

Innovative financing of renewable energy



Knowledge need

Financing technologies and measures for climate change mitigation constitute one of the main issues in the transition to a decarbonised economy. There is a debate about innovative financing mechanisms that can substitute conventional ones that are based on government support. Minimising the need for such support, through adopting more market-based mechanisms, could be beneficial for countries whose public finances are under pressure.

Therefore, stakeholders need information with regard to new ways of mobilising financial flows, specifically from private sources. In the European Union, innovative

financing mechanisms are needed in order to achieve large-scale deployment of renewable energy, to reach the targets for 2020 and 2030, and to work towards a decarbonised economy by 2050.

Policy framework

The overall policy for renewable energy in the EU is established by Directive 2009/28/EC, the Renewable Energy Directive (RED). The RED specifies national renewable energy targets for each Member State for 2020, ranging from 10% in Malta to 49% in Sweden. Most Member States use feed-in tariff or premium schemes to reach these targets.

In 2014 the European Commission adopted new Environmental and Energy State Aid Guidelines, which aim to better integrate renewables into the internal energy market. As a result, feed-in tariffs are progressively replaced by competitive bidding processes. A gradual move to market-based mechanisms will thus take place. This means that more attention needs to be placed on introducing innovative financing models.

At a glance

Thematic area Renewable energy; Financing

Key words Innovative financing; third-party ownership; solar loans; community ownership; crowdfunding; microfinance

Author(s) Mak Đukan, University of Graz and Erwin Hofman, JIN Climate and Sustainability

Summary

With government support for renewable energy being phased out, more attention is placed on innovative financing models. This Briefing Note considers such mechanisms, including local investment funds, free market options as popular in the US (third-party ownership and loans), community ownership, crowdfunding and microfinance.

Innovative financing mechanisms

There is a wide range of innovative financing options conceivable for renewable energy development. Options discussed in this Briefing Note include local investment funds, free market options that are common in the United States, community ownership, crowdfunding and micro-financing.

Local investment funds

Local authorities have stepped in to reduce CO₂ emissions on their territories, and several innovative financing solutions are available, including local carbon and investment funds. For example, the municipality of Almada (Portugal) created the Almada Less Carbon Fund, which provides € 10 per tonne of CO₂ reduction. Another example is the Amsterdam Investment Fund in the Netherlands, where the local government provides soft loans to projects for sustainability, as well as seed funding to support start-up companies in the field of sustainable energy.

Third-party ownership

In a third-party ownership mechanism, an individual or organisation permits another organisation (the 'third party') to install and own a renewable energy facility on its property. Third-party ownership is often applied to rooftop solar PV, and comes in two basic forms: solar lease, and power purchase agreements (PPA). Both of these forms offer homeowners a way to benefit from solar PV, without high upfront costs and the burdens of the installing, operating, maintaining and financing the system. Therefore this allows for a much more rapid adoption of a technology.

In a solar lease arrangement, homeowners typically sign long-term (typically 15- or 20-year) lease contracts and pay a fixed monthly fee for the solar energy system and generated electricity. If excess electricity is generated, this is provided to the grid and the homeowner receives credit for this.

In a PPA, homeowners do not pay a fixed monthly tariff. Instead, all of the electricity generated is provided to the homeowner at a fixed tariff per consumed kWh of energy. This tariff is usually at or slightly below the utility electricity rate.

Third-party ownership solar finance approaches have been pioneered in the United States, but have since also been introduced in, among others, Australia, the Netherlands, India, and a range of African countries.

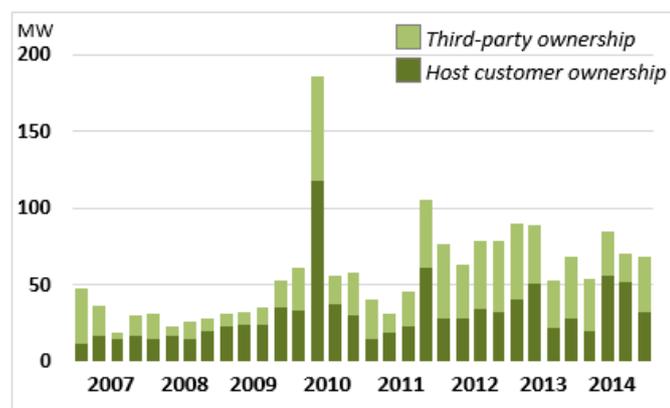


Figure 1. Quarterly solar energy capacity installed in California, by system ownership (source: Go Solar California).

Most literature on the abovementioned third-party ownership mechanisms focuses on the US, especially California. However, also in developing countries such models have been developed, often called pay-as-you-go (PAYG). Several companies have pioneered this approach in Africa, where solar systems are installed on the roofs of poor households, which purchase the generated electricity in affordable increments through a pre-paid system. After a certain period of regular payments, customers acquire full ownership of the solar system and have access to free solar energy.

Also in Europe, especially in regions with high solar radiation, third-party ownership of solar systems can be worthwhile. Europe can learn from the US, and especially California where more than half of solar energy systems are owned by third parties, as shown in Figure 1. According to the Climate Policy Initiative, a customer-owned system often forms a complex home investment, while third-party ownership provides the customer with solar energy as a money-saving service.

Solar loans

As third-party ownership does not allow customers of solar energy to take advantage of the benefits of the ownership of the renewable energy facility, loans could be another financing option. Recently, loan programmes have been rolled out in the US, targeting specifically distributed solar. Solar loans allow customers to spread the upfront costs of the system over time, while retaining ownership, and thus benefiting from potential government incentives for renewable energy development. However, with the ownership of the system come also the associated liabilities, e.g. for repairs and maintenance. Solar loans come in the form of secured home equity loans ('second mortgage'), with the customer's home as collateral, and as unsecured loans without collateral and higher interest rates. Just as with third-party ownership, the monthly payments for the loan are usually lower than the utility electricity bill.

Community ownership

Communities have emerged in several EU countries, most notably Germany and Denmark, as the drivers of renewable energy development, often through forming energy cooperatives. A cooperative business model allows individuals to invest within their community or near vicinity, through buying a small stake in a renewable energy project. Since these individual investments tend to be smaller, individuals perceive them as less risky. In Germany almost half of renewable energy capacity is owned by individuals, farmers and communities.

In comparison to large-scale projects from developers, benefits associated with community renewable energy projects, include for example economic benefits such as community income and local jobs, but also social benefits (community-owned projects are often faced with less local opposition, as also discussed in [POLIMP's 1st Briefing Note on public acceptance](#)). In Denmark, specific policies are in place to ensure at least community co-ownership of wind farms. Developers are required to offer 20% of shared in a project to residents living within 4.5 km from the site.

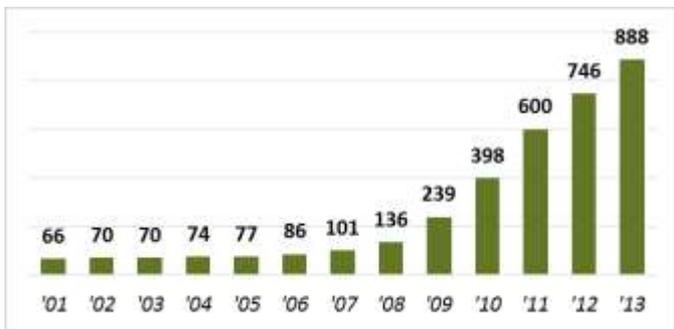


Figure 2. Number of registered energy cooperatives in Germany 2001-2013 (source: Agentur für Erneuerbare Energien).

As the upfront costs of larger projects, such as wind turbines, may be too high for a community to cover, community (co-)ownership can be (co-)financed by the government through the provision of grants or loans. However, also crowdfunding may be used.

Crowdfunding

Crowdfunding can be used for (co-)financing a local community energy project, but also for large-scale renewable energy projects. Several internet platforms for renewable energy crowdfunding have emerged in Europe and beyond, such as Abundance Generation in the UK which has until now collected £ 9.6M from around 1,800 investors.

Crowdfunding gained traction in recent years, mainly in Europe, the US and Australia. As with community ownership, renewable energy development through crowdfunding increases public support for such projects. An example is a € 1.3M wind turbine in the Netherlands, which was financed by 6,900 citizens through crowdfunding in 2013 in just 13 hours and developed by Windcentrale. In this way, citizens can co-own renewable energy facility, without installing e.g. solar panels on their own roof.

Microfinance

Microfinance is especially relevant for the developing world includes a range of financial services, such as loans, credits, insurance, etc. These services can play an important role in enhancing economic opportunities for poor people, and by offering credit or loans to enable the poor to purchase low-carbon energy options. From the perspective of the client, the benefit of microfinance options is to gain energy access, but at the same time clean energy options can be implemented as alternative to kerosene, firewood and other conventional fuel options.

Policy implications

Some of the mechanisms introduced in this Briefing Note are already common in some of the EU's Member States, but would need more widespread promotion.

Community ownership of renewable energy projects, for example through cooperatives, is well-developed in amongst others Denmark and Germany. Regulatory requirements defining a minimum level of community co-ownership in new energy projects, such as used in Denmark, could be stipulated in other Member States as well, or at the European level.

In addition, the EU and EU Member States can utilise the lessons learned in the United States, where the market has the main role in renewable energy development, as opposed to the government. Especially for rooftop solar installations, financing mechanisms that have been pioneered in the US can be implemented in Europe as well. This includes third-party ownership of installations with lease or PPA arrangements, as well as specific solar loans.

While Europe can learn from financing mechanisms in the US, the EU and its Member States could enhance the uptake of renewable energy internationally by disseminating innovative mechanisms as used in Europe. Models of community (co-)ownership are still rare outside Europe, and policy transfer in this field could take place. Specifically in developing countries, such models might be combined with microfinance in order to encourage the development of small-scale distributed renewable energy development.

Read more

A wide range of publications is available on innovative financing mechanisms for renewable energy. Some include USAID's briefing note on [Pay-As-You-Go Technologies in Consumer Energy Finance](#), the US Clean Energy States Alliance's [Homeowner's Guide to Solar Financing](#), and the Australian Community Power Agency's [Guide for community-owned renewables](#).

Author information

Authors

Mak Đukan, *University of Graz*
Erwin Hofman, *JIN Climate and Sustainability*

Coordinator

Vlasios Oikonomou,
JIN Climate and Sustainability
(www.jiqweb.org)

Dissemination

Alexandros Flamos and
Charikleia Karakosta,
University of Piraeus Research Centre (UPRC)

The **POLIMP** project aims to address gaps in knowledge and to inform policy at various decision-making levels regarding the implications of international climate policies under discussion. www.polimp.eu

