

Photon Energy NV

Netherlands | Utilities | MCap EUR 103.4m

25 April 2022

INITIATION



The sky has no limits: BUY; PT EUR 4.10

What's it all about?

The solar market is the fastest growing sector within the global energy industry. Photon Energy is a well-established player in this market, covering the whole downstream solar ecosystem. Top line growth over the next years is driven by the addition of capacity to the current portfolio of 87 proprietary solar power plants in Central and Eastern Europe and Australia. The project pipeline of 745 MWp is sufficient to increase capacity more than 8-fold over the next years. In the short term, a partial switch of capacity from lower feed-in tariffs to higher market prices will significantly drive revenues (+80% 22E) and EBITDA (+90% 22E). Compared to peers, the company trades at an EV/EBITDA discount of 30% to 45%. We are initiating coverage of Photon Energy NV ("P7V:GR") with a BUY recommendation and a PT of EUR 4.10, offering an upside potential of 115.5%.

BUY (INITIATION)

Target price	EUR 4.10 (none)
Current price	EUR 1.90
Up/downside	115.5%



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Photon Energy NV

Netherlands | Utilities | MCap EUR 103.4m | EV EUR 192.5m

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The sky has no limits: BUY, PT EUR 4.10

Established solar player. Photon Energy Group was founded in 2008 and now is a well-established player in the solar market. The company covers the whole downstream solar ecosystem, including project development, the design, building, operation and maintenance of solar plants, the trading of components and the production and sale of solar electricity in 87 proprietary power plants. Photon Energy Group also has access to promising solar IP via an equity stake in RayGen. Finally, the Photon Energy Group has a foothold in the strongly growing market for water treatment.

Early mover with unique focus. Photon Energy Group is an early mover in the solar market with a unique focus on the Central and Eastern European and Australian markets. The resulting knowhow and networks provide access to projects in the sweet spot of renewable energies. Combining strong ESG credentials with transparent reporting, open capital market communications and a reliable management, Photon Energy Group is highly investable despite its still small size.

Visible high double-digit growth. The growth of Photon Energy Group is driven by

- a steep decline in the cost of producing solar energy, making it **cost-competitive without subsidies** and a crucial building block in the **decarbonization** of economies, and thus the **fastest growing renewable energy**,
- a project pipeline of 745 MWp, enough to **increase capacity more than 8-fold**,
- and a partial switch of capacity **from lower feed-in tariffs to higher market prices**.

Consequently, **for 2022** Photon Energy expects **almost 80% top line** and almost **90% EBITDA growth**. Backed by the project pipeline, growth continues medium term, with steadily increasing earnings quality and recurring revenues (more than 75% in 24E).

BUY; PT EUR 4.10. Photon Energy has not yet made it onto the radar screen of many institutional investors. Valuation looks very attractive and does not reflect the growth and margin expansion potential. Compared to peers, the company trades at an **EV/EBITDA discount of 30% to 45%**. Based on DCF and supported by a peer group, we recommend to **BUY with PT EUR 4.10**, offering more than 100% upside potential.

Photon Energy NV	2019	2020	2021	2022E	2023E	2024E
Sales	30.2	28.3	36.4	65.0	76.1	93.6
<i>Growth yoy</i>	48.9%	-6.3%	28.7%	78.7%	17.1%	23.0%
EBITDA	7.9	8.4	9.6	18.0	35.9	48.5
EBIT	1.1	-0.1	-0.7	5.8	19.3	22.8
Net profit*	-0.7	2.1	2.1	5.3	34.9	49.1
Net debt (net cash)	67.3	84.5	89.1	100.9	166.7	323.1
Net debt/EBITDA	8.5x	10.0x	9.3x	5.6x	4.6x	6.7x
EPS reported*	-0.01	0.04	0.04	0.10	0.64	0.90
DPS	0.00	0.00	0.00	0.00	0.00	0.00
<i>Dividend yield</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gross profit margin	67.6%	83.6%	65.0%	63.1%	79.4%	82.2%
EBITDA margin	26.3%	29.9%	26.4%	27.8%	47.2%	51.8%
EBIT margin	3.5%	-0.5%	-2.0%	9.0%	25.3%	24.4%
ROCE	0.9%	-0.1%	-0.4%	2.7%	6.5%	4.6%
EV/EBITDA	21.5x	22.3x	20.1x	11.3x	7.5x	8.8x
EV/EBIT	161.8x	-1,323.6x	-270.8x	35.0x	14.0x	18.7x
PER	-134.1x	46.8x	49.3x	19.7x	3.0x	2.1x
FCF yield	0.7%	-1.1%	-2.2%	1.2%	3.8%	-0.1%

Source: Company data, AlsterResearch; * including OCI



Source: Company data, AlsterResearch

High/low 52 weeks 2.96 / 1.44
Price/Book Ratio 2.0x

Ticker / Symbols

ISIN NL0010391108
WKN A1T9KW
Bloomberg P7V:GR

Changes in estimates

		Sales	EBIT	EPS
2022E	old	65,0	5,8	0,10
	Δ	0,0%	0,0%	0,0%
2023E	old	76,1	19,3	0,64
	Δ	0,0%	0,0%	0,0%
2024E	old	93,6	22,8	0,90
	Δ	0,0%	0,0%	0,0%

Key share data

Number of shares: (in m pcs) 54.36
Book value per share: (in EUR) 0.95
Ø trading volume: (12 months) 1,000

Major shareholders

Solar Future Cooperatief U.A. 36.3%
Solar Power to the People Cooperatief U.A. 34.7%
Treasury Shares 6.2%
Free Float 22.8%

Company description

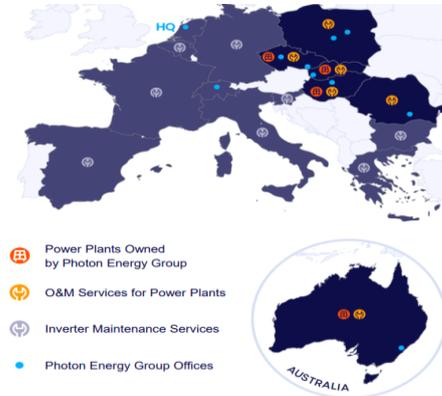
Photon Energy NV is a solar energy and water treatment solutions company based in the Netherlands that covers the entire lifecycle of its technologies. The Company develops projects in Australia, Hungary, Poland and Romania, and provides operations and maintenance services for over 300 MWp worldwide. The Company has offices in Europe and Australia.

Investment case in six charts

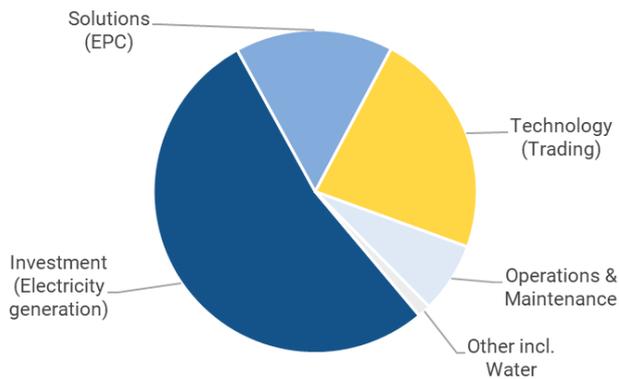
Business Model



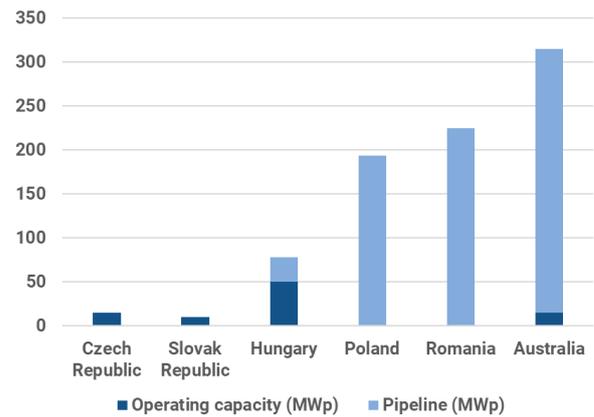
Geographical Presence



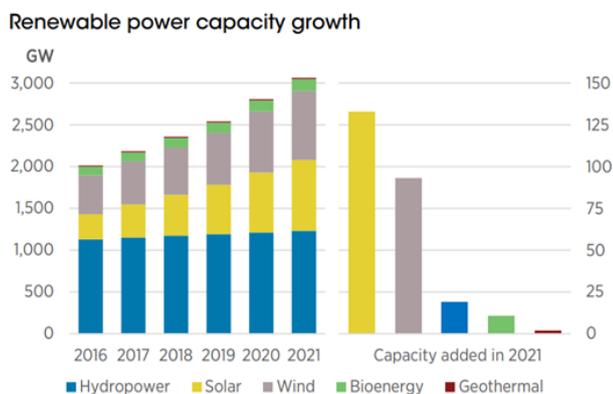
External Revenue Shares (2021)



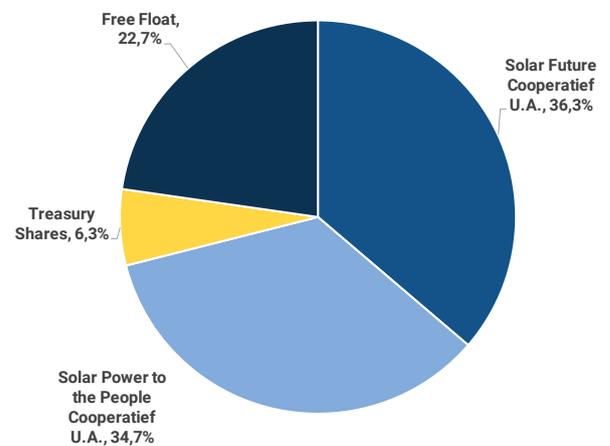
Capacity and pipeline



Fastest growing renewable energy



Major shareholders



Source: Company data; AlsterResearch; IRENA

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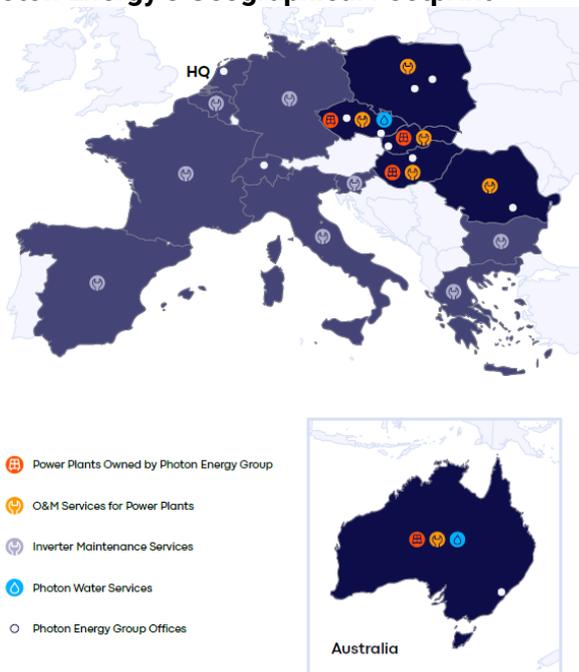
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Company background

Products & services

Photon Energy Group is a company focused on solar power and clean water solutions headquartered in the Netherlands. Founded in 2008, it operates offices, plants and servicing stations in 16 countries, with most of its operations located in Central and Eastern European (CEE) countries such as the Czech Republic, Hungary, Poland, Romania and Slovakia, as well as Australia. Photon Energy Group's services mostly revolve around solar energy, with a small but growing share in water treatment. Photon covers a wide range of services over the entire lifecycle of photovoltaic (PV) systems. These services include the development of solar plants, maintenance and the management of them.

Photon Energy's Geographical Footprint



Source: Company data; AlsterResearch

Photon Energy Group reports in **two segments**, the **Photon Energy Segment** and the **Photon Water Segment**:

- 1) The **Photon Energy Segment** consists of four divisions:
 - **Solutions:** Design and construction of on-grid and off-grid installations for rooftop and green-field from 300 kWp to 300 MWp¹, including battery storage solutions.
 - **Technology:** Trading of photovoltaic components like modules, inverters and batteries.
 - **Investments:** Investment into photovoltaic power plants and generation of revenues from production and sale of electricity.
 - **Operations:** Operations, maintenance and monitoring of photovoltaic power plants.

¹ MWp stands for megawatt peak and describes the electric power a solar module can produce in a standard testing environment with a temperature of 25°C, a light intensity of 1000 W/m² and a spectrum similar to sunlight hitting the earth at a latitude of 35°N in the summer. Simply put, it is the output of a solar module under optimal conditions.

In the Photon Energy segment, the company thus covers the full lifecycle of PV systems:

Business model Photon Energy

Our services cover the entire lifecycle of photovoltaic systems.



Source: Photon Energy

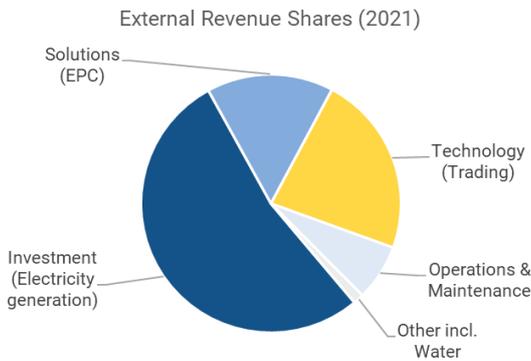
The business units are synergetic, and multiple units may serve a single project or client over the life-cycle of a PV installation. For example:

- **Project Development** might initiate a project or acquire it in an early stage, for example once a location is scouted and analyzed and a letter of intent for the land purchase is signed. Photon Energy would then complete the environmental assessment and apply for grid connection. At the same time, the commercial model is developed. Electricity can be sold via a feed-in-tariff, a long-term power purchase agreement (PPA) with an offtaker (a company, a municipality, a university etc.) or it can be sold into the merchant market (spot or future).
- After securing the land and grid connection, obtaining the necessary permits for construction and securing financing, the project is ready to build. **Solutions** would then design and build the PV installation with components sourced by **Technology**.
- After completion, the PV plant remains within the Photon Energy Group and is used to generate revenues from the production and sale of electricity in the **Investment** unit. For all future capacity, Photon Energy has decided to go merchant and sell electricity into the market.
- After connection to the grid and during the life of the plant, **Operations and Maintenance** would operate and maintain the facility. These services are also provided to third parties as a service, thus utilizing economies of scale.

This life-cycle for example has been followed for most European projects, which were developed from scratch by Photon Energy and are now held in the proprietary portfolio. An example where Photon Energy leveraged know-how and assets to provide similar services to third parties is a contract realized with ALDI Australia. Photon Energy managed the whole process of

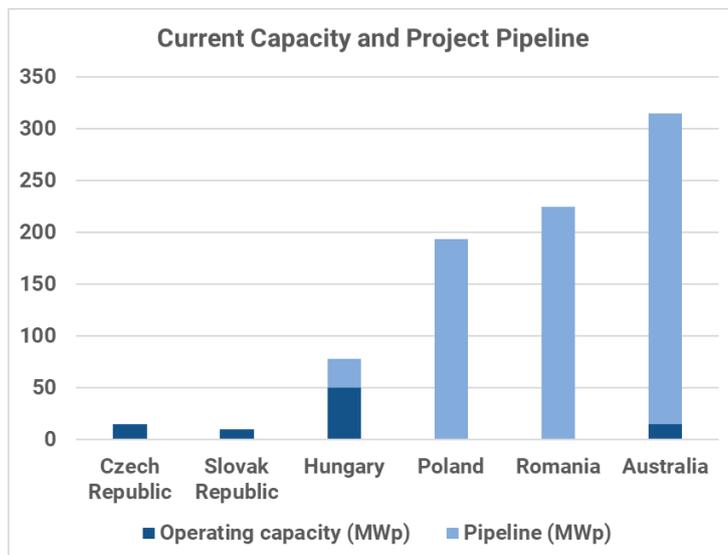
- designing, commissioning and installing solar projects for 31 sites in New South Wales and Queensland,
- and monitoring, operation and maintenance services after completion of the projects.

Within the Photon Energy Group, **Investment** is the largest segment. It almost exclusively generates external revenues; all other business units generate both internal revenues from the sale of products and services to other Photon Energy Group business units and external revenues from the sale of products and services to external entities. Investment operates solar plants with a capacity **of over 90 MWp** and contributes more than half of total external revenues of Photon Energy Group:



Source: Photon Energy Group, AlsterResearch

Photon Energy Group currently owns power plants in the Czech Republic, the Slovak Republic, Hungary and Australia. The pipeline also includes projects in Poland and Romania. The following shows the geographic distribution of the current operating capacity and of the pipeline:



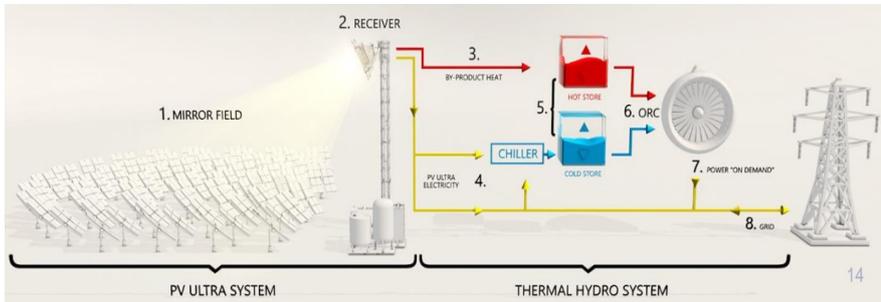
Source: Photon Energy Group, AlsterResearch

Equity stake in strategic partner RayGen:

Photon Energy holds a 9% stake in RayGen Resources Pty. Ltd, an Australian technology company with capabilities in the next generation of solar power and electricity storage. Photon Energy Group has invested alongside prestigious co-investors like Schlumberger New Energy, Chevron Technology Ventures, AGL Energy, Equinor Ventures (all stock market listed companies) and the Australian Renewable Energy Agency.

RayGen's proprietary PV Ultra system generates heat and electricity which are stored in water reservoirs. The storage system is attached to a heat-to-power engine which allows for electricity generation on demand:

Raygen's PV Ultra system



Source: Company Data; AlsterResearch

The PV Ultra system comes with several **advantages** compared to conventional PV technologies.

- The combination of production and storage **overcomes the duck curve problem**, i.e. the timing difference between power supply of PV systems and power demand.
- The capacity of the storage is large enough to discharge **power on demand**, for example during peak demand when electricity prices are high, or to power green hydrogen production via electrolyzers where intermittent operations can have a negative impact on performance.
- Apart from the receivers with satellite grade solar cells, the facilities only need **standard components**, and many can be **produced and sourced locally**. For example, the Organic Rankine Cycle (ORC) power generation units are similar to those used in geothermal plants.
- The combined generation of PV electricity and heat in the receiver is **very efficient**. The by-product heat increases the overall round-trip efficiency of the system to 70%, i.e. 10 MWh of electricity put into storage can deliver 7 MWh of electricity out of storage to customers.
- Using water instead of batteries as a storage medium **lowers costs by up to 50%** and does not require raw materials like lithium or cobalt that come with substantial procurement, environmental and social risks.
- In contrast to pumped hydro storage systems which need hilly or mountainous sites, the PV Ultra storage is **suitable to any site** that can accommodate a PV plant.

RayGen is currently building a 4 MWp plant in Carwap, Victoria, due for completion in Q4 2022, which will be the first utility-scale facility based on this technology. A smaller scale pilot plant has been in operation in Newbridge, Victoria, since 2015. **Photon Energy's pipeline includes a 300 MWp generation capacity plant based on RayGen technology in Australia.**

Equity stake in strategic partner Lerta:

Photon Energy has also acquired an equity stake in strategic partner Lerta. Photon Energy has participated in two equity financing rounds:

- In a first investment in December 2020, Photon Energy took a 12% stake in return for PLN 4m.
- As the lead investor in a Series A funding in December 2021, Photon Energy increased its ownership stake to 24% in return for PLN 8.75m.

The total investment at current FX rates equals c. EUR 2.8m.

Lerta is a company offering electricity trading and virtual power plant services in CEE. Photon Energy is cooperating with Lerta in the areas of electricity trading for the company's utility-scale PV power plant portfolio and an integrated approach to the booming behind-the-meter market segment. This approach combines on-site energy generation, electricity trading and virtual power plant services.

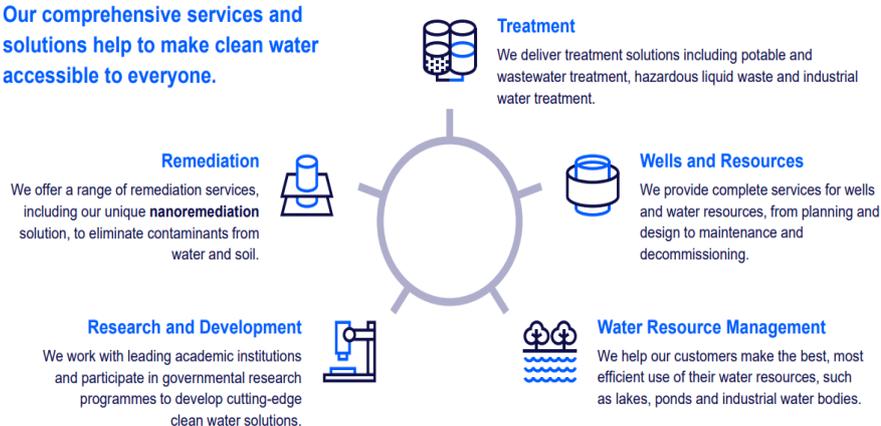
2) Water Segment

The Photon Water Segment is reported under “Other segments”, together with all other activities not included in the Photon Energy segments. Services of Photon Water include:

- Water treatment – wastewater and hazardous liquid waste treatment
- Remediation – elimination of harmful pollutants in water and soil
- Wells and Resources – design and maintenance of wells
- Water Resource Management – managing water resources such as lakes, ponds or industrial water bodies

Business model Photon Water

Our comprehensive services and solutions help to make clean water accessible to everyone.



Source: Company data; AlsterResearch

Currently, Photon Water only makes a minor contribution to the Photon Energy Group, at roughly 1.3% of revenues in 2021. However, the company sees **great potential in its proprietary patent-pending technology to clean per- and polyfluoroalkyl substances (PFAS) contamination.**

PFAS reduce the surface tension of water and have economic uses in stain- and water-repellant products, for example apparel, home furnishings, paints, coatings and niche applications like firefighting foams and ski wax. Once released into the environment, PFAS are very persistent, and residues can accumulate in humans and wildlife over time.

While originally PFAS were thought to be harmless due to their inertia, health concerns have been growing. Exposure to **PFAS has with high certainty been linked to kidney and testicular cancer, liver damage, thyroid disease and other adverse health effects.** Due to widespread use in the past, many sites show a high degree of contamination. For example, in the U.S. alone 26,000 sites are estimated to be contaminated, and at least **six million Americans are estimated to have PFAS contaminated drinking water.** The awareness of these hazards is only starting to build, with restrictions and remedial actions being discussed in many jurisdictions.

Photon Water has developed a technology that has the potential to treat contamination in-situ, i.e. without the need to remove or pump and treat soil and groundwater. The technology is still in its **pilot phase**, and it is too early to determine if and at what scale it will become commercially viable. The **potential**, however, is **very significant**, and Photon Energy is currently conducting a trial project with the Department of Defence in Australia.

Management

Photon's top management team consists of **Georg Hotar**, **Michael Gartner** and **Clemens Wohlmuth**:

		
Georg Hotar	Michael Gartner	Clemens Wohlmuth
Co-Founder and CEO	Co-Founder and CTO	CFO

Source: Company data; AlsterResearch

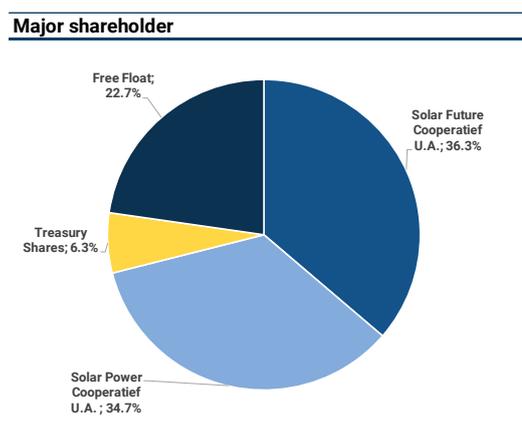
Georg co-founded Photon Energy in 2008 and was the company's CFO until 2011. Since then he has spearheaded the group's expansion in Europe and overseas as CEO. Georg has extensive knowledge of the solar energy industry as well as in international finance. Before Photon Energy, Georg established a finance and strategy advisory boutique focused on the CEE region and previously held various positions in financial services in London, Zurich and Prague.

Michael developed one of the first large PV installations in the Czech Republic before co-founding Photon Energy in 2008. Michael was CEO of Photon Energy until rolling out the company's business in Australia. Michael is instrumental in driving Photon Energy's off-grid and solar-hybrid power solutions. Before Photon Energy, Michael ran an investment boutique and was an analyst and head of fixed income sales at ING and Commerzbank Securities in Prague.

Clemens joined Photon Energy in 2012 and is responsible for the group's financial activities and strategies. He contributes many years of experience in financial management, having run his own consulting practice focused on financial services and interim management. Prior to this, he was CFO and later CEO at Telekom Austria's subsidiary, Czech On Line. From 1994 to 2000 he was Senior Manager for Ernst & Young Consulting in Austria and worked on several reorganization projects in Central Europe.

Shareholders

Largest shareholders in Photon Energy are Solar Future Cooperatief and Solar Power to the People Cooperatief with 36.3% and 34.7% respectively. Both companies are the investment vehicles of the co-founders, Georg Hotar and Michael Gartner, aligning the interests of management and outside shareholders. Treasury shares provide some financial flexibility for future larger projects.



Source: Company data; AlsterResearch

Quality

Customers

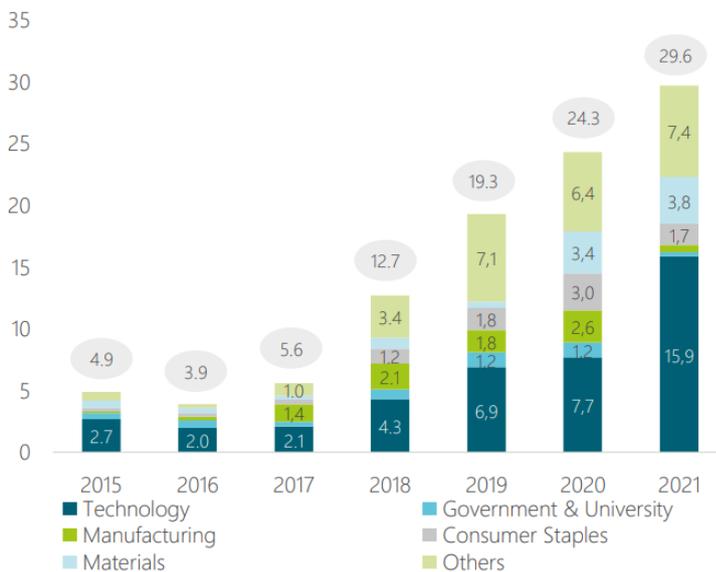
Photon serves a wide range of customers, and the external customer base varies between divisions.

In the **Investment** division, customers are the buyers of the generated electricity. In most cases these are local electricity distributors, for example E.ON Energie in the Czech Republic or MAVIR in Hungary. For the capacity covered by feed-in-tariffs, the price is fixed by the state and the distributors are obliged to purchase the electricity, so there is no issue of bargaining power. This is the case for all plants in the Czech Republic,² Slovakia and Hungary.

For Hungary, Photon Energy has decided to “go merchant” and sell via currently more lucrative spot and forward electricity markets (Photon Energy can switch back to the feed-in-tariff later for most plants), a business model also followed in Australia. The transactions in these cases take place at a market price determined by overall supply and demand, so again there is no issue of bargaining power. Finally, Photon Energy plans to expand its business with power purchase agreements (PPAs), whereby electricity is sold in a long-term contract to a single customer, and “behind-the-meter” projects, whereby solar facilities are developed specifically to serve the needs of an industrial or commercial customer. The market for PPAs is growing steadily as large and power-hungry corporates, especially from the tech world like Amazon, Meta, Google and Microsoft, increasingly go green to meet ESG targets:

PPA capacity by offtaker type

Annual volume in GW



Source: Encavis, BNEF Corporate PPA Deal Tracker, March 2022

The **Solutions** division develops solar parks based on engineering, procurement and construction (EPC) contracts. These contracts can be awarded in competitive tender processes or directly. Customers here are, for example, utility companies, independent power producers (IPPs), governments / municipalities / local authorities, or corporates. In a given year, a large project with a single customer can contribute a large share of revenues to the division, as in the case of Aldi Australia in 2019 or the Lord Howe Island Board in 2020. The **Technology** and **O&M** division potentially have a similar customer base as the Solutions division, as the projects

² For 2022, Photon Energy switched the Czech portfolio into the alternative green bonus scheme. This allows the sale of electricity at market prices. Photon Energy can switch back to the feed-in tariff in 2023.

also require procurement of components during construction, and operations, maintenance and monitoring services after completion.

In the **Water** business segment, core target customers are municipalities and industrial customers managing water resources. For example, Photon Energy managed to gain Czech authorities as vital clients, supporting them in the repair, maintenance and update of the Karany water catchment area, one of Prague's most important water collection centers.

Regional sales split (EUR m)	2019	2020	2021	2022E	2023E	2024E
Domestic	0.0	0.0	0.0	0.0	0.0	0.0
Europe (ex domestic)	24.9	22.8	29.3	52.4	61.3	75.4
The Americas	0.0	0.0	0.0	0.0	0.0	0.0
Asia	0.0	0.0	0.0	0.0	0.0	0.0
Rest of World	5.2	5.5	7.1	12.6	14.8	18.2
Sales	30.2	28.3	36.4	65.0	76.1	93.6

Source: Company data; AlsterResearch

Competition

To understand the competitive landscape, it is again reasonable to distinguish between business segments.

Although there are many companies producing and selling electricity, there is no ongoing competition for the **Investment** division once a solar plant has been connected to the grid. The reason is that either offtake of production has been secured long-term via feed-in-tariffs or PPAs, or electricity is sold in the spot or future market where Photon Energy and all other suppliers are price takers. In its current markets, Photon Energy holds the following shares of installed PV capacity at the end of 2021:

- Australia: 14.6 MWp of 25.6 GWp = 0.06%
- Czech Republic: 15.0 MWp / 2.7 GWp = 0.6%
- Hungary: 50.4 MWp / 3.0 GWp = 1.7%
- Slovakia: 10.4 MWp / 0.5 GWp = 2.1% (market data for 2020)

The **Solutions** division competes with other companies providing turn-key solar plants (EPC). This market is fragmented and characterized by a few multinationals and a large number of players that have a local or regional footprint. Photon Energy has the advantage of being a well-established long-term partner of firms and governments in its core markets CEE and Australia. Especially some CEE markets are still underdeveloped, and competition is less intense than in more mature geographies. The following graph shows a number of relevant players in the EPC market in Germany. Some of these, for example Goldbeck Solar, are also active in the CEE region.



Source: Solytic

For **O&M** contracts, there is a certain overlap in competitors with the Solutions division. There are also many solar IPPs and integrated solar downstream companies (similar to Photon Energy Group) in this market, often providing O&M services both on their own facilities and as a service to external customers. The following table displays an overview of the European market for PV O&M, showing the high fragmentation. The MWp under management include services on own plants.

Top European solar PV O&M companies ranking

Rank	Name	Country	MWp under management (O&M)	Rank	Name	Country	MWp under management (O&M)
1	Belectric	Germany	2.790	19	Abengoa	Spain	500
2	Enerparc	Germany	2.738	20	solara	Belgium	450
3	juwi	Germany	2.530	21	Blue Elephant Energy	Germany	424
4	BayWa r.e.	Germany	1.900	22	Valorem	France	400
5	Scatec	Norway	1.898	23	British Solar Renewables	United Kingdom	356
6	Neoen	France	1.800	24	Photon Energy	Netherlands	300
7	Encavis	Germany	1.780	25	Pfalzsolar	Germany	300
8	Statkraft	Norway	1.700	26	saferay	Germany	295
9	Sonndix	United Kingdom	1.590	27	Amarenco	France	191
10	ENcome	Austria	1.500	28	Revolta	Germany	180
11	acciona	Spain	1.412	29	enel green power	Italy	160
12	enovos	Netherlands	1.200	30	Clere	Germany	153
13	EF Solare Italia	Italy	850	31	renovalia	Spain	139
14	opdenenergy	Spain	807	32	ensiba	Germany	135
15	ecoprime	Italy	610	33	bos.ten	Germany	112
16	edf	France	605	34	Legendre	France	100
17	greentech	Germany	550	35	Natural Generation	United Kingdom	100
18	ESAPRO	Italy	500	36	Suncycle	Germany	50

Source: Solytic; AlsterResearch

For Photon Energy, the provision of solar plants in the Solutions division facilitates the acquisition of a service contract for the O&M division. The market shares calculated as O&M under contract in relation to total installed capacity are as follows:

- Australia: 24.1 MWp of 25.6 GWp = 0.09%
- Czech Republic: 133.3 MWp / 2.7 GWp = 4.9%
- Hungary: 77.1 MWp / 3.0 GWp = 2.6%
- Slovakia: 20.8 MWp / 0.5 GWp = 4.2% (market data for 2020)
- Poland: 2.9 MWp / 6.0 GWp = 0.05%
- Romania: 4.0 MWp / 1.5 GWp = 0.3%

For Poland and Romania, Photon Energy is only starting to build O&M operations, so there is plenty of upside in market share and profitability (which tends to increase with scale).

Finally, for the **Technology** division, there are many other companies that in principle can supply the same products as Photon Energy, i.e. modules, inverters, power storage systems, and monitoring and control devices. However, a large share of revenue is generated with external EPC clients of Photon Energy, as part of the procurement. With access to warehousing capacity and consignment stock in CEE markets, Photon Energy is in a position to supply products quickly and cost effective.

Suppliers

To develop solar plants, Photon Energy is **sourcing solar modules** from various manufacturers. The processing steps to arrive at a solar module are:

polysilicon -> wafer -> cell -> module

The first step is the purification of **polysilicon**, the key raw material in solar modules. Its raw form silicon is the second most abundant element in the world, but purification of it into polysilicon is capital intensive. Thus, the market for polysilicon is characterized by an oligopoly, whereby the top 5 companies produce more than 70% of the total production, mostly in China. Polysilicon prices could not escape the resource inflation seen in other raw materials and have increased by 300% from 2020 to the end of 2021. Even though demand for polysilicon will increase in the future, prices should stabilize as production is expected to increase and supply chains recover from recent shocks.

Moving down the value chain, the market becomes more fragmented: there are more than 50 suppliers for **wafers**, more than 100 for **solar cells** and over 400 **solar module** producers. Bargaining power of suppliers deteriorates as you go downstream in the value chain, and solar modules are basically commodities. Photon Energy can easily switch suppliers, if required (current suppliers are Longi Solar, JA Solar and Jinko Solar, among others). The cost of solar modules has increased recently from USD 0.20 per Wp to between USD 0.26-0.28 per Wp, reflecting the price increase of polysilicon.

Regarding personnel, Photon Energy employs project developers, engineers, service technicians, energy and storage specialists and standard corporate roles such as accountants or lawyers. While qualified personnel is always difficult to find, there are no specific labor shortages in these fields.

Supply chain

	Product	Process	Industry characteristics	Technology	Generic strategies
Upstream	Polysilicon	<ul style="list-style-type: none"> Quartz silica changed into silicon ingots 	<ul style="list-style-type: none"> Oligopolistic 5-10 companies High entry barriers Ample supply of inputs 	<ul style="list-style-type: none"> Siemens trichlorosilane Fluidized bed reactor Upgraded metallurgical silicon Vapor to liquid deposition 	<ul style="list-style-type: none"> Build scale economies Establish quality control Set price ceilings
	Wafer	<ul style="list-style-type: none"> Silicon ingots cut into wafers 	<ul style="list-style-type: none"> Limited competition About 50 companies Medium entry barriers due to high investment High dependence on polysilicon suppliers 	<ul style="list-style-type: none"> Monocrystalline Multicrystalline String ribbon 	<ul style="list-style-type: none"> Access low-cost financing Develop proprietary technology Integrate midstream operations
Midstream	Cell	<ul style="list-style-type: none"> Circuitry put on wafer 	<ul style="list-style-type: none"> Highly competitive About 100 companies Low entry barriers Essential component of silicon-based power Boom-bust exposure 	<ul style="list-style-type: none"> Crystalline Thin film (CIGS, CdTe, a-Si) 	<ul style="list-style-type: none"> Establish proprietary technology Integrate midstream operations
	Module	<ul style="list-style-type: none"> Cells placed on glass and made into panels 	<ul style="list-style-type: none"> Highly competitive More than 400 companies Low entry barriers due to low investment Boom-bust exposure 	<ul style="list-style-type: none"> Low technology 	<ul style="list-style-type: none"> Differentiation
Downstream	Installation	<ul style="list-style-type: none"> Solar panels installed 	<ul style="list-style-type: none"> Fragmented Over 5000 companies Requires financing and connections 	<ul style="list-style-type: none"> Low technology 	<ul style="list-style-type: none"> Price Non-market strategies

Source: Authors' interviews/research Barclays, Deutsche Bank (AG), GCL Poly, Evergreen Solar, Ignite Solar, Natcore; independent research.

Source: Usha Haley, Douglas A. Schuler; AlsterResearch

SWOT analysis

Strengths

- early mover in the PV market with expertise in the whole system life cycle
- unique focus on and understanding of CEE market
- visible growth trajectory with a growing share of recurring revenue
- strong ESG credentials translating into lower cost of capital (-> green bond)
- transparent and detailed reporting and comprehensive capital market communications
- strong management team and high standards of corporate governance

Weaknesses

- still a relatively small player
- high leverage and capital needs to fulfill project pipeline
- strong seasonality in solar business (mitigated by Australian projects)
- analysis of underlying profitability complex due the nature of the business (FX and derivatives effects, strong contribution of OCI, capital gains on resale of projects and high share of internal revenues in business segments)

Opportunities

- fragmented competition in the 1 MWp – 20 MWp PV sweet spot
- solar power finally competitive without subsidies
- access to promising technology (RayGen) via equity participation
- catch up potential in CEE and a well filled project pipeline (745 MWp)
- increasing electricity prices combined with a shift to selling electricity at market prices
- high prices for fossil energy and geopolitical tailwinds
- increasing interest in behind-the-meter projects
- PFAS water remediation potentially huge market

Threats

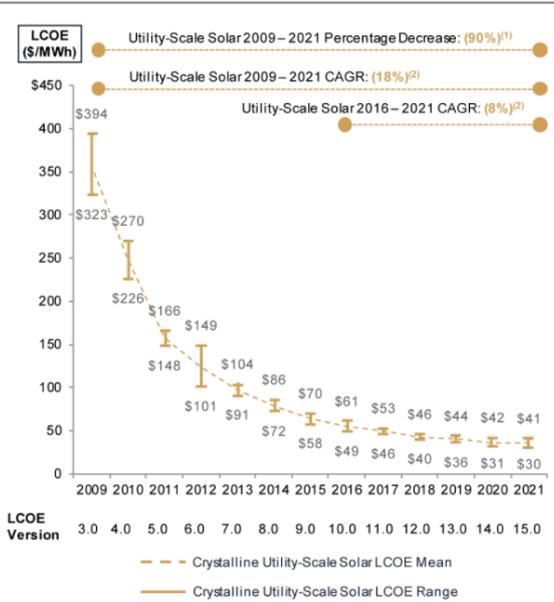
- water business line could distract focus
- volatile market prices and supply bottlenecks for solar panels
- large-scale project risk (cost overruns, change in market conditions during development etc.)
- regulatory risks, for example retroactive adjustments to feed-in tariffs

Growth

The solar market is the **fastest growing sector within the global energy industry**. There are several drivers for growth:

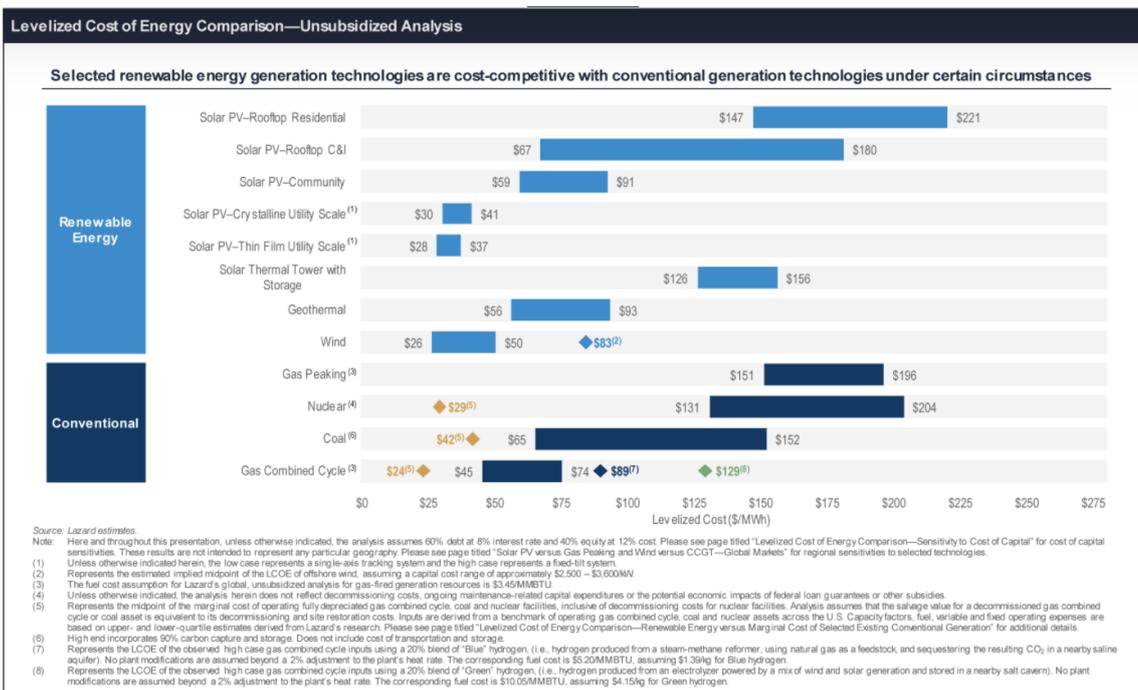
First, and foremost, the **costs of producing solar energy have declined steeply** over the past decade. Between 2009 and 2021, the full life-cycle costs of generating a unit of photovoltaic electricity (the levelized cost of energy, LCOE) have dropped by 90%, or on average by 18% per year:

Unsubsidized Solar PV LCOE



Source: Lazard, 2022

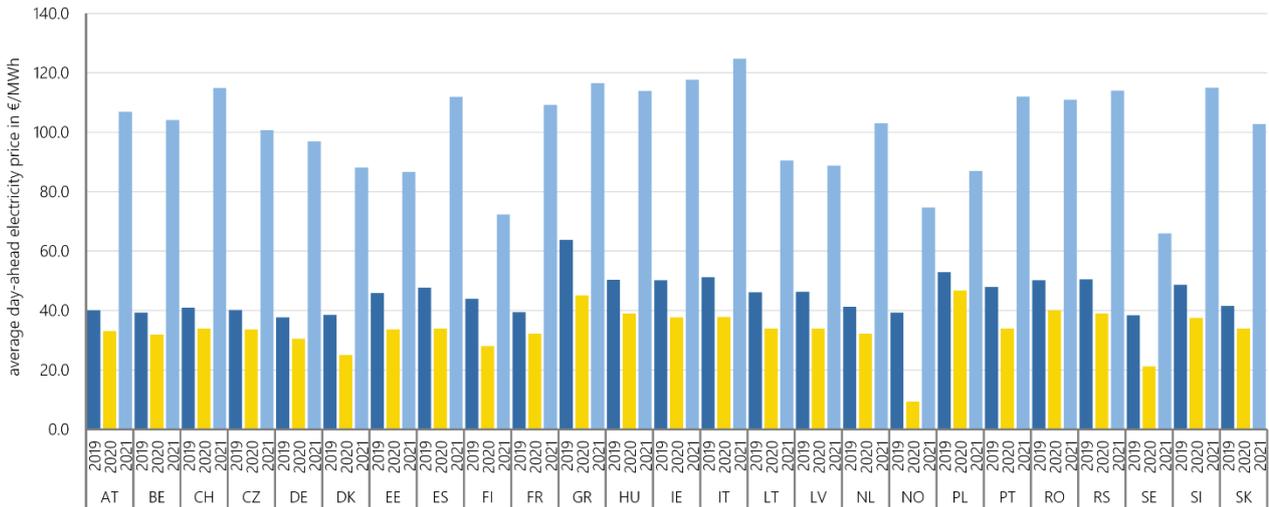
This decline in costs has resulted in a situation where solar energy at utility scale is **cost-competitive with other renewable technologies and with conventional fossil fuel and nuclear-powered generation technologies**:



Source: Lazard, 2022

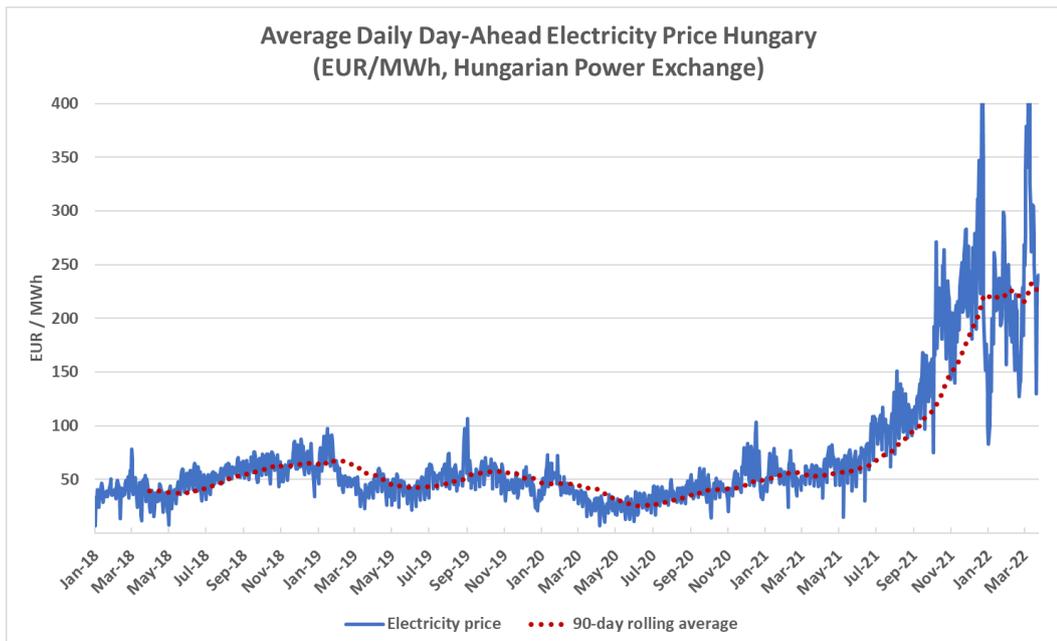
So utility-scale photovoltaic power generation does not require subsidies any more to be viable, and it has even become more competitive versus gas or coal following the recent increase in fossil fuel prices and the related increases in electricity prices.

The following chart shows that the average day-ahead electricity price more than tripled in many European markets from 2020 to 2021. This also holds for Hungary, where Photon Energy Group has started selling electricity at market prices:



Source: FfE München

A more granular view on the Hungarian market shows the steep increase in daily prices starting mid-2021 and holding up until today (last data point in the chart is 24 March 2022). Despite significant volatility in 2022, the 90-day rolling average has been continuously in excess of EUR 200 per MWh in 2022, which makes utility-scale PV facilities highly profitable:



Source: Hungarian Power Exchange, AlsterResearch

A second reason for solar electricity’s steep growth is that compared to other renewable energy technologies, new solar projects meet **relatively little local opposition** and NIMBYism: unlike wind parks, they have **no noise emissions**, a **lower level of visual intrusion** (less of an eyesore due to their lower height and lack of irritating movements and flickering shadows) and they don’t harm migrating birds. They have also been shown to have **no significant negative impact on residential or commercial property values** nearby and are thus favored by local planning officials. A study covering the overwhelming majority of all wind and solar projects in the U.K. until 2021 has shown that the planning process takes three to four times longer for wind projects compared to solar projects, and the initial approval rate for solar projects at 72% is much higher than for wind projects at 39% (see table below). It can be assumed that similar relations hold in other countries.

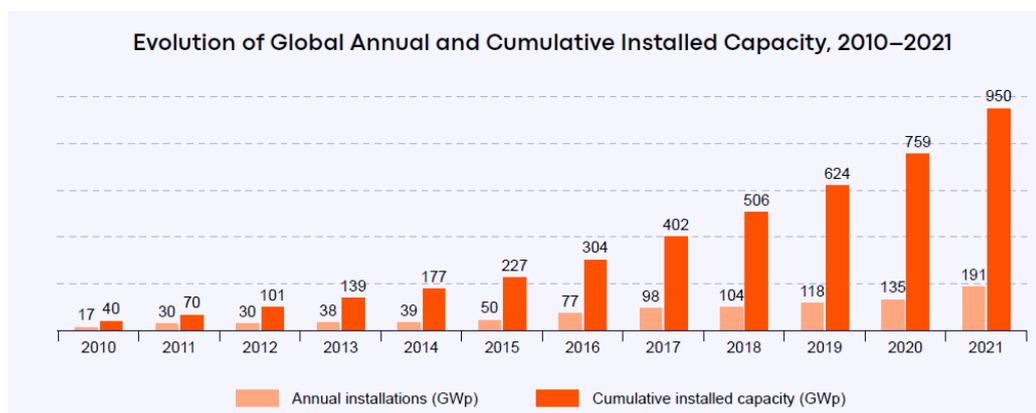
Table 1: Summary Statistics on Project Planning Outcomes

	Solar	Wind
Number of Projects	1675	1775
Total Capacity (MW)	13737	58618
Average Capacity (MW)	8.2	33.0
Length of Planning Process to Initial Decision (days)	143	545
Length of Planning Process to Final Decision (days)	184	643
Initial Decision Approval Rate	0.724	0.391
Share of Projects subject to National Authority Decision	0.001	0.128
National Authority Initial Decision Approval Rate	1.000	0.648
Local Authority Initial Decision Approval Rate	0.723	0.353
Share of Projects Appealed	0.123	0.230
Appeal Success Rate	0.461	0.460
Final Decision Approval Rate	0.779	0.490

Notes: This table contains summary statistics for all wind and solar energy projects in the UK with a capacity of 1MW or greater. This excludes projects that are under review at the time of writing. Projects can be subject to approval by either a local or national planning authority. The planning authority makes an initial decision to either approve or refuse the project. Projects may then be appealed in which case the final decision may differ from the initial decision.

Source: Jarvis, S. (2021), *The Economic Costs of NIMBYism: Evidence from Renewable Energy Projects*

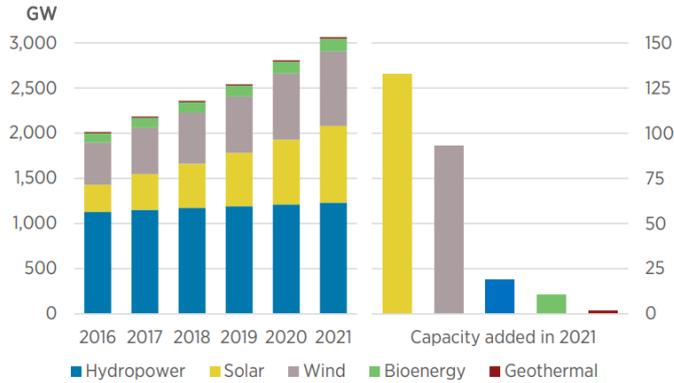
Finally, as a renewable energy, solar energy is a crucial building block for **decarbonization and the green transition** of electricity production following the Paris climate agreement goals. Thus it has significant tailwinds from federal and regional governments, ranging from benign regulatory environments to different kinds of subsidy schemes. According to the International Renewable Energy Agency, **164 countries have renewable energy targets in place**. As a result, the installed PV capacity has grown more than 20-fold between 2010 and 2021:



Source: Photon Energy

Consequently, the solar capacity added worldwide in 2021 surpassed the wind capacity by a significant margin. Thus it is hardly surprising that solar is overtaking wind as the second largest provider of renewable energy worldwide, only tracking hydropower, which however is stagnating (see graph below).

Renewable power capacity growth



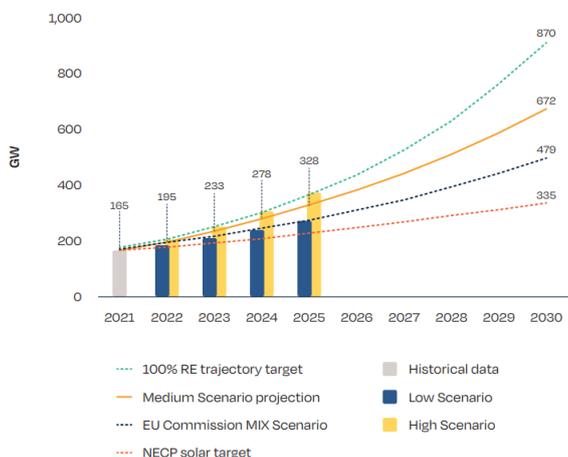
Source: IRENA Renewable capacity highlights 2022

The main drawback of solar energy is the fact that there often is a **timing difference between power supply and power demand** (the duck curve or Dunkelflaute problem). For example, daily peak supply from solar installations is around noon, while daily peak electricity demand usually is in the evening. Thus solar needs to be complemented by dispatchable generation capacity like natural gas power plants to achieve load balancing. Alternatively, demand can be managed to better match supply, for example by using time-of-use pricing. Finally, the energy generated by solar plants can be stored to bridge the timing difference, for example in pumped-storage hydroelectrical facilities, battery storage power stations, EV batteries or thermal energy storage.

Photon Energy holds a stake in RayGen, a company that has developed the PV Ultra system, a technology to cogenerate electricity and heat and store energy in two reservoirs of different temperatures. The heat can be converted into electricity at any time through a thermally-driven engine, thus overcoming the mismatch (see section Company Background).

Despite the load balancing challenges, the considerable advantages of solar power set the stage for rapid growth: in a medium scenario projection, the installed photovoltaic capacity in the EU is expected to **double between 2021 and 2025, translating into a CAGR of 18,7%**, followed by another doubling between 2025 and 2030:

EU PV market scenarios

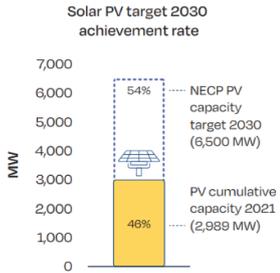


Source: Solarpower Europe; AlsterResearch

In order to meet the EU’s new energy and climate targets for 2030, member states must establish a 10-year “National Energy and Climate Plan” (NECP) for the period from 2021 to 2030. It is instructive to take a look at the current progress in achieving the targets set in the NECP, though it has to be kept in mind that solar energy is increasingly cost-competitive and less reliant on government quotas or subsidies.

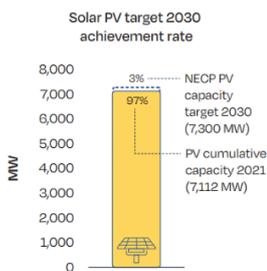
Key future focus markets for Photon Energy Group are Poland, Hungary, Romania and Australia. All these countries apart from Romania feature power plants owned by Photon Energy. The current state of affairs for Photon Energy’s most important markets is as follows (source for graphs: Solarpower Europe):

Hungary:



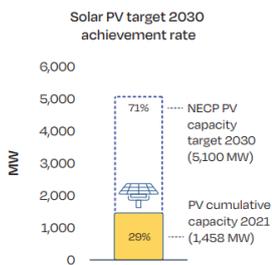
Hungary represents a big growth opportunity. The country has a gap of over 3,500 MW left to fulfill its NECP targets. This translates into an increase of solar output of over 118%. The Hungarian government is encouraging so called prosumers (consumers who also produce) and with that the installation of photovoltaic plants on houses as part of carbon emission reduction policies.

Poland:



Poland has almost reached its NECP target, which however can be regarded as being relatively unambitious. This is seen in the low relative target of only 198 Watt per capita, compared to the EU average of 758 W/cap. A CO2 emission tax has resulted in a recent boom, with installed capacity increasing by a factor of 10 over the past two years.

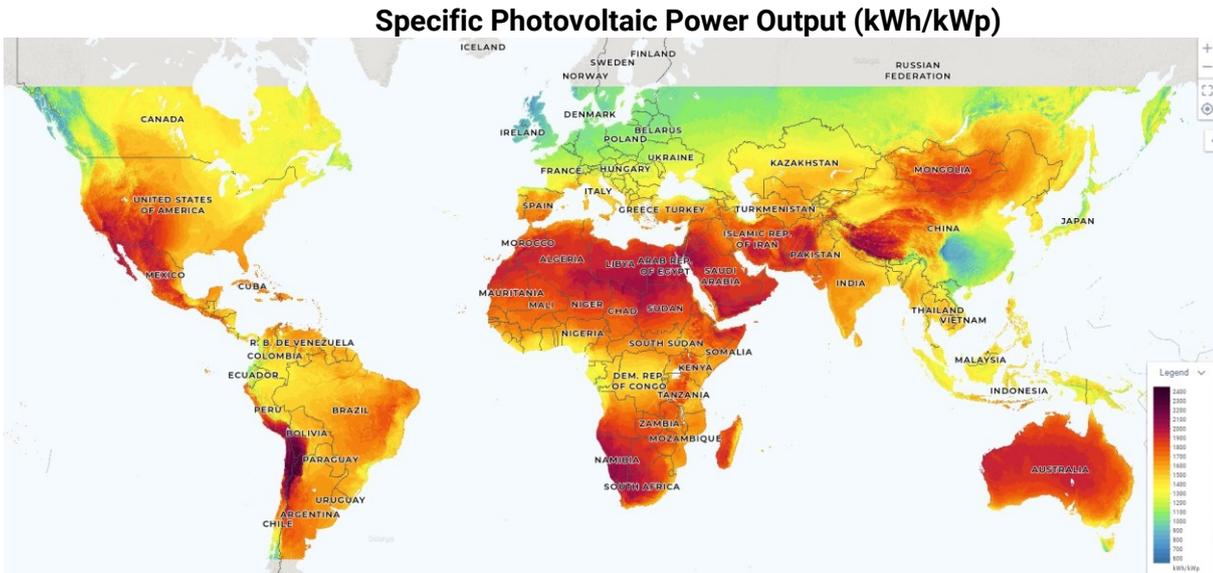
Romania:



Romania is a strongly underdeveloped market with targets of more than tripling the current output from 1458 MW to 5100 MW (increase of 249%). Even though this target seems ambitious it is still significantly lower than for other European countries when compared on a per capita basis, meaning there could be more to come. Romania has favorable conditions for PV facilities as it is quite sunny. A national tender for utility-scale installations is expected in 2022.

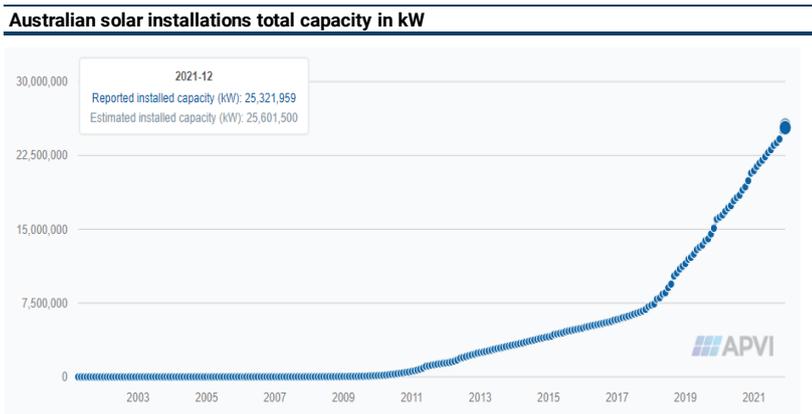
Australia:

Australia has very favorable conditions for solar electricity production: the solar irradiance, i.e. the power per unit area received from the sun in the form of electromagnetic radiation, in large parts of the country is higher than in any part of Europe. As a result, the output per unit of installed photovoltaic capacity can be up to twice as high as in CEE countries, as displayed in the following graph:



Source: Global Solar Atlas, 2022

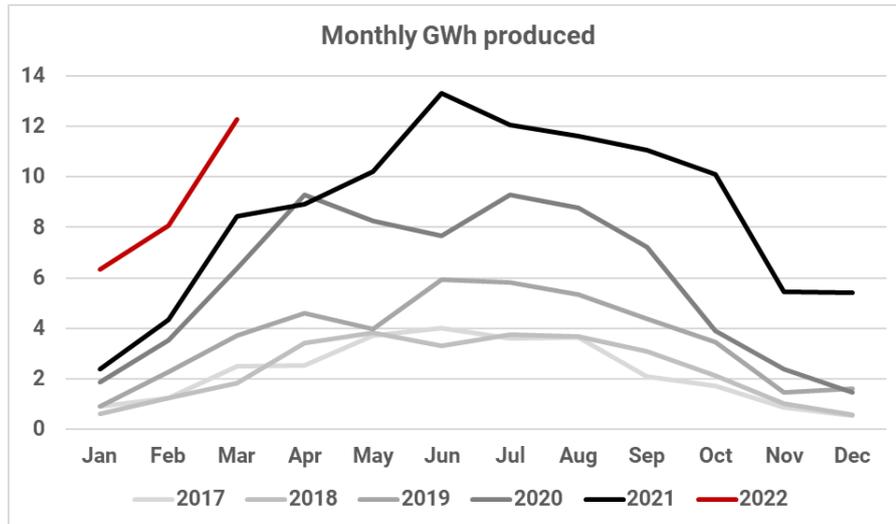
In addition, Australia has vast open spaces where utility scale solar plants can be built. As a logical result, Australian solar installations experienced stellar growth in the last decade:



Source: Australian PV Institute; AlsterResearch

This growth looks set to continue according to Mordor Intelligence, at **an expected CAGR of 20.6% from 2022-2027**. Photon Energy has indicated that the group will focus future project development activities in Australia on utility-scale projects based on RayGen technology, i.e. combined solar co-generation and electro-thermal energy storage.

Overall, Photon Energy has continually built its proprietary portfolio, reporting rising monthly electricity production numbers:



Source: Photon Energy, AlsterResearch

The current **project pipeline of Photon Energy** is loaded with a volume of almost 750 MWp in different stages (see below), compared to current capacity of c. 90 MWp. These projects are being developed in Romania, Poland, Hungary and Australia. Photon Energy distinguishes 5 phases of a solar project: feasibility, early development, advanced development, ready-to-build technical, and under construction. The corresponding timeline depends on many variables, and especially on the size of the project. For Photon Energy’s projects in Europe and smaller projects in Australia, the development phase takes 12 to 24 months and the construction phase 6 to 12 months. Very large projects like the 300 MW Raygen project have longer development times of 3 to 4 years and construction times of 1 to 2 years.

Photon has the option to sell plants after reaching the “ready to build” phase, which could be used to finance new projects if necessary. The most notable pipeline project is the development of a 300 MWp generation capacity / 3.6 GWh storage capacity RayGen solar project in Australia, one of the world’s largest solar energy storage projects. Further details on the pipeline are shown in the next graph.

Country	1. Feasibility*	2. Early development	3. Advanced development	4. Ready-to-build technical	5. Under construction	Total in MWp
Australia	-	300.0	-	-	-	300.0
Hungary	-	23.1	2.7	-	1.4	27.2
Romania	33.8	97.6	93.2	-	-	224.6
Poland	166.0	27.9	-	-	-	193.9
Total in MWp	199.7	448.6	95.9	-	1.4	745.7

Source: Photon Energy Group

Water solutions market

The global water and wastewater treatment market is expected to grow from c. USD 283bn in 2021 to USD 465bn in 2028, at a CAGR of 7.3%. Water reservoirs are under increasing stress due to agricultural, municipal and industrial demands. Treatment of water is thus necessary to meet these demands, while at the same time preserving natural habitats and biodiversity.

Photon Energy Group is still a marginal player in the water market, and the growth of the division is less dependent on overall market growth. Rather, future growth will to a large part depend on the commercial success of the PFAS remediation technology developed, which at this stage is still difficult to predict.

Wetland restoration in the Czech Republic



Source: Company data; AlsterResearch

Putting it all together

The table below shows the sales and EBIT growth for Photon Energy Group as a whole. For further detail on the growth of divisions, see the next section ("Key Planning Assumptions").

Growth table (EURm)	2019	2020	2021	2022E	2023E	2024E
Sales	30.2	28.3	36.4	65.0	76.1	93.6
Sales growth	48.9%	-6.3%	28.7%	78.7%	17.1%	23.0%
EBIT	1.1	-0.1	-0.7	5.8	19.3	22.8
EBIT margin	3.5%	-0.5%	-2.0%	9.0%	25.3%	24.4%
Net profit	-0.7	2.1	2.1	5.3	34.9	49.1

Source: Company data; AlsterResearch

Quarterly performance table

P&L data	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
Sales	5.3	8.9	9.0	5.1	4.6	9.9	10.2	11.7
yoy growth in %	26.6%	11.8%	-12.7%	-34.2%	-14.0%	10.9%	13.8%	130.3%
Gross profit	4.2	6.6	6.6	1.9	4.1	7.1	8.1	4.4
Gross margin in %	78.7%	74.2%	73.5%	37.4%	88.9%	72.4%	79.0%	37.3%
EBITDA	1.2	4.0	3.8	-1.1	0.2	4.0	4.4	0.9
EBITDA margin in %	22.5%	45.4%	42.0%	-21.8%	3.7%	40.5%	43.5%	8.0%
EBIT	-0.1	1.6	1.1	-3.0	-1.5	1.0	0.4	-1.0
EBIT margin in %	-1.5%	18.2%	12.1%	-59.7%	-32.3%	9.8%	4.1%	-8.9%
EBT	-1.8	0.1	-0.6	-4.2	-3.1	-0.6	-1.1	-1.2
taxes paid	-0.1	1.1	1.0	0.1	0.1	0.3	0.3	-0.2
tax rate in %	7.4%	750.3%	-167.0%	-3.6%	-3.9%	-53.7%	-30.9%	20.0%
net profit	-1.7	-0.9	-1.6	-4.4	-3.1	-0.8	-1.4	-1.0
yoy growth in %	na%							
EPS	-0.03	-0.02	-0.03	-0.08	-0.06	-0.02	-0.03	-0.02

Source: Company data; AlsterResearch

Key Planning Assumptions

Strategic targets and guidance

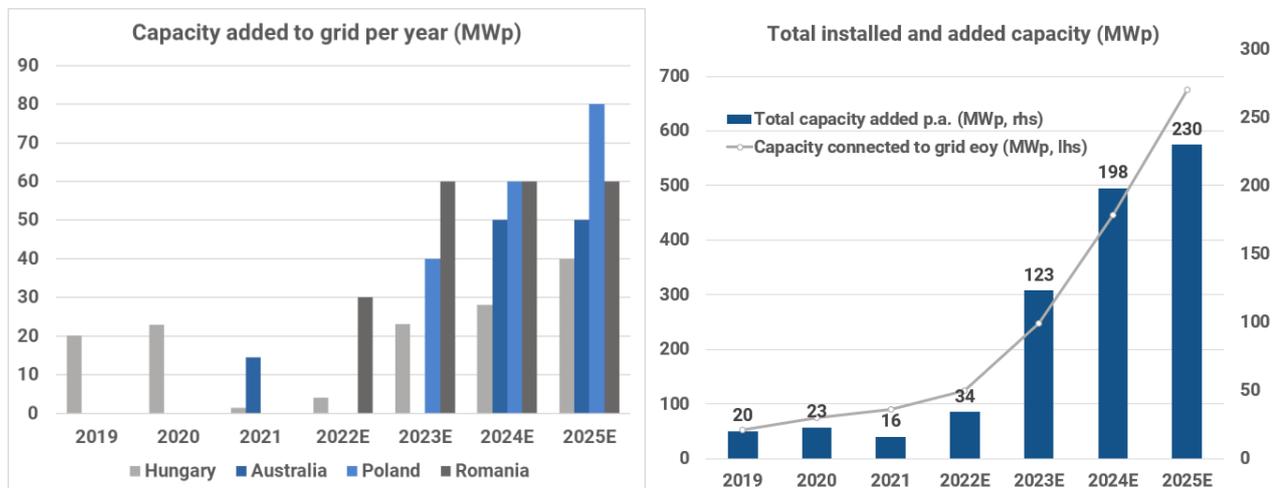
Photon Energy Group has provided guidance on the medium-term expectations in the form of **strategic targets per business segment by 2024**. Quantitative medium-term targets are:

- The target output of the portfolio of **proprietary solar plants is 600 MWp**, from 90.5 MWp at the end of 2021. The development pipeline shall be 1.5 GWp, roughly doubling from today.
- The portfolio under operations & maintenance (**O&M**) contracts is targeted at **1 GWp**, from currently 310 MWp (roughly a doubling of external volume).
- **EBITDA** is projected to grow **five-fold** from 2020 to 2024.
- The **equity ratio** is sustained above **25%**.

As **guidance for 2022**, Photon Energy expects **EUR 65m of revenues** and **EUR 18m of EBITDA**.

Revenues

The model only captures external revenues. Following are the assumptions for the business units. In the **Investment Business Unit**, we assume that the current pipeline will be fully connected to the grid by the end of 2025 in Hungary, Poland and Romania. For Australia, the connection to the grid of the 300MWp pipeline will be staggered in 50 MWp batches starting 2024:



Source: Photon Energy, AlsterResearch

Overall, this results in a less steep capacity ramp-up than suggested by the strategic targets. The 600 MWp targeted for the end of 2024 will under these assumptions only be reached in the course of 2025. The reason for a more cautious approach is that supply bottlenecks, for example in modules, could lead to delays. Also, the timing of some project parameters is outside the influence of Photon Energy, for example when it comes to permits.

The **Solutions** business unit stands to benefit from increasing demand for behind-the-meter projects, especially in Europe. We expect revenues to increase from EUR 5.6m in 2021 to EUR 10.0m in 2024. The **Technology** unit (trading business) has more than doubled revenues in 2021 to EUR 8.3m. We expect revenues to move into double digits quickly and reach EUR 11.0m in 2024. There is some upside to this number, especially considering the planned introduction of a B2B sales platform. For **O&M**, we expect external revenues to double from EUR 2.6m in 2021 to EUR 5.2m in 2024, in line with the strategic targets. Finally, for **Water**, we expect this division to remain a marginal business with revenues below EUR 1m in 2024. Success of the PFAS remediation would provide upside to these estimates.

EBITDA

The overall development of the EBITDA margin is mostly impacted by mix effects. Going forward, we assume the following EBITDA margins for the divisions:

- **Investment:** We expect the EBITDA margin to increase from 82% to 87% as the lower-margin Czech business is diluted by new capacity in higher-margin countries. These margin assumptions are in line with other pure-play solar IPPs. As Photon Energy is going merchant for part of the capacity, there is upside to these margins if electricity prices remain at the current elevated level.
- **Solutions:** We assume a 15% EBITDA-margin, which is roughly the average level achieved in the past two years. Yearly margins can be very volatile, depending on the timing of phases of large projects.
- **Technology:** We assume a sustainable EBITDA-margin of this lower-margin trading business at 7%. The higher 2021 figure is probably not sustainable as it was supported by a short supply and increasing prices of modules.
- **O&M:** Over the last years, this unit only just broke even on EBITDA-level. However, Photon Energy is still in the ramp-up phase in Poland and Romania, and once operations have reached critical mass there, EBITDA-margins of 20% should be feasible.
- **Water:** Due to spending for the PFAS remediation technology, we assume this division will continue to be loss-making on EBITDA-level.

Putting it all together, the **EBITDA-margin for the group looks set to rise from 65% in 2021 to more than 80% in 2024**, mostly a result of the strong growth of the Investment unit. The strategic target of a five-fold increase of EBITDA 20-24E would thus be over-achieved.

Capex, depreciation and OCI

We assume that capex per newly installed MWp is EUR 660k in 22E, growing to EUR 687k in 24E. For the Raygen technology, we assume EUR 1.5m per MWp, including storage. For capacity transferred into the proprietary portfolio, Photon Energy recognizes an estimated EUR 250k per MWp as Other Comprehensive Income (OCI) from revaluing the asset. This is included as a non-cash component in capex and also included in the basis for depreciation. Solar facilities are depreciated over 25 years.

Financing

The steep capacity ramp-up will lead to negative cash flows over the next years, which will require outside financing. We have assumed that all needs are financed by debt at an interest rate of 6.5%, which is the coupon of the most recently placed EUR 55m green bond. The high demand for the bond, a good ESG rating and the growing share of stable cash flows make it likely that Photon Energy can also secure attractive financing conditions going forward. In the AlsterResearch estimates, Photon Energy can maintain the targeted 25% equity ratio despite the considerable financing needs.

Valuation

DCF Model

The DCF model results in a **fair value of EUR 4.10 per share**. This includes the equity stakes in Raygen and Lerta only at book value, which could provide further upside.

Top-line growth: We expect Photon Energy NV to grow strongly, driven mostly by investments in electricity generation. Hence our growth estimates for 2021-28E is in the range of 17.9% p.a. The long-term growth rate is set at 2.0%.

Cash Flows. We expect Photon Energy to invest into growth over the whole planning period. In the normalized year, we set capex at the level of depreciation, leading to positive cash flows.

WACC. We set the historical equity beta to 1.00, leading to an unlevered beta of 0.68, roughly in line with the average 2017-2021 unlevered industry beta for Green & Renewable Energy in Western Europe. Combined with a risk-free rate of 2.0% and an equity risk premium of 6.0% this yields cost of equity of 9.9%. With pre-tax cost of borrowing at 6.5%, a tax rate of 30.0% and target debt/equity of 1.3 this results in a long-term WACC of 6.8%.

DCF (EUR m) (except per share data and beta)	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	Terminal value
NOPAT	4.1	13.5	16.0	24.7	33.3	41.7	48.2	52.1	
Depreciation & amortization	12.2	16.6	25.6	35.9	45.3	52.2	58.4	61.6	
Change in working capital	-3.3	-2.7	-3.8	-6.1	-5.0	-4.4	-3.7	-2.4	
Chg. in long-term provisions	5.1	-1.0	-1.2	1.7	3.5	3.1	2.6	1.7	
Capex	-22.5	-82.9	-176.7	-199.6	-184.1	-133.4	-118.6	-61.6	
Cash flow	-4.4	-56.5	-140.1	-143.3	-106.9	-40.7	-13.1	51.4	1,084.9
Present value	-4.2	-50.4	-116.5	-111.0	-77.1	-27.4	-8.2	30.0	652.9
WACC	6.8%	6.9%	7.1%	7.2%	7.2%	7.2%	7.2%	7.2%	6.8%

DCF per share derived from

Total present value	288.0
Mid-year adj. total present value	298.0
Net debt / cash at start of year	89.1
Financial assets	14.1
Provisions and off b/s debt	0.0
Equity value	223.1
No. of shares outstanding	54.4

Discounted cash flow / share	4.10
upside/(downside)	115.7%

Share price	1.94
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DCF avg. growth and earnings assumptions

Planning horizon avg. revenue growth (2021E - 2028E)	17.9%
Terminal value growth (2028E - infinity)	2.0%
Terminal year ROCE	6.3%
Terminal year WACC	6.8%

Terminal WACC derived from

Cost of borrowing (before taxes)	6.5%
Long-term tax rate	30.0%
Equity beta	1.00
Unlevered beta (industry or company)	0.68
Target debt / equity	1.3
Relevered beta	1.31
Risk-free rate	2.0%
Equity risk premium	6.0%
Cost of equity	9.9%

Sensitivity analysis DCF

Change in WACC (%-points)	Long term growth						Share of present value	
	1.0%	1.5%	2.0%	2.5%	3.0%	2021E - 2024E	2025E - 2028E	
2.0%	-1.3	-0.9	-0.3	0.3	1.1	-98.0%	-28.7%	
1.0%	-0.0	0.7	1.5	2.4	3.6			
0.0%	1.9	2.9	4.1	5.6	7.5			
-1.0%	4.7	6.3	8.3	10.9	14.4			
-2.0%	9.1	11.9	15.6	21.0	29.3		226.7%	

Source: AlsterResearch

FCF Yield Model

Due to the fact that companies rarely bear sufficient resemblance to peers in terms of geographical exposure, size or competitive strength and in order to adjust for the pitfalls of weak long-term visibility, an Adjusted Free Cash Flow analysis (Adjusted FCF) has been conducted.

The adjusted Free Cash Flow Yield results in a fair value between EUR 2.05 per share based on 2022E and EUR 9.15 per share on 2026E estimates. Again, the equity stakes in Raygen and Lerta are included only at book value, which could provide further upside.

The main driver of this model is the level of return available to a controlling investor, influenced by the cost of that investors' capital (opportunity costs) and the purchase price – in this case the enterprise value of the company. Here, the adjusted FCF yield is used as a proxy for the required return and is defined as EBITDA less minority interest, taxes and investments required to maintain existing assets (maintenance capex).

FCF yield in EURm	2022E	2023E	2024E	2025E	2026E
EBITDA	18.0	35.9	48.5	71.1	92.9
- Maintenance capex	9.5	13.2	20.4	28.6	36.2
- Minorities	0.0	0.0	0.0	0.0	0.0
- tax expenses	-1.4	1.8	-0.2	0.1	1.1
= Adjusted FCF	9.9	21.0	28.2	42.3	55.6
Actual Market Cap	105.4	105.4	105.4	105.4	105.4
+ Net debt (cash)	100.9	166.7	323.1	490.8	628.5
+ Pension provisions	0.0	0.0	0.0	0.0	0.0
+ Off B/S financing	0.0	0.0	0.0	0.0	0.0
- Financial assets	14.1	14.1	14.1	14.1	14.1
- Acc. dividend payments	0.0	0.0	0.0	0.0	0.0
<i>EV Reconciliations</i>	86.8	152.6	309.0	476.7	614.4
= Actual EV'	192.1	257.9	414.4	582.1	719.8
Adjusted FCF yield	5.2%	8.1%	6.8%	7.3%	7.7%
base hurdle rate	6.0%	6.0%	6.0%	6.0%	6.0%
ESG adjustment	1.0%	1.0%	1.0%	1.0%	1.0%
adjusted hurdle rate	5.0%	5.0%	5.0%	5.0%	5.0%
Fair EV	198.2	419.8	564.9	847.0	1,111.5
- <i>EV Reconciliations</i>	86.8	152.6	309.0	476.7	614.4
Fair Market Cap	111.4	267.2	255.9	370.3	497.2
No. of shares (million)	54.4	54.4	54.4	54.4	54.4
Fair value per share in EUR	2.05	4.92	4.71	6.81	9.15
Premium (-) / discount (+)	7.8%	158.4%	147.4%	258.1%	380.8%

Sensitivity analysis FV						
	3.0%	4.5	10.1	11.6	17.2	22.8
Adjusted hurdle rate	4.0%	3.0	6.8	7.3	10.7	14.3
	5.0%	2.0	4.9	4.7	6.8	9.1
	6.0%	1.4	3.6	3.0	4.2	5.7
	7.0%	1.0	2.7	1.7	2.4	3.3

Source: Company data; AlsterResearch

Simply put, the model assumes that investors require companies to generate a minimum return on the investor's purchase price. The required after-tax return equals the model's hurdle rate of 6.0%. Anything less suggests the stock is expensive; anything more suggests the stock is cheap. **ESG adjustments might be applicable, based on the overall Leeway ESG Score. A high score indicates high awareness for environmental, social or governance issues and thus might lower the overall risk an investment in the company might carry. A low score on the contrary might increase the risk of an investment and might therefore trigger a higher required hurdle rate.**

Peer Group

The following is a peer group of **renewable energy companies**:

Company name	Sales	ROCE	Market data			
			Share price	% of 52 wk high	Market Cap	EV
2021	2021					
ECV:GR Encavis AG	333	4,5%	20,48	-5%	3.286	4.770
HRPK:GR 7C Solarparken AG	56	3,7%	4,60	-4%	351	580
AB9:GR ABO Wind AG	127	na	63,60	-6%	586	654
SLR:SM Solaria Energia y Medio Ambien	95	8,3%	21,51	-8%	2.688	3.202
GRE:SM Grenergy Renovables SL	83	9,0%	34,82	-8%	972	1.207
Mean		4,1%			1.577	2.083
P7V:GR Photon Energy NV	36	-0,4%	1,90	-35%	105	206

Source: AlsterResearch, Sentio

Encavis AG, formerly Capital Stage AG, is a Germany-based producer of electricity from renewable energy sources. The Company invests in solar and wind parks, which it also operates. The Company divides its activities into four segments: Solar Parks, which is engaged in acquisition and operation of ground mounted photovoltaic (PV) parks; Wind Parks, engaged in acquisition and operation of onshore wind parks; Institutional Clients, which, through Encavis Asset Management AG, offers customized portfolios or fund solutions for investments in renewable energies, and Technical Services, responsible for technical operation and maintenance of PV parks. The Company focuses on the acquisition of finished solar and wind parks that are already connected to the power supply system. The Company operates more than 160 solar and more than 60 wind parks across Europe, in Germany, Italy, France and the United Kingdom, among others, with a total wind parks in Germany, Italy, France and the United Kingdom.

7C Solarparken AG is a Germany-based company engaged in the design, manufacture and operation of solar power plants. It also serves as an independent supplier of solar power systems, cooperating with a network of manufacturers, other suppliers and service providers. The Company divides its business operations into three segments: Plant operation, Projects & Services, and Trade. The Plant operation segment operates a portfolio of a number of solar power plants in Germany. The activities of Projects & Services segment comprise the maintenance and optimization of external photovoltaic systems and own solar power plants, as well as the development of solar projects for private and institutional investors. The Trade segment is engaged in the sales of solar modules and complementary accessories.

ABO Wind AG is a Germany-based company engaged in development of wind energy projects both domestically and internally. The Company plans and develops wind farms in Germany, France, Spain, Ireland, the United Britain, Belgium and Bulgaria. It initiates projects, acquires locations, manages technical and commercial planning, prepares financing and erects the wind farms. Furthermore, it engages planning and building of biogas plants. The Company, in addition to their own projects, manages wind farms on behalf of international operators. The project portfolio encompasses approximately 400 wind energy turbines with a total capacity of over 700 megawatts (MW) is the parent company of ABO Wind Group. Within the group, the Company has a minority stake in ABO Invest AG, which is engaged in operation of plants throughout Europe for the power generation from renewable energy sources.

Solaria Energia y Medio Ambiente SA (Solaria) is a Spain-based company engaged, together with its subsidiaries, in the renewable energy sector. The Company's activities comprise the designing and installation of solar, thermal, photovoltaic and wind energy plants. The Company's business is structured in three areas: Photovoltaic and Thermal Panels division, which is engaged in the development, production and sale of the solar panels. Turnkey Projects division includes the processing of licenses and permits, planning and design of photovoltaic systems, supervision and coordination of the construction of facilities, drafting and technical management of projects, as well as the set-up and maintenance of the installations. In the Generation division the Company develops, manages and operates its own photovoltaic plants.

Grenergy Renovables SL is a Spain-based company engaged in the marketing of energy recovery facilities. The Company develops projects and is an Independent Power Producer (IPP) that generates renewable energy mainly through solar photovoltaic plants.

Photon Energy is the smallest of these companies but, together with Solaria and Grenergy, has a much higher than average growth rate. In terms of margins, it is still below peer average, but catching up as the weight of the Investment unit is growing:

Company name	EBITDA Margin			EBIT margin			Sales CAGR
	2022	2023	2024	2022	2023	2024	2021-2024
ECV:GR Encavis AG	75,6%	75,5%	75,5%	37,3%	36,7%	35,7%	8,4%
HRPK:GR 7C Solarparken AG	82,9%	81,8%	81,7%	36,0%	32,0%	31,8%	5,2%
AB9:GR ABO Wind AG	18,6%	18,6%	17,6%	11,9%	14,6%	15,7%	26,1%
SLR:SM Solaria Energia y Medio Ambiente SA	84,2%	85,5%	84,8%	67,2%	67,5%	65,7%	50,8%
GRE:SM Grenergy Renovables SL	35,4%	43,8%	48,2%	28,0%	33,6%	35,6%	56,6%
Mean	59,0%	58,6%	58,3%	28,4%	27,8%	27,7%	13,2%
P7V:GR Photon Energy NV	27,8%	47,2%	51,8%	9,0%	25,3%	24,4%	37,0%

Source: AlsterResearch, Sentio

A valuation on **EV/EBITDA** shows that Photon Energy is **trading at a discount of between 30% (22E) and almost 45% (23E)** compared to the peer group mean:

Company name	EV/EBITDA		
	2022	2023	2024
ECV:GR Encavis AG	17,4x	16,5x	14,9x
HRPK:GR 7C Solarparken AG	10,5x	11,1x	10,8x
AB9:GR ABO Wind AG	17,2x	14,9x	14,5x
SLR:SM Solaria Energia y Medio Ambiente SA	20,3x	14,7x	11,6x
GRE:SM Grenergy Renovables SL	16,8x	9,9x	7,9x
Mean	16,4x	13,4x	12,0x
P7V:GR Photon Energy NV	11,4x	7,6x	8,8x

Source: AlsterResearch, Sentio

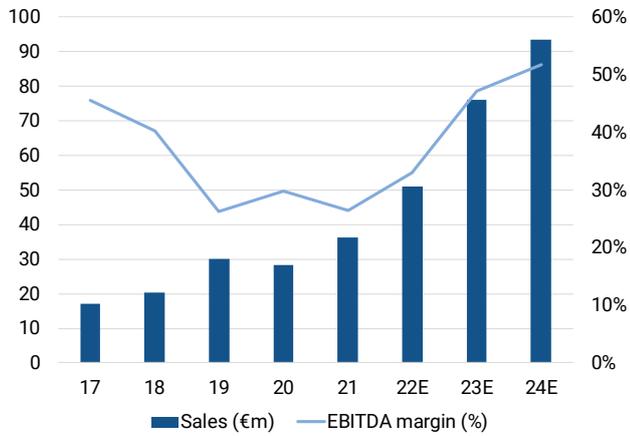
Valuation on the mean EV/EBITDA results in **fair values between EUR 3.60 and EUR 5.79 per share** of Photon Energy:

Photon Energy NV	EBITDA		
	2022	2023	2024
Financial data (eAR)	18	36	48
Fair multiple	16,4x	13,4x	12,0x
Fair EV	297	481	579
Net debt (cash)	101	167	323
Pension provisions	0	0	0
Fair equity value	196	315	256
Number of shares	54,4	54,4	54,4
Fair value per share	3,60	5,79	4,71

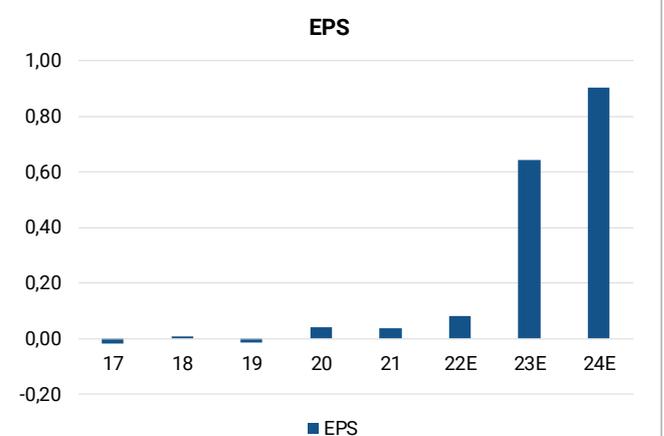
Source: AlsterResearch, Sentio

Financials in six charts

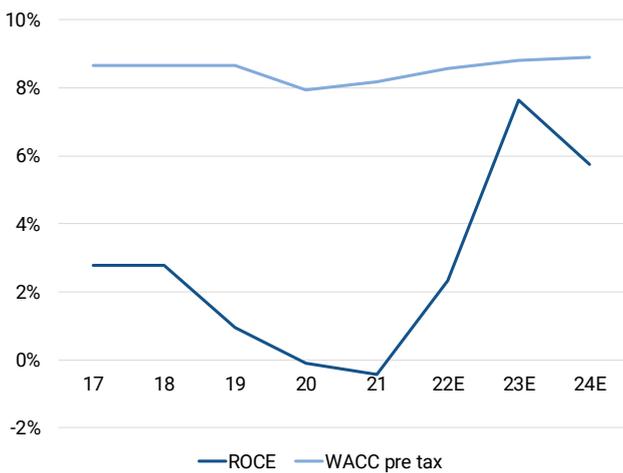
Sales vs. EBITDA margin development



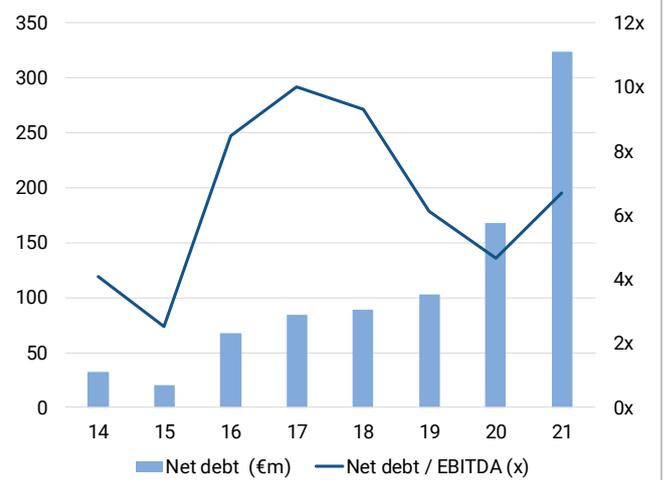
EPS, DPS in EUR & yoy EPS growth



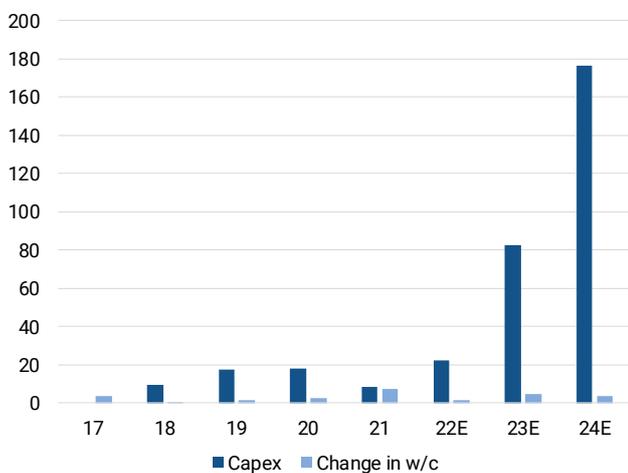
ROCE vs. WACC (pre tax)



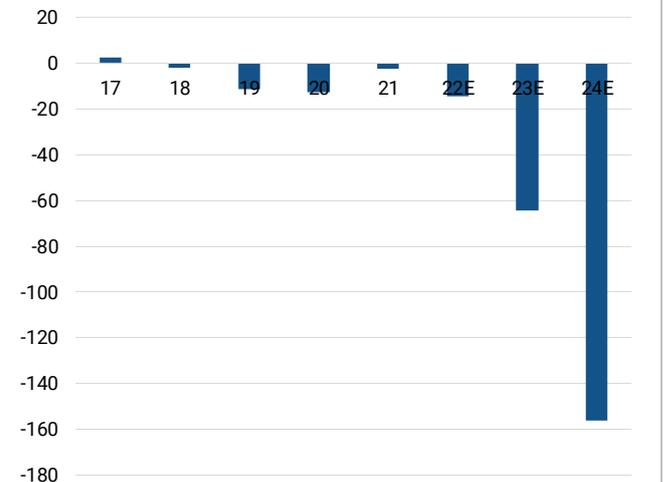
Net debt and net debt/EBITDA



Capex & chgn in w/c requirements in EURm



Free Cash Flow in EURm



Source: Company data; AlsterResearch

Financials

Profit and loss (EUR m)	2019	2020	2021	2022E	2023E	2024E
Net sales	30.2	28.3	36.4	65.0	76.1	93.6
Sales growth	48.9%	-6.3%	28.7%	78.7%	17.1%	23.0%
Change in finished goods and work-in-process	0.0	0.0	0.0	0.0	0.0	0.0
Total sales	30.2	28.3	36.4	65.0	76.1	93.6
Material expenses	9.8	4.6	12.7	24.0	15.7	16.7
Gross profit	20.4	23.6	23.6	41.0	60.4	76.9
Other operating income	0.2	0.4	0.6	0.6	0.8	0.9
Personnel expenses	4.6	5.8	6.7	11.9	13.1	15.3
Other operating expenses	8.0	9.7	7.7	11.7	12.2	14.0
EBITDA	7.9	8.4	9.6	18.0	35.9	48.5
Depreciation	6.8	8.3	10.7	11.9	16.5	25.5
EBITA	1.1	0.1	-0.9	6.1	19.5	23.0
Amortisation of goodwill and intangible assets	0.1	0.3	-0.2	0.3	0.2	0.1
EBIT	1.1	-0.1	-0.7	5.8	19.3	22.8
Financial result	-4.4	-6.4	-5.2	-10.5	-13.3	-23.4
Recurring pretax income from continuing operations	-3.3	-6.5	-5.9	-4.7	5.9	-0.6
Extraordinary income/loss	0.0	0.0	0.0	0.0	0.0	0.0
Earnings before taxes	-3.3	-6.5	-5.9	-4.7	5.9	-0.6
Taxes	1.7	2.2	0.5	-1.4	1.8	-0.2
Net income from continuing operations	-5.1	-8.7	-6.4	-3.3	4.2	-0.4
Result from discontinued operations (net of tax)	4.3	10.8	8.5	8.5	30.8	49.5
Net income	-0.7	2.1	2.1	5.3	34.9	49.1
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Net profit (reported)	-0.7	2.1	2.1	5.3	34.9	49.1
Average number of shares	51.17	51.20	54.36	54.36	54.36	54.36
EPS reported	-0.01	0.04	0.04	0.10	0.64	0.90

Profit and loss (common size)	2019	2020	2021	2022E	2023E	2024E
Net sales	100%	100%	100%	100%	100%	100%
Change in finished goods and work-in-process	0%	0%	0%	0%	0%	0%
Total sales	100%	100%	100%	100%	100%	100%
Material expenses	32%	16%	35%	37%	21%	18%
Gross profit	68%	84%	65%	63%	79%	82%
Other operating income	1%	1%	2%	1%	1%	1%
Personnel expenses	15%	21%	19%	18%	17%	16%
Other operating expenses	27%	34%	21%	18%	16%	15%
EBITDA	26%	30%	26%	28%	47%	52%
Depreciation	23%	29%	29%	18%	22%	27%
EBITA	4%	0%	-3%	9%	26%	25%
Amortisation of goodwill and intangible assets	0%	1%	-1%	0%	0%	0%
EBIT	3%	-1%	-2%	9%	25%	24%
Financial result	-15%	-23%	-14%	-16%	-18%	-25%
Recurring pretax income from continuing operations	-11%	-23%	-16%	-7%	8%	-1%
Extraordinary income/loss	0%	0%	0%	0%	0%	0%
Earnings before taxes	-11%	-23%	-16%	-7%	8%	-1%
Taxes	6%	8%	1%	-2%	2%	-0%
Net income from continuing operations	-17%	-31%	-18%	-5%	5%	-0%
Result from discontinued operations (net of tax)	14%	38%	23%	13%	40%	53%
Net income	-2%	7%	6%	8%	46%	52%
Minority interest	0%	0%	0%	0%	0%	0%
Net profit (reported)	-2%	7%	6%	8%	46%	52%

Source: Company data; AlsterResearch

Balance sheet (EUR m)	2019	2020	2021	2022E	2023E	2024E
Intangible assets (exl. Goodwill)	0.9	1.3	0.8	0.5	0.4	0.2
Goodwill	0.0	0.0	0.0	0.0	0.0	0.0
Property, plant and equipment	102.0	126.3	127.5	146.6	243.8	444.5
Financial assets	5.7	7.5	14.1	14.1	14.1	14.1
FIXED ASSETS	108.7	135.1	142.5	161.3	258.3	458.9
Inventories	1.2	1.0	2.2	5.3	3.4	3.7
Accounts receivable	5.6	6.1	9.1	16.0	18.8	23.1
Other current assets	6.5	2.2	2.9	2.9	2.9	2.9
Liquid assets	15.1	14.3	39.4	39.1	23.3	21.9
Deferred taxes	0.0	0.0	0.3	0.3	0.3	0.3
Deferred charges and prepaid expenses	0.0	0.3	0.3	0.5	0.6	0.7
CURRENT ASSETS	28.4	23.9	54.2	64.2	49.4	52.6
TOTAL ASSETS	137.0	158.9	196.6	225.5	307.7	511.5
SHAREHOLDERS EQUITY	37.9	40.2	51.7	56.9	91.9	141.0
MINORITY INTEREST	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Long-term debt	78.7	92.8	100.0	130.0	180.0	335.0
Provisions for pensions and similar obligations	0.0	0.0	0.0	0.0	0.0	0.0
Other provisions	1.1	10.8	11.1	16.2	15.2	14.0
Non-current liabilities	79.8	103.6	111.1	146.2	195.2	349.0
short-term liabilities to banks	3.7	6.0	28.5	10.0	10.0	10.0
Accounts payable	3.5	3.7	2.3	5.9	3.9	4.1
Advance payments received on orders	0.0	0.0	0.0	0.0	0.0	0.0
Other liabilities (incl. from lease and rental contracts)	4.7	4.9	3.2	6.5	6.8	7.5
Deferred taxes	7.4	0.6	0.0	0.0	0.0	0.0
Deferred income	0.1	0.0	0.0	0.0	0.0	0.0
Current liabilities	19.4	15.2	34.0	22.4	20.7	21.6
TOTAL LIABILITIES AND SHAREHOLDERS EQUITY	137.0	158.9	196.6	225.5	307.7	511.5

Balance sheet (common size)	2019	2020	2021	2022E	2023E	2024E
Intangible assets (excl. Goodwill)	1%	1%	0%	0%	0%	0%
Goodwill	0%	0%	0%	0%	0%	0%
Property, plant and equipment	74%	80%	65%	65%	79%	87%
Financial assets	4%	5%	7%	6%	5%	3%
FIXED ASSETS	79%	85%	72%	72%	84%	90%
Inventories	1%	1%	1%	2%	1%	1%
Accounts receivable	4%	4%	5%	7%	6%	5%
Other current assets	5%	1%	1%	1%	1%	1%
Liquid assets	11%	9%	20%	17%	8%	4%
Deferred taxes	0%	0%	0%	0%	0%	0%
Deferred charges and prepaid expenses	0%	0%	0%	0%	0%	0%
CURRENT ASSETS	21%	15%	28%	28%	16%	10%
TOTAL ASSETS	100%	100%	100%	100%	100%	100%
SHAREHOLDERS EQUITY	28%	25%	26%	25%	30%	28%
MINORITY INTEREST	-0%	-0%	-0%	-0%	-0%	-0%
Long-term debt	57%	58%	51%	58%	59%	65%
Provisions for pensions and similar obligations	0%	0%	0%	0%	0%	0%
Other provisions	1%	7%	6%	7%	5%	3%
Non-current liabilities	58%	65%	57%	65%	63%	68%
short-term liabilities to banks	3%	4%	14%	4%	3%	2%
Accounts payable	3%	2%	1%	3%	1%	1%
Advance payments received on orders	0%	0%	0%	0%	0%	0%
Other liabilities (incl. from lease and rental contracts)	3%	3%	2%	3%	2%	1%
Deferred taxes	5%	0%	0%	0%	0%	0%
Deferred income	0%	0%	0%	0%	0%	0%
Current liabilities	14%	10%	17%	10%	7%	4%
TOTAL LIABILITIES AND SHAREHOLDERS EQUITY	100%	100%	100%	100%	100%	100%

Source: Company data; AlsterResearch

Cash flow statement (EUR m)	2019	2020	2021	2022E	2023E	2024E
Net profit/loss	1.0	-6.5	-5.9	-3.3	4.2	-0.4
Depreciation of fixed assets (incl. leases)	6.8	8.3	10.7	11.9	16.5	25.5
Amortisation of goodwill	0.0	0.0	0.0	0.0	0.0	0.0
Amortisation of intangible assets	0.0	0.0	0.0	0.3	0.2	0.1
Others	-0.1	6.4	9.0	5.1	-1.0	-1.2
Cash flow from operations before changes in w/c	7.7	8.2	13.7	14.1	19.8	24.0
Increase/decrease in inventory	-0.1	0.1	-1.2	-3.1	1.8	-0.2
Increase/decrease in accounts receivable	-3.5	-1.1	-1.5	-6.9	-2.7	-4.3
Increase/decrease in accounts payable	4.2	-1.6	-2.4	3.6	-2.1	0.2
Increase/decrease in other w/c positions	-2.2	-0.1	-2.5	3.0	0.3	0.5
Increase/decrease in working capital	-1.5	-2.6	-7.5	-3.3	-2.7	-3.8
Cash flow from operating activities	6.2	5.6	6.2	10.7	17.1	20.3
CAPEX	-17.5	-18.3	-8.6	-22.5	-82.9	-176.7
Payments for acquisitions	-2.1	-0.0	-4.3	0.0	0.0	0.0
Financial investments	5.3	-1.9	-2.8	0.0	0.0	0.0
Income from asset disposals	0.0	0.0	1.6	0.0	0.0	0.0
Cash flow from investing activities	-14.4	-20.2	-14.2	-22.5	-82.9	-176.7
Cash flow before financing	-8.2	-14.6	-8.0	-11.8	-65.8	-156.5
Increase/decrease in debt position	15.4	18.6	28.9	11.5	50.0	155.0
Purchase of own shares	0.0	0.0	0.0	0.0	0.0	0.0
Capital measures	0.0	0.2	7.8	0.0	0.0	0.0
Dividends paid	0.0	0.0	0.0	0.0	0.0	0.0
Others	-3.7	-6.7	-6.1	0.0	0.0	0.0
Effects of exchange rate changes on cash	0.0	0.0	0.0	0.0	0.0	0.0
Cash flow from financing activities	11.7	12.1	30.6	11.5	50.0	155.0
Increase/decrease in liquid assets	3.5	-2.5	22.6	-0.2	-15.8	-1.5
Liquid assets at end of period	12.4	9.9	32.5	32.3	16.5	15.0

Source: Company data; AlsterResearch

Regional sales split (EURm)	2019	2020	2021	2022E	2023E	2024E
Domestic	0.0	0.0	0.0	0.0	0.0	0.0
Europe (ex domestic)	24.9	22.8	29.3	52.4	61.3	75.4
The Americas	0.0	0.0	0.0	0.0	0.0	0.0
Asia	0.0	0.0	0.0	0.0	0.0	0.0
Rest of World	5.2	5.5	7.1	12.6	14.8	18.2
Total sales	30.2	28.3	36.4	65.0	76.1	93.6

Regional sales split (common size)	2019	2020	2021	2022E	2023E	2024E
Domestic	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Europe (ex domestic)	82.6%	80.6%	80.6%	80.6%	80.6%	80.6%
The Americas	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Asia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rest of World	17.4%	19.4%	19.4%	19.4%	19.4%	19.4%
Total sales	100%	100%	100%	100%	100%	100%

Source: Company data; AlsterResearch

Ratios	2019	2020	2021	2022E	2023E	2024E
Per share data						
Earnings per share reported	-0.01	0.04	0.04	0.10	0.64	0.90
Cash flow per share	0.01	-0.02	-0.04	0.02	0.07	-0.00
Book value per share	0.74	0.79	0.95	1.05	1.69	2.59
Dividend per share	0.00	0.00	0.00	0.00	0.00	0.00
Valuation						
P/E	-134.1x	46.8x	49.3x	19.7x	3.0x	2.1x
P/CF	133.7x	-89.6x	-44.7x	86.0x	26.5x	-694.5x
P/BV	2.6x	2.4x	2.0x	1.8x	1.1x	0.7x
Dividend yield (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
FCF yield (%)	0.7%	-1.1%	-2.2%	1.2%	3.8%	-0.1%
EV/Sales	5.7x	6.7x	5.3x	3.1x	3.6x	4.6x
EV/EBITDA	21.5x	22.3x	20.1x	11.3x	7.5x	8.8x
EV/EBIT	161.8x	-1,323.6x	-270.8x	35.0x	14.0x	18.7x
Income statement (EURm)						
Sales	30.2	28.3	36.4	65.0	76.1	93.6
yoy chg in %	48.9%	-6.3%	28.7%	78.7%	17.1%	23.0%
Gross profit	20.4	23.6	23.6	41.0	60.4	76.9
Gross margin in %	67.6%	83.6%	65.0%	63.1%	79.4%	82.2%
EBITDA	7.9	8.4	9.6	18.0	35.9	48.5
EBITDA margin in %	26.3%	29.9%	26.4%	27.8%	47.2%	51.8%
EBIT	1.1	-0.1	-0.7	5.8	19.3	22.8
EBIT margin in %	3.5%	-0.5%	-2.0%	9.0%	25.3%	24.4%
Net profit	-0.7	2.1	2.1	5.3	34.9	49.1
Cash flow statement (EURm)						
CF from operations	6.2	5.6	6.2	10.7	17.1	20.3
Capex	-17.5	-18.3	-8.6	-22.5	-82.9	-176.7
Maintenance Capex	5.4	6.6	8.5	9.5	13.2	20.4
Free cash flow	-11.4	-12.7	-2.4	-11.8	-65.8	-156.5
Balance sheet (EURm)						
Intangible assets	0.9	1.3	0.8	0.5	0.4	0.2
Tangible assets	102.0	126.3	127.5	146.6	243.8	444.5
Shareholders' equity	37.9	40.2	51.7	56.9	91.9	141.0
Pension provisions	0.0	0.0	0.0	0.0	0.0	0.0
Liabilities and provisions	83.5	109.6	139.6	156.2	205.2	359.0
Net financial debt	67.3	84.5	89.1	100.9	166.7	323.1
w/c requirements	3.3	3.5	9.0	15.4	18.3	22.6
Ratios						
ROE	-1.9%	5.2%	4.1%	9.2%	38.0%	34.8%
ROCE	0.9%	-0.1%	-0.4%	2.7%	6.5%	4.6%
Net gearing	177.4%	210.3%	172.4%	177.2%	181.4%	229.2%
Net debt / EBITDA	8.5x	10.0x	9.3x	5.6x	4.6x	6.7x

Source: Company data; AlsterResearch

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Photon Energy NV	2, 8

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