PV waste financing – an acyclic phenomenon

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Working at the world's first take-back and WEEE compliance scheme for photovoltaic modules, PV CYCLE staff are often confronted with the question of why pay for something that has not yet occurred.

While about 9 million tonnes of photovoltaic – or PV – modules had been installed in Europe by the end of 2015, only an estimated 0.3% have become waste today. PV CYCLE – as the largest service provider in the market – has collected and treated the vast majority of these waste modules, coming from transport or installation damage as well as from severe weather conditions or warranty cases. More than 99% of today's sold modules continue perfectly to generate green solar energy as expected.

Yet, European authorities require that importers and manufacturers based in their countries foresee financial provisions for waste management based on the entire business volume that they sell into the market. Financing obligations can go from financial guarantees and trusts to clearing houses or waste fees at the time of sales. Some countries go as far as to combine trusts with reductions on feed-in-tariffs to ensure that the financing of collection, transport, treatment, recycling and disposal of end-of-life PV modules is truly guaranteed at any time.

A high-volume market, PV modules are sold and installed in millions to contribute to a fast transition from traditional electricity production to renewables. With a technical lifetime of 20 and more years, the time span of product use and waste generation differs significantly from most other products falling under the Waste Electrical and Electronic Equipment (WEEE) Directive however. Future waste management and long-term financing are hence crucial aspects of PV waste management today.

Information published by PV CYCLE in 2016 shows the financing regulations applied in the 28 EU states and to the detriment of PV companies and owners, all PV-relevant member States – from Germany, France and Italy to the Netherlands, Belgium and the UK – implemented different financial models to manage current and future waste streams in their countries.

Italy is the only one in the Union, to apply a hybrid product classification that entails quite diverging financial rules and operational procedures for waste holders and WEEE producers (manufacturer/importers).

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Producers finance all new, as well as historic household waste, through their membership with a compliance scheme. However the end-of-life costs, for modules before 2015, installed in projects bigger than 10 kW, must be borne by the waste holder directly. Moreover, all modules must be registered with a serial number and a guarantee.

Additional waste management financing is required for PV modules benefiting from public subsidies under Conto Energia I-V to ensure sustainable waste treatment in the future.

Belgium and France opted for an accreditation model, granting only selected collective or individual waste management schemes the right to collect and manage a mandatory environmental fee which is due on every newly sold PV module. All operational activities pertaining to end-of-life modules are executed by these schemes too.

At the other extreme of WEEE management mechanisms, Germany, the Netherlands and the UK apply an open-market principle with dozens of different waste treatment and compliance providers. To ensure sound financing across the solutions, Germany requires a financial guarantee on the entire annual turnover; the UK put in place a market share obligation, calculated by the Environment Agency and based on the annual UK WEEE collection target for PV modules.

A study done by the Department of Economics Management & Industrial Engineering at the Politecnico of Milan and the University of Technology in Delft identified four main financing principles today applied in Europe's WEEE legislations[1]:

- Compliance Cost (CC). Producers finance activities in the system, bearing costs for management of all WEEE, both historical and new waste by either joining a compliance scheme or financing their own take back system.
- Compliance Cost & Visible Fee (CC&VF). Producers finance activities in the system, bearing costs for management of new WEEE by either joining a compliance scheme or financing their own take back system. They also bear costs for management of historical WEEE but they use a visible fee on the invoice to get money back from final users.
- Reimbursed Compliance Cost (RCC). Producers finance activities in the system, bearing costs for management of WEEE by either joining a compliance scheme or financing their own take back system. They also bear costs for management of WEEE but they use a visible fee to get money back from final users in respect to both historical and new WEEE management costs.
- Recycling Fee (RF). Final users, when buying new equipment, bear costs for the management of WEEE. There is no involvement of Producers. Recycling fees could be used to raise funds for future treatment of appliances currently being sold (Advanced Recycling Fee): this means that the future recycling costs for each appliance is estimated in advance and paid upfront by the end user when buying the appliance. Otherwise the recycling fee represents and is calculated as a share of actual costs of recycling for WEEE arising (Shared Recycling Fee): this means that recycling costs currently arising are shared on appliances being sold.

While the Compliance Cost (CC) model is broadly applied throughout the EU, the 2007-study concluded that it does not necessarily provide "the best economic and environmental outcome".

PV CYCLE data confirms that the VF/RCC countries Belgium and France quickly achieved high compliance rates after the entry into force of their PV WEEE obligations, while the Netherlands and the UK still score relatively high in the free-rider ranking. In a joint call for due diligence in PV WEEE compliance, PV CYCLE and leading PV companies calculated that about 50% of the UK and more than 90% of the Dutch PV market were not compliant in 2014.

With the aim of ensuring both a level playing field for industry actors and high financial certainty for end-users and society, PV CYCLE offers PV-dedicated consultancy to help reduce the overall complexity in the PV WEEE market – also or especially because of the multifold financing mechanisms. The initial question of waste financing in the PV industry is expected to remain vital however.

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1 Executive summary, Management of WEEE & Cost Models across the EU - Could the EPR principle lead us to a better environmental policy?, 2007, page 4, Federico Magalini / Department of Economics Management & Industrial Engineering Politecnico di Milano & Jaco Huisman / Design for Sustainability Research Group, Delft University of Technology