

A scenic landscape photograph of a mountain valley. In the foreground, a calm lake reflects the surrounding landscape. A large, blue glacier flows down a steep, rocky mountain slope on the right side of the image. The mountain peaks are covered in snow and partially obscured by a clear blue sky with some light clouds. The overall scene is majestic and serene.

Developing a sustainable PV framework: an opportunity for impact

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April 2022 saw an important landmark event: 1 TW of globally installed solar capacity. Solar power entered the terawatt age. It is staggering to consider that solar power is set to double to over 2 TW within the next three years. Alongside this rapidly growing market is an increasing narrative regarding environmental costs and social impact to secure resources for the production and transportation of renewables. There are also growing concerns regarding land use for solar projects.



Value network, more than the value chain

How do we move forward with rapid growth and embrace sustainability as a 'PV Value Network'? And why a value network rather than value chain? A chain can be seen as having a start and end point, and yet how the PV industry influences the broader social and economic system is vast. A PV Value Network has a real sense of interconnectedness spanning the constellation of inputs and outputs.

The core of this concept is that industries which buy from and sell to the PV industry are

more than a chain, but rather a network of interconnecting activities and influences.

We can look outside PV for examples, such as Starbucks. It has chosen to work with its value network, or stakeholders, with the aspiration of becoming resource positive by supporting and strengthening the people around it.¹

Norwegian Crystal as a corporate citizen is being called to a higher standard. As we continue to measure our Scope 1 and 2 Green

House Gas (GHG) emissions, we acknowledge the need to account for the emissions we have less control of: aka Scope 3.

According to Deloitte, Scope 3 emissions account for more than 70% of an organisation's carbon footprint. '... for an organisation that manufactures products, there will often be significant carbon emissions from the extraction, manufacture, and processing of the raw materials.'²

² [deloitte.com/uk/en/focus/climate-change/zero-in-on-scope-1-2-and-3-emissions.html](https://www.deloitte.com/uk/en/focus/climate-change/zero-in-on-scope-1-2-and-3-emissions.html)

¹ [starbucks.com/responsibility/reporting-hub/](https://www.starbucks.com/responsibility/reporting-hub/)

Renewable and clean

As the European solar PV industry ramps up, how do we balance global expectations of 'clean' green energy? Is it time for the industry to amplify discussions to proactively develop a Sustainability Agenda?

Perhaps PV can look to the retail fashion industry as an example of this idea.

For over a decade the Global Fashion Agenda (GFA) has been leading the movement on sustainability in fashion. The GFA encompasses more than emissions into the framework. Its vision is to accelerate the fashion industry towards a net positive industry for people and the planet.

In 2018 the Fashion CEO Agenda framework was established, which put forward a vision statement for the fashion industry highlighting the need for social and environmental sustainability. From this statement the GFA Monitor was created as a resource to guide fashion leaders towards a net positive fashion industry by 2050. 'The report presents guidance according to five sustainability priorities which outline opportunities for fashion brands and retailers to set fact-based sustainability strategies and take action to achieve the vision.'³

Developing an industry wide Renewables Sustainability Framework

Norwegian Crystals has given much thought to what the key priorities might be. We would be encouraged to continue this dialogue with the PV Value Network. The following narrative is intended to instigate discussion towards the development of such a framework.

Embed circular economy principles

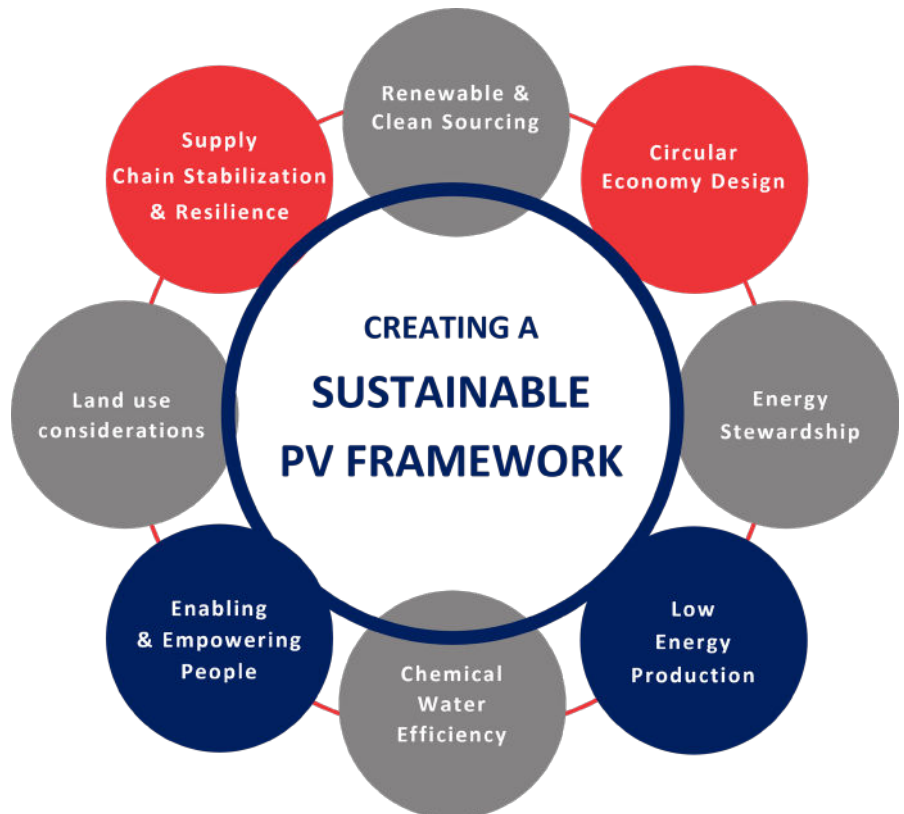
As we discussed in PES March 2022, 'The emergence of a circular PV economy', a circular economy is based on three principles which is driven by design to eliminate waste and pollution, circulate products and materials at their highest value and regenerate nature.

Through industry co-ordination a strong, resilient interconnected PV value network can provide a powerful opening to revitalize the PV industry in Europe. The recommendations forwarded in the ARUP Circular Photovoltaics report could provide a good baseline for incorporation into the development of a Renewables Sustainability Framework.

Supply chain stabilization and resilience

Resilience is necessary to facilitate the energy transition. A secure and diverse solar manufacturing value network based on collaboration across different continents will help and support each other to grow.

The past two years have exposed the fragility of the global supply chain. Sourcing from a single, distant region exposes everyone in the value network to risk. If we are going to



stabilize our energy mix and properly manage it, as energy and resource stewards, we need to be able to rely on our supply chain.

When we talk about a resilient value supply network, it needs to be 'elastic', so it can stretch and snap back, however it also needs to be 'plastic', so it can reform itself. This concept is lacking within the current supply network. As an industry, we have seen it stretch, however it then breaks. Inefficiencies are realized because there are not enough alternative sources, or relief valves.

Supply chain resilience will enable breath and scope of the supply chain, enabling organisations to determine alternatives and distribute the risk. Stable production cannot tolerate variability. Here is an opportunity for the PV industry to act as an enabler, working together to achieve its ambition.

Energy stewardship

We define this as the efficient consumption of energy to produce value. The more efficient industry can become across the value network, the lower the impact on the environment and the better the yield.

Logistics optimization takes resource movements into account. Crucible production, a key component used to produce monosilicon ingots, is an example of the opposite. Currently, quartz mined in North America is shipped to Norway, where the quartz is refined then shipped to China for processing into a Crucible. The finished product is then shipped back to Norway for use in ingot production. Certainly, there is a better way.

Low energy production

Logistics optimization is an important starting point. Second is to ensure the manufacturing operation is poised to maximise energy efficiencies. The logical next step, and a way to drive and support the industry, is to use renewables in our production processes. We would encourage key components of a Renewables Sustainability Framework to include miles, energy efficiency and use of renewable resources in production.

Chemical and water efficiency: reuse, review, replace reduce

We are looking to examine hazardous material use and implement replacements. This includes continuous review and evaluation of the chemicals in use and questioning if there are alternatives. Efficient water usage begins with good water management practices in place to create a closed loop whenever practical to reduce the industry's reliance on clean water.

There is untapped potential for a more efficient use of chemicals and water in existing manufacturing methods alongside the pursuit of innovative technologies to implement new processes.

Enabling and empowering people: valued and valuable resources throughout the network

As an industry, whether it be working to mine natural resources or a company that manufactures specialised glass for PV modules, or an ingot manufacturer, another question, and growing societal expectation,

³ globalfashionagenda.org/the-gfa-monitor/

is simply 'can the industry provide a platform for a meaningful equitable living wage?'

Starbucks refers to this as ethical sourcing, linking the company's success to the success of the farmers and suppliers who grow and produce Starbucks products. Perhaps now is an opportunity for the industry to show leadership in developing our social impact as part of a Renewables Sustainability Framework.

Land use and solar projects

Community concerns and legislation across a number of countries is making it harder for companies to build utility-scale solar projects on farmland and forests.

There has been a stance that 'solar should stay off of green space'. There is an opportunity to learn from the research being undertaken across the globe in successful multiple land use development and to develop key sustainability benchmarks.

We found numerous examples of dedicated farmers 'committed to food production that can happen locally in a way that involves humans and the land working in a synergistic relationship'⁴ and those with a sense that solar income will bring security to small-scale farmers.⁵

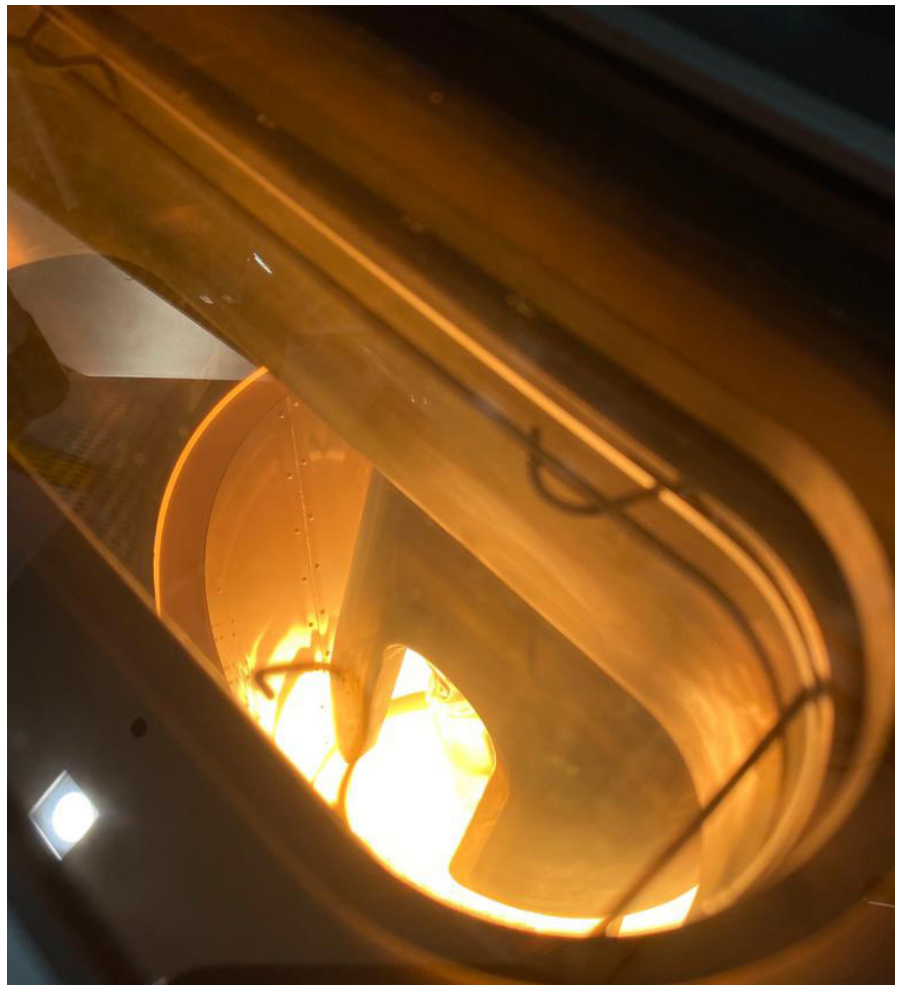
Policy makers are being encouraged to incentivise the use of brownfield and landfill sites for Solar projects alongside commercial building rooftops.

A feel-good story to end here is of North American beekeeper and owner Joel Fassbinder. Fassbinder saw the chance for land being used for solar farms to be used as 'one that is supportive and intentionally beneficial for insects... In 2020, Fassbinder harvested around fifteen thousand pounds, or 6800 kgs, of honey from 200 hives'.⁶

⁴ bluewave.energy/bw-resources/can-land-conservation-and-dual-use-solar-on-farms-coexist

⁵ *ibid*

⁶ climateactionpathways.org/articles-and-resources/honey-bees-in-a-solar-field-a-sweet-combination



Importantly, there is growing support in the number of new solar developments being planted with native vegetation to support pollinators, including honeybees.

This exciting double, even triple, use of the land, producing renewable energy, providing pollinator habitat, and beekeeping, is becoming increasingly popular.⁷

⁷ *ibid*

As a key member of the renewed European PV Value Network, Norwegian Crystals continues to progress the dialogue about a Renewables Sustainability Framework across the industry. Each industry will be called to account for its contribution to the ESG story and PV is no exception. This is an essential component to future-proof our business and operate within guiding principles.

 www.crystals.no

