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PV panel recycling in Greece: The regulatory landscape, the recycling fee standoff & the way forward

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BY GUS J. PAPAMICHALOPOULOS, ANTONIS N. KOUMPIAS, ANDRIANI KOLOKYTHA

I. Introduction

As Greece cements its position as a solar energy leader, the industry is increasingly turning its attention to the "afterlife" of solar panels. This transition is rapidly becoming a critical challenge across Europe as early photovoltaic (PV) installations approach the end of their operational life, transforming a green asset into a critical waste management problem.

Under the WEEE Directive (2012/19/EU) and national Law 4819/2021, the legal landscape strictly defines who bears the financial burden, how panels must be treated, and which recovery strategies are viable. With the PV recycling and waste management market currently in development amidst significant industry pushback over recycling costs, navigating these regulatory requirements is essential to ensuring compliance and safeguarding the long-term financial viability of PV assets.

The legislative architecture

The regulatory framework governing PV waste management in Greece is anchored in the principle of extended producer responsibility (EPR), dictating that the manufacturer of a product is responsible for such product during its entire lifecycle. In Greek legislation, the EPR principle is established in Joint Ministerial Decision 23615/651/E.103/2014, which transposed the EU's WEEE Directive (2012/19/EU), bringing PV modules within the scope of the waste electrical and electronic equipment (WEEE) regime. This classification places the entire financial and operational burden of collection, transport, and treatment squarely on the *"producers"* of solar panels (defined as manufacturers, importers, or distributors placing panels on the Greek market for the first time). Specifically, the above decision mandates that producers must either establish or join a collective or individual alternative waste management system approved by the Hellenic Recycling Agency (**"EOAN"** as per its Greek acronym) ensuring that end-of-life PV panels are collected, transported, and treated in an environmentally sound manner.

Subsequent legislation has strengthened the oversight capabilities of EOAN. To ensure market transparency and prevent illicit compliance evasion, Ministerial Decision 181504/2016 mandated the operation of the National Producers Register (**"NPR"**). Under this mechanism, any entity importing or selling solar panels must maintain active registration and accurately declare imported volumes. This framework was further reinforced by Law 4819/2021, Greece's overarching waste management law, which transposed EU Directives 2018/851 and 2018/852, enacted higher material recovery targets, and established a clear statutory preference for circular economy principles within the domestic energy sector.

II. Market evolution

For years, the domestic compliance market operated under a centralized model, with *Fotokyklosi S.A.* serving as the sole approved alternative waste management system for PV waste. However, as the volume of decommissioned panels has begun to scale, the market has transitioned toward a more competitive, multi-player landscape. EOAN has approved three new collective schemes, namely *RE-LAT S.A.*, *PV REVIVE S.A.*, and *ANA.FOS S.A.*

Crucially, this diversification coincides with a major breakthrough in Greece's domestic industrial capacity. The historical dependency on expensive, logistically complex transborder waste shipments to central European recycling hubs has come to an end. Dedicated heavy-industry processing plants are now fully operational in Crete and Ritsona, with new infrastructure expanding into Kozani to service the high-density solar clusters of Western Macedonia. This localization of the recycling supply chain significantly reduces both carbon footprints and operational costs, laying the groundwork for Greece to become a regional hub for PV circularity.

III. The high cost of recycling

Despite the deployment of domestic recycling facilities, the industry is currently entangled in a critical financial standoff regarding the mandatory recycling fees levied per tonne of recycled solar panels. As localized economies of scale emerged, schemes initially lowered their proposed fees to €90/t, while new entrants targeted operational costs well under €100/t. However, EOAN intervened by imposing a rigid, temporary baseline rate of €300/t, a price point reminiscent of the early days of compliance, when panels had to be exported abroad to be processed.

This regulatory intervention triggered significant industry pushback, creating an administrative bottleneck and effectively freezing the recycling fee payments. Asset owners and developers have voiced concerns that inflated compliance fees distort project economics. While an independent cost-benefit study commissioned by EOAN indicates that a realistic, sustainable baseline should position fees between €170 and €200 per tonne, the final regulatory determination remains pending.

IV. Regulatory blind spots and their impact on transactions

A primary unresolved issue is the liability for "legacy waste". This refers to early-generation solar panels (mainly those installed during the solar boom of 2011 to 2013) that were connected to the grid before any recycling fee collection system was in place. Since no fees were ever paid for these panels, in practice, the burden of their eventual removal and recycling falls on project owners, who currently seek to mitigate this liability by reselling decommissioned PV modules on the secondary market. However, this practice only defers the problem rather than resolving it, as those panels will still eventually reach end-of-life and require recycling. Without targeted legislative measures to address this regulatory gap, the resulting cost burden could lead to financial defaults or, in the worst case, to panels being disposed of illegally.

Beyond legacy waste, the rapid expansion of the sector has exposed a further structural gap in the existing legal framework, namely the absence of explicit links between waste management obligations and the broader energy licensing milestones of renewable energy projects. During the public consultation phases of recent Ministry of Environment and Energy legislation concerning the financing of renewables, stakeholders have expressed their concerns for this very omission. Without cementing recycling clearance as a mandatory milestone in project repowering, decommissioning, or secondary asset transfers, the risk of regulatory evasion increases. Addressing this missing link is critical; however, any such regulatory intervention must be

carefully calibrated, as tying the licensing progress of renewable energy projects to the waste management compliance of equipment suppliers or EPC contractors, i.e., entities whose conduct falls outside the control of the project owner, risks generating significant backlash from RES investors, who would effectively bear the consequences (i.e. project delays) of third-party non-compliance.

Compounding these problems is the widespread non-compliance among PV module suppliers with their EOAN registration and collective scheme participation obligations, driven in large part by the financial standoff over recycling fees described above. According to recent market reports (March 2026), approximately 88% of PV module suppliers active in Greece have not joined an alternative waste management system, meaning that no recycling fees have been paid for the vast majority of solar panels placed on the Greek market, despite the existing legal obligation to that end. This creates real uncertainty about who will ultimately bear the recycling costs at the end of a project's life. There is a tangible risk that these costs will fall on PV investors and project companies, since pursuing claims against non-compliant suppliers decades later may prove ineffective, particularly where those suppliers have ceased operations, been dissolved, or can no longer be traced. The possibility of recycling cost liability being imposed on PV investors, whether by operation of law or by court decision, cannot be ruled out. This enforcement gap is already generating risks and unpredictability in project financing and M&A transactions and is increasingly being reflected in the assumptions underpinning financial models.

V. The way forward

For the market to advance, a number of key developments are required.

A fair and realistic recycling fee must be established on the basis of actual cost data. Once the financial standoff regarding the recycling fee is addressed, the competent authorities must (i) actively enforce registration and compliance obligations to ensure that all producers contribute their share, and (ii) proactively establish a clear regulatory mechanism to address the outstanding recycling fee liability for the approximately 88% of PV panels already placed on the Greek market without any recycling fee having been paid. Without timely legislative intervention, these disputes will inevitably be referred to the Greek courts for resolution, a process that, given the well-documented delays in the Greek judicial system, would leave the market in a state of prolonged uncertainty.

With a significant portion of early-generation solar projects now entering the repowering phase, addressing these developments is all the more critical. Resolving the outstanding regulatory gaps would eliminate a key source of uncertainty for Greece's solar investments, enabling investors to confidently plan and finance projects over their full lifecycle on the basis of clear and predictable decommissioning costs.

Contact Us



Gus J. Papamichalopoulos
SENIOR PARTNER

g.papamichalopoulos@kglawfirm.gr

Follow Us

ATHENS OFFICE

28, Dimitriou Soutsou Str.,
115 21 Athens

T +30 210 817 1500
E kg.law@kglawfirm.gr

THESSALONIKI OFFICE

31, Politechniou Str.,
551 34 Thessaloniki

T +30 2310 441 552
E kg.law@kglawfirm.gr

www.kglawfirm.gr

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