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## **Report: small-scale solar power saves energy system billions in fuel, grid and CO<sub>2</sub> costs**

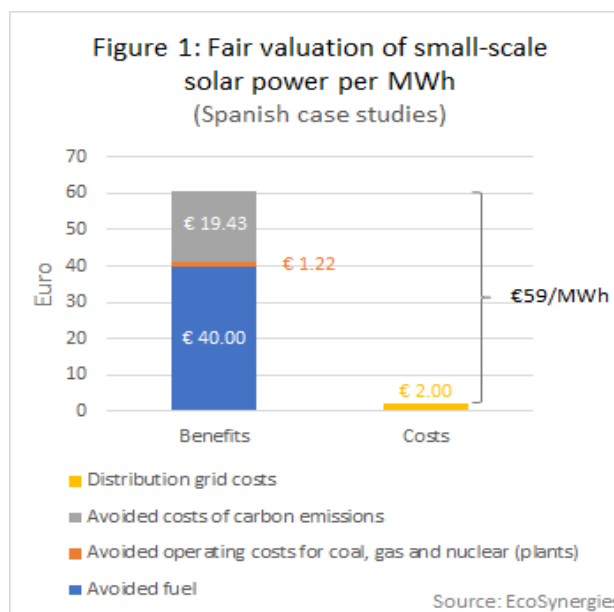
### **Payback period for household solar panels would be cut in half with fairer cost-benefit analysis**

Households with solar panels are saving the energy system billions in fuel and grid costs and benefiting society overall by helping cut greenhouse gases, a new report has found.

An accurate assessment of costs and benefits of small-scale, locally distributed solar power would also allow households and small businesses to recover investments in solar panels twice as fast as is currently possible, according to the report by energy consultancy ecoSynergies.

The new valuation of solar power that is the basis for this report – and is in line with brand [new EU renewable energy rules](#) – is based on the so-called ‘value of solar’ approach that is already used in the United States,<sup>i</sup> but has never before been applied in a European context.

The report focuses on two Spanish case studies because, while Spain has some of the best conditions for solar energy in Europe, it also has some of the most restrictive laws for people and small businesses producing their own electricity with solar panels. Energy consultants ecoSynergies expect that the results of the Spanish analysis would be replicated in other European countries.



The overall benefits of small-scale renewables, which mainly stem from savings on fossil fuel costs, CO<sub>2</sub> emission savings, avoided operating costs for fossil fuel and nuclear plants, and power grid distribution savings, are not currently recognised in remuneration schemes for distributed solar power. The report, commissioned by Greenpeace, puts the net benefits generated by a small household solar installation in Spain at €440 per year<sup>ii</sup> (based on €59/MWh), or €1.77 billion overall (based on a scenario with a 40% uptake of renewables by households and small businesses) (see figure 2).

New EU rules require governments to fairly remunerate electricity from renewable energy sources that is sold to the power grid. Under these rules, electricity sold to the grid must be remunerated at least at the market price and may also account for wider benefits, such as fossil fuel and CO<sub>2</sub> savings, as well as savings for the power grid.

However, small-scale solar energy producers in Spain and several other European Union countries are subjected to draconian registration requirements and dissuasive taxes and levies. In Spain, households with solar panels are either taxed for the electricity they consume themselves, or are obliged to give away any surplus electricity for free.

In recent years, a sharp decline in costs for solar panels has resulted in households and local communities increasingly [producing and consuming their own electricity](#). However, in many countries, like Spain and Romania, governments have taxed people for producing and consuming their own electricity, prevented them from selling surplus electricity to the grid or put in place unnecessary red tape.

This has made it unattractive for people and businesses to invest in solar power, hampering efforts to tackle climate change and meet renewable energy targets, as well as stifling the solar sector and its employment potential. Following punitive measures against renewables in Spain starting in 2011, including the introduction of the so-called 'sun tax' in 2015, employment in the sector dropped by 40% in three years.

The study finds that attempts by governments to curtail small-scale solar power are unwarranted, as the overall benefits of those producing solar energy at home or on small business properties far outway any costs.

### **A net benefit**

The main benefits of small-scale solar power are avoided fuel costs and avoided CO<sub>2</sub> emissions. Put simply, the solar power generated by a small-scale installation displaces the fossil fuels (and associated CO<sub>2</sub> emissions) in the system that would have been used to produce the same amount of energy.

The valuation also takes into account avoided costs related to the running of fossil fuel power plants and to the transferring of electricity over long distances, from power plants to consumers.

The study shows that, even assuming a strong uptake of solar power, additional investments needed to upgrade distribution networks would be negligible (€2/MWh) when compared to the benefits.

To calculate the value of small-scale solar power, the study compares two extreme hypothetical scenarios. The first scenario assumes no new solar panels are installed in Spain at all, while the second scenario assumes all new solar panels are built as small-scale installations by households and small businesses. The two scenarios are compared to determine an average value for the impact of small-scale solar power on the power system, and to determine the costs and benefits of small scale solar power.

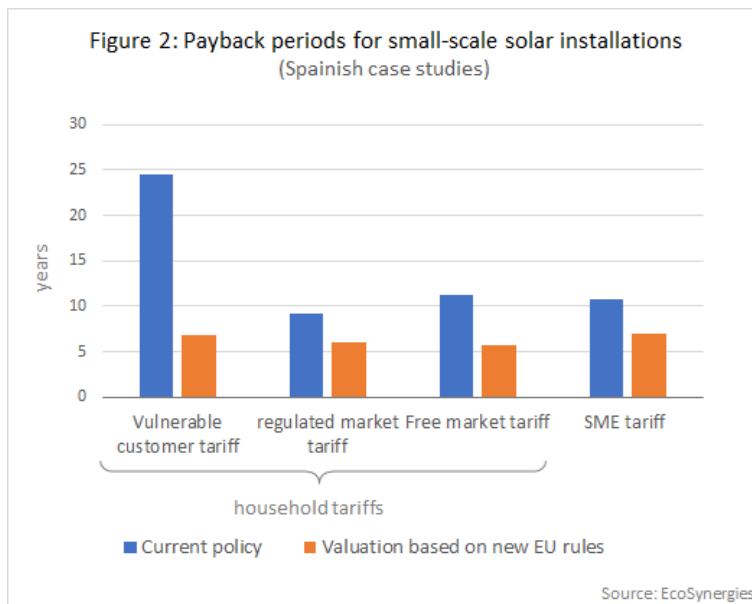
### **Shorter payback period**

At current prices, payback periods for investments in solar power are often unattractive. Most people buying solar panels in Spain can expect their investment to be recovered in about 9 to 11 years. But

new EU rules on small-scale renewable energy have opened the door to a more accurate valuation of solar power.

This valuation would translate to a price for solar electricity sold to the grid of up to €0.10/kWh<sup>iii</sup> (or €100/MWh). This would allow households to generate an annual profit of around €250 by selling electricity to the grid, on top of around €175 in savings on electricity bills. This would drastically reduce the payback period for anyone investing in small-scale solar power who currently only benefits from savings on their electricity bill (see figure 1).

Payback periods could be slashed to between 5.5 and 7 years for households, and between 6.5 to 7.5 years for small businesses, based on an average small-scale solar installation (2 kilowatt peak) costing roughly €2,600. Those suffering energy poverty are set to benefit most from this new valuation. Vulnerable customers (who are charged special tariffs) would see their payback period for an average solar installation fall from 25 years to 7 years.



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This change in approach could be a major driver for investments in small-scale, distributed solar energy, and renewable energy in general. The employment potential of the distributed renewable energy sector in Spain alone is at least [136,000 new jobs over the next ten years](#).

## New EU rules

The new EU rules on renewables ban disproportionate and discriminatory charges, make it illegal to force households and small business producing their own energy to give surplus electricity away to the grid for free, and prohibit disproportionate administrative burdens.

These rules effectively make Spain's sun tax illegal. The sun tax requires those producing energy to either give away their surplus electricity for free or pay high charges for the electricity they produce and consume themselves.

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<sup>i</sup> This approach is used in the states of Minnesota and Oregon, and the city of Austin in Texas, to set the price for the electricity sold to the grid. It has been applied in a number of studies related to energy systems in California, New York and Texas.

<sup>ii</sup> The amount of electricity that an average household can generate is €470 in Andalusia and €410 in Catalonia.

<sup>iii</sup> This price would more accurately reflect the market price for electricity of €40/MWh as well as the overall benefit of small-scale solar of €59/MWh.