RENEWABLE POWER GENERATION COSTS IN 2014

FIGURE 5.9: ESTIMATED GLOBAL AVERAGE INSTALLED COSTS FOR UTILITY-SCALE AND RESIDENTIAL SOLAR PV SYSTEMS AND THE RANGE OF COUNTRY AVERAGES, 2009 TO 2014

2014 USD/W



Source: IRENA Renewable Cost Database and Photon Consulting, 2014.

Different perspective of „Greening Goliaths“ (Hockerts & Wüstenhagen, 2010)

Different needs from energy policy than entrepreneurs



*Carbon price rather than subsidies
(CEO of major utility)*



*Small-scale solar pointless when large
plants are possible (view of CEO of
major utility engaged in renewables)*

For entrepreneurs, support mechanisms remain relevant

- Carbon prices too abstract an instrument for entrepreneurs (Ball and Kittler, 2017)
- Entrepreneurs emphasised stability provided by support mechanisms (Ball and Kittler, 2017)
- Venture capitalists have been shown to prefer feed-in tariffs (Hofman and Huisman, 2012)

What might come after for entrepreneurs?

Savings-based model of renewable generation

„This second business model based on self-sufficiency is here, because the government cannot afford to finance the development of renewables“ (F5)

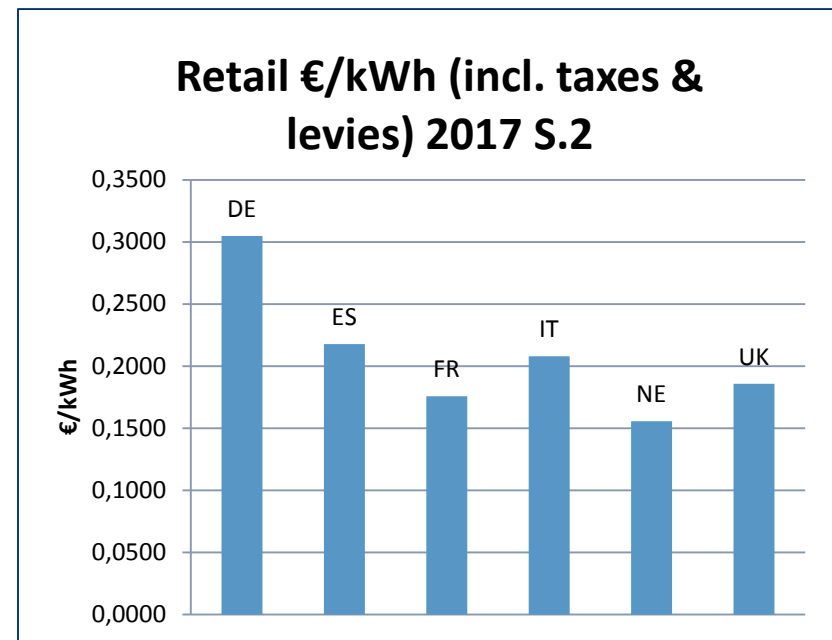
„In PV, it is increasingly the case that those who install a PV appliance use this to supply themselves...that is the biggest economic lever...less so the feed in-tariff“ (G1)

Feeding power into the grid may become less important a business model for entrepreneurs

Models based on self-sufficiency may become crucial to the continuation of entrepreneurial opportunities

Limitations of self-sufficiency business model: interaction with market price

„Energy in Germany is sold to the customer at a far higher price than in France and people are used to the self-consumption scenario“ (F3)



From eurostat (2018)

Limitations of self-sufficiency business model

Certain respondents expressed concerns about the impact of nuclear and shale gas on the competitiveness of renewables



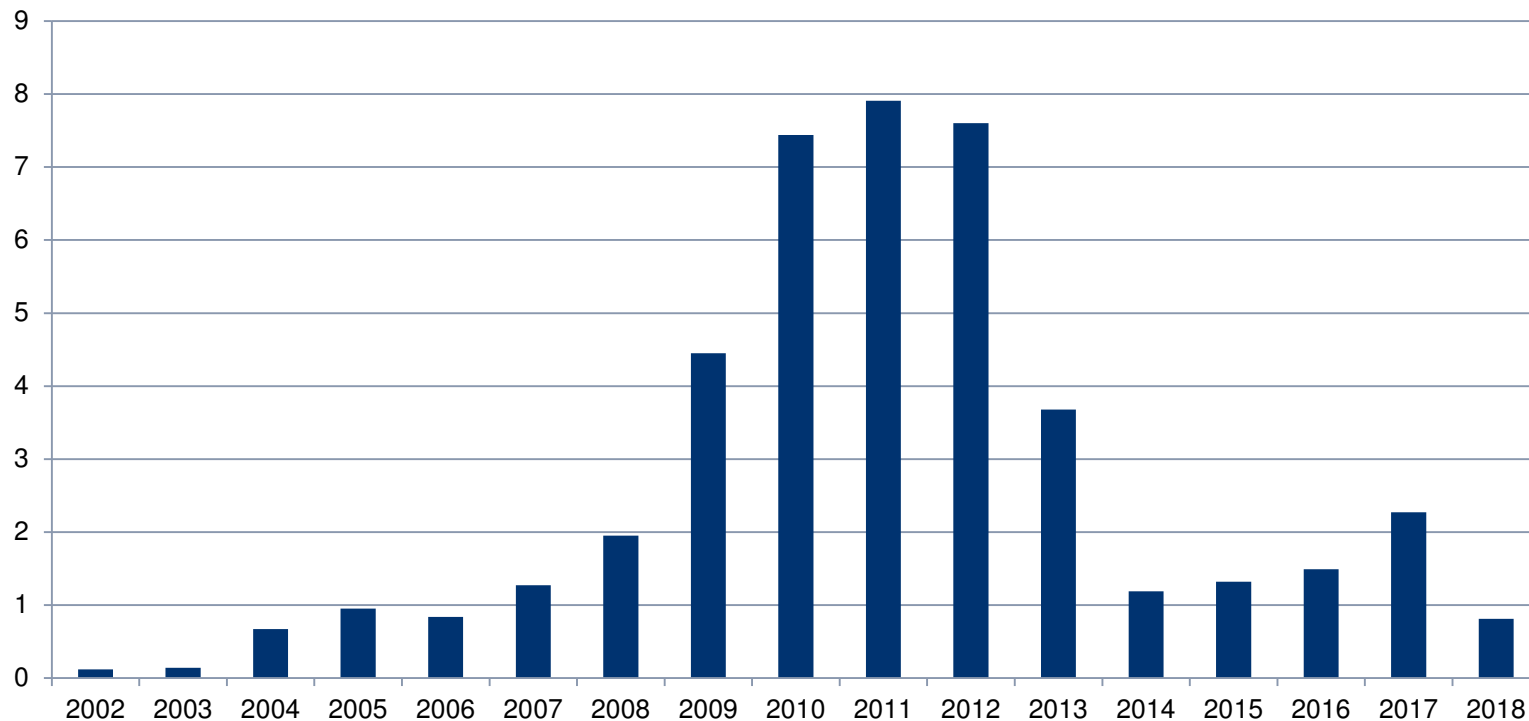
Large French nuclear fleet & new build nuclear in the UK



UK government approval of shale gas: „energy security, growth & jobs“ (DBEIS, 2017)

Drop in new German PV installations from 2013

Increase in German solar PV capacity (GW) (from: Fraunhofer ISE (2018))



Energy storage

Energy storage could form cornerstone of self-sufficiency model (Karneyava and Wüstenhagen, 2017)

- UK Capacity Market
- Auctions for fixed power generation capacity
- Storage: 6% of awarded capacity
- €30m loans for decentralised energy storage (Germany)
- Funds allocated to storage R&D across 3 countries

Support for capacity provision

Support for R&D and deployment

Conclusions

Public support for green technologies has created opportunities for entrepreneurship, but what happens when public support is reformed?

Costs have come down,
but removing support
may be too simplistic

- Economies of scale
- More diversified
- Greater resources

*There are indications that
entrepreneurial actors still need support
in some form*

Advantages of incumbent firms

Conclusions

Do we want to preserve entrepreneurship in the power sector?
What does entrepreneurship bring?

Relying on the growth of
self-sufficiency models
may be inadequate to
sustain entrepreneurs

- Different innovatory advantages of SMEs
- Part of innovation ecosystem?
- Local economic development?

Conclusions

Developing the empirical part of the paper

Results of auctions for PV and wind generation: who is successful in winning bids under more market-orientated support scheme?

- Distribution by size of project
- Distribution by type of organisation
- What patterns emerge?

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