

# briefing

## New business models help the take-up of sustainable technologies

How can innovative sustainable technologies be spread to make an impact on global warming and resource scarcity? PhD student in the Centre for Technology Management, **Harold Overholm**, has been researching how business model innovation could contribute to the take-up of sustainable technologies.

Property owners who would otherwise consider installing solar panels have been put off by the up-front costs and the steep learning curve involved. So a new type of firm has emerged that provides a 'solar service' to residential customers - the firm builds, owns and maintains the solar panels and sells the electricity back to the property owner.

There are solar service firms in the UK, the Netherlands and Singapore but the business model has been most successful in the United States.

### How does it work?

The solar service firm takes away the barriers to entry for the property owner by:

- removing customers' upfront investment cost
- shouldering the initial effort of selecting, installing and securing permits for the technology
- taking full responsibility for the long-term operation and maintenance of the solar panel

In return, the customer gets green electricity, typically at a rate cheaper than grid electricity, with long-term guaranteed price stability. The main potential drawback for the customer is that, due to financing costs, the project may become more expensive over its lifetime than if they paid for it up-front.



### A new business model

All the early solar service firms in the US were new ventures. Two entrepreneurial firms, SunEdison and Renewable Ventures, pioneered the business model around 2005, and laid the foundation for a market that grew rapidly. These firms acted purely as intermediaries - they did not own or manufacture the solar technologies they were using.

New incentives for solar power installations, in particular the 2007 California Solar Initiative, helped motivate early entrants. After that, growing familiarity with the business model among the firms' networks (finance providers, insurers, installers and end-customers) became an important driving force in itself, increasing the speed with which solar service firms could sell, finance and build solar installation portfolios. The same model has emerged to support the take-up of other sustainable technologies in North America and Europe, such as: ground-source heat pumps, methane combustions from landfills, solar heating, water treatment, greenhouses for local food production and electric vehicles (car sharing).

### Risks and rewards

So, what are the problems with this new model? It seems that the sheer entrepreneurial effort needed to build intermediary companies is a major constraint. As the ventures provide a full solution to the end-customer, they have to arrange financing, insurance and permits, contract installers, oversee procurement and design, and negotiate interconnection with utilities to sell surplus solar electricity to the grid. Only at the point that this is all in place will they start to see any cash flow in the form of an initial fee from financial project partners and running fees for customer service.

However, the reward for taking on the task can be a fast-growing company. SolarCity became the largest US installer of residential solar installations in 2011. SunEdison, one of the early pioneers, built solar projects between 2005 and 2012 with a combined generating capacity of almost a gigawatt, using a total \$3bn in project financing.

What is distinctive about this type of new venture? For one thing, the firms all lacked significant intellectual

property or other proprietary assets. They also differed from the vast majority of new ventures in other industries in the number of partnerships they needed to establish and the time-critical way in which those relationships had to be created and sequenced.

## 'Bankability'

The firms had the most difficulty finding financial partners. They had to quickly acquire the skills to finance a portfolio of installations through banks. Known as 'bankability', the new ventures had to meet the exacting demands of these financial partners. All potential customers had to be credit-checked and only tried and tested equipment from large and reliable manufacturers could be installed.

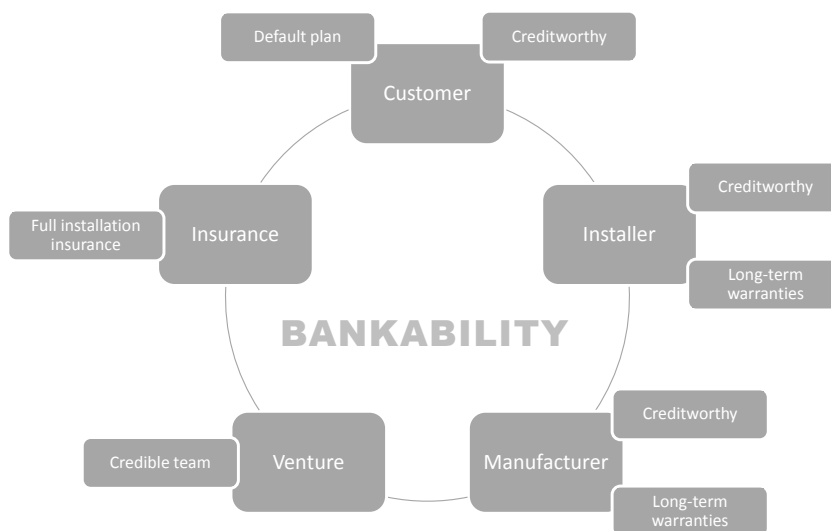
The study also highlights a danger of service entrepreneurship – the difficulty in protecting the venture from competition. In order to recruit and educate partners, the new ventures had to share their knowledge of the process, thereby giving the partners a clear roadmap for setting up their own partnerships and offering the same service.

The research suggests that ventures of this kind are likely to encounter similar conditions irrespective of their industry or nationality. However, for entrepreneurs in developing markets, issues of trust and infrastructure - such as the ability to obtain credit ratings for end customers - may need to be clarified before the business model can be successfully established.

## How can policymakers help?

Facilitating the emergence of intermediary service ventures in sustainable technology industries can help policymakers with a green agenda achieve their goals. US researchers have concluded that support for solar service firms 'represent strong opportunities for stimulating PV [Photovoltaic] demand in concert with traditional incentives that reduce system costs or increase revenues. These opportunities frequently represent low-cost or cost-neutral policies that have the potential to dramatically increase PV demand by enticing new customers to adopt PV that are associated with a significantly larger population demographic'<sup>1</sup>.

<sup>1</sup>Drury, E. et al., 2012. The transformation of southern California's residential photovoltaics market through third party ownership. Energy Policy, 42



Key aspects of 'bankability' – the ability to secure bank financing for a solar installation

## Recommendations for policymakers

1) The commercial front of the solar market has lagged behind the technology front, due to the bankability phenomenon. Intermediary service ventures are forced to use robust and time-tested technologies rather than the most innovative ones. Policymakers need to understand the whole issue of bankability when planning R&D and making policy to help commercialise new energy technologies.

2) An intermediary service industry works differently from a product market, and the ultimate policy aim should be to attract entrepreneurs into developing firms, rather than to push customers to make decisions. To nudge entrepreneurs into creating ventures, stable and well-defined rather than initially lavish but unpredictable policy instruments are needed.

3) Standardised and transparent regulation of technology installation and maintenance procedures can be a greater help to entrepreneurs than incentives. The devil was in the details for the solar service ventures: to build installations they needed to successfully interact with utilities, fire authorities and zoning departments, to name but a few regulatory bodies.

## How can technology firms benefit from solar services?

This research shows how intermediary service firms rather than end-customers can shape demand for technology products. So what do

technology managers need to know to profit from such markets?

Firstly, bankability is pivotal to intermediary markets. To sell a technology, the intermediary needs validated long-term performance and strong warranties from a creditworthy manufacturer. This limits the prospects for novel technologies, or for small manufacturers without credit ratings.

Secondly, intermediary service ventures are often lead users and contribute significantly to product innovation – they are typically the most sophisticated customers of the technology they are using.

Manufacturers may also want to use the findings on how new ventures use the business model to evaluate whether they could create such businesses themselves. Over the last three years, several manufacturers have entered the solar service market.

You can read the whole report at: [www.ifm.eng.cam.ac.uk/uploads/Research/CTM/20130131\\_Overholm\\_Guide\\_for\\_practitioners.pdf](http://www.ifm.eng.cam.ac.uk/uploads/Research/CTM/20130131_Overholm_Guide_for_practitioners.pdf)

For more information contact Harald Overholm: [ho254@cam.ac.uk](mailto:ho254@cam.ac.uk)

## Institute for Manufacturing

Part of the University of Cambridge's Department of Engineering, the IfM brings together expertise in management, technology and policy to develop new approaches to modern industrial practice.