Enapter AG

Germany / Cleantech
Primary exchange: Frankfurt
Bloomberg: BUF1 GR
ISIN: DE000A255G02

Initiation of Coverage

RATING	**BUY**
PRICE TARGET	**€ 8.90**
Return Potential	36.9%
Risk Rating	High

INEXPENSIVE GREEN HYDROGEN FOR EVERYONE

Enapter AG (currently still named S&O Beteiligungen AG) is a technology leader in innovative Anion Exchange Membrane (AEM) electrolysis, which can be used to produce green hydrogen. The technology enables the construction of efficient and cost-effective standardised electrolysers and stacks which can be scaled up to larger units according to the principle of modularity. State-of-the-art energy management system software ensures easy operation, control & monitoring and high compatibility. Patents and strong in-house research and development resources give Enapter a sustainably defendable competitive advantage. The company is imitating the development of the computer industry (from the expensive large mainframe to the cheap small PC) and the solar industry (solar modules as an unrivalled low-cost commodity) and is planning to set up mass production that will drastically reduce production costs through scaling, standardisation and automation. Enapter needs around €100m for this, which is to be raised through additional equity and investment grants. The aim is the inexpensive production of green hydrogen on a small scale. For the year 2021 Enapter plans turnover of €9.3m and €34.8m in 2022. We see post-money fair value at €8.90 per share. Our rating is Buy.

Market for green hydrogen at the beginning of a strong and long-term growth phase The complete decarbonisation of the entire energy system requires green hydrogen in very large quantities, and the efforts to build a global hydrogen infrastructure are immense. The German federal government has adopted a hydrogen strategy that provides for investments totalling €9bn to build a hydrogen economy. When it announced its hydrogen strategy, the EU Commission proposed promoting the installation of at least 6 GW by 2024. We therefore expect a strong and long-lasting surge in demand for electrolysers.

(p.t.o.)

FINANCIAL HISTORY & PROJECTIONS

	2018*	2019*	2020E	2021E	2022E	2023E
Revenue (€ m)	0.71	0.93	2.75	9.25	34.84	68.31
Y-o-y growth	n.a.	30.8%	196.2%	236.2%	276.5%	96.1%
EBIT (€ m)	-1.09	-1.88	-5.37	-6.72	-9.93	-2.52
EBIT margin	-152.8%	-202.8%	-195.3%	-72.6%	-28.5%	-3.7%
Net income (€ m)	-1.09	-1.88	-5.37	-6.72	-10.28	-3.24
EPS (diluted) (€)	0.00	0.00	-0.24	-0.23	-0.35	-0.11
DPS (€)	0.00	0.00	0.00	0.00	0.00	0.00
FCF (€ m)	-0.98	-0.32	-6.14	-42.22	-68.45	-4.07
Net gearing	-144.7%	-15.8%	-6.3%	-23.6%	22.2%	29.6%
Liquid assets (€ m)	0.75	0.42	1.61	18.39	4.94	1.87

* Enapter S.r.l.

RISKS

The main risks are: financing risk, technological risk, production risk, increasing competition, innovations.

COMPANY PROFILE

Enapter produces standardised electrolysers, which are scalable to larger units based on a modular approach. Enapter's patent protected AEM technology offers high cost reduction potential, which is to be raised in a planned mass production facility. Enapter has a production site in Pisa, Italy, and ca. 100 employees.

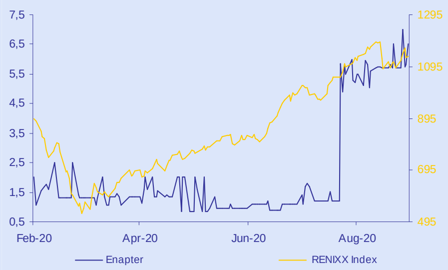
MARKET DATA

As of 9/18/2020

Closing Price	€ 6.50
Shares outstanding	1.24m
Market Capitalisation	€ 8.05m
52-week Range	€ 0.85 / 7.00
Avg. Volume (12 Months)	124

Multiples	2019	2020E	2021E
P/E	n.a.	n.a.	n.a.
EV/Sales	84.3	28.5	8.5
EV/EBIT	n.a.	n.a.	n.a.
Div. Yield	0.0%	0.0%	0.0%

STOCK OVERVIEW



COMPANY DATA*

As of 31 Dec 2019

Liquid Assets	€ 0.42m
Current Assets	€ 2.29m
Intangible Assets	€ 2.49m
Total Assets	€ 6.03m
Current Liabilities	€ 3.23m
Shareholders' Equity	€ 2.80m

* Enapter S.r.l.

SHAREHOLDERS

BluGreen	61.5%
Deutsche Balaton AG	32.3%
Free Float	6.2%

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INVESTMENT CASE

INNOVATIVE ELECTROLYSIS TECHNOLOGY WITH DISRUPTIVE POTENTIAL

Enapter is a technology leader in Anion Exchange Membrane (AEM) electrolysis. Research confirms that AEM electrolysis has enormous cost reduction potential of > 75% of the stack costs compared to PEM electrolysis through the use of cheaper components, which opens the way to hydrogen production costs of < 2 $/kg (P. I. Hoon T. Chung (2019), p. 2). However, the relatively low efficiency of AEM electrolysis and the relatively short service life of AEM electrolysis cells have so far prevented the commercial breakthrough of this technology (Min Kyung Cho et al. (2017)). To our knowledge, Enapter is currently the only company that has removed these obstacles. Thanks to an improved membrane electrode assembly (MEA) and an optimised set-up of the electrolysis cells, Enapter's electrolysers achieve values in terms of both performance and service life that enable commercial use. Enapter's AEM electrolysis has strengths similar to Proton Exchange Membrane (PEM) electrolysis (high flexibility, quick reactivity, high degree of hydrogen purity, production of hydrogen under high pressure, compactness). Compared to PEM electrolysis, the less corrosive environment allows the use of significantly cheaper materials and opens up high potential for cost savings and therefore enormous market opportunities.

ELECTROLYSERS AS A COST-EFFECTIVE MASS PRODUCT

While classic alkaline electrolysis has to rely on large systems for technical reasons and the PEM technology relies on ever larger units to reduce costs, Enapter goes the opposite way, since AEM technology makes construction of simple, standardised and cheap electrolysers and stacks possible. Enapter's product concept is based on modularity and scalability. Its latest product, the EL 2.1 electrolyser, is small, compact and produces 0.5 Nm^3 of hydrogen per hour with a power consumption of 2.4 kW. The modularity means that by combining many units, large electrolysers on a kilowatt or megawatt scale can be put together. Enapter thus imitates the development of the computer industry (from the large, individual mainframe to the small standard PC) and of the solar industry, which has made the solar module an unrivalled cheap commodity through mass production. Enapter plans to set up a mass production of electrolysers and stacks that will drastically reduce unit costs through scaling, standardisation, and automation, thereby enabling the production of green hydrogen at competitive costs.

SUSTAINABLE COMPETITIVE ADVANTAGE THROUGH PATENTS AND STRONG R&D

Enapter owns a growing portfolio of approved and pending patents. The most important patent protects Enapter's core technology, AEM electrolysis with a dry cathode, in Europe, the USA, China and India. In Enapter's R&D department, an excellent team of around 50 chemists and engineers is working on the further development of the AEM technology. We estimate the long-term R&D cost share at 6-8% of sales. In addition, Enapter has research collaborations with the Universities of Pisa, Madrid, and the Technical University of Munich (TUM). Furthermore, Enapter is cooperating in different research projects with the German Aerospace Center (DLR), the Norwegian University of Science and Technology (NTNU) and the Forschungszentrum Jülich. We highlight the cooperation with Professor Hubert Gasteiger, one of the world's leading researchers in the field of electrochemistry and a professor at TUM. He is a member of the Enapter Advisory Board. We see Enapter as excellently positioned to sustainably defend their competitive edge through patents and further R&D.

CUTTING-EDGE PROPRIETARY SOFTWARE ENABLES EMBEDDING IN DIGITAL ENERGY WORLD, SIMPLE SCALING, AND PROTECTS AGAINST IMITATION

The energy industry is currently going through a dynamic digitisation process. In addition to powerful hardware, a modern energy system is also based on software that enables simple, frictionless, and secure communication between the system and its environment and is also suitable for predictive maintenance and the use of artificial intelligence. Only the intelligent connection of hardware and software results in a powerful, modern energy system.

On the software side, Enapter relies on the competence of its founder Sebastian-Justus Schmidt, a successful software entrepreneur who sold his software company in 2011 for a double-digit million amount. He has hired a software team for Enapter that has developed energy management system software that meets state-of-the-art digital communication and control requirements.

The software also enables quick and easy scaling. Many individual electrolyser or stack units form a large system and are uniformly controlled via the software. The proprietary software represents a competitive barrier for possible imitators because the energy system only works with the interaction of hardware and software, and software updates regularly bring the system up to date. Even if the hardware can be imitated, this is not enough to copy the entire energy system.

SWOT ANALYSIS

STRENGTHS

- **Enapter is the technology leader in AEM electrolysis which has clear advantages over competing electrolysis technologies** Compared to classic alkaline electrolysis (ALK-EL), Anion Exchange Membrane Electrolysis (AEM-EL) impresses with its responsiveness and flexibility and therefore adapts much better to the volatile electricity production by sun and wind. While ALK-EL works with highly alkaline electrolyte solutions, AEM-EL uses only a weakly alkaline electrolyte. Thus, it is clearly less risky to handle. Enapter's AEM-EL produces hydrogen in greater purity at higher pressure than ALK-EL. It therefore requires comparatively fewer additional cleaning and compression steps, which reduces costs.
  Compared to Proton Exchange Membrane Electrolysis (PEM-EL), AEM-EL takes place in a less corrosive environment. It therefore does not need any catalysts from the group of expensive platinum metals and can use cheaper stainless steel instead of titanium for the bipolar plates. In addition, AEM-EL works with a comparatively lower degree of water purity. This reduces the complexity and cost of the water input system.

- **Sustainable competitive advantage through patents and strong R&D** Enapter owns a growing patent portfolio of approved and pending patents. The most important patent protects Enapter's core technology, AEM electrolysis with a dry cathode, in Europe, the USA, China and India. In Enapter's research and development (R&D) department, an excellent team of around 50 chemists and engineers is working on the further development of AEM technology. The company is estimated to invest more than €3m annually in R&D. In the long term, we assume that R&D expenditure will account for around 6-8% of sales. Enapter also has research collaborations with the Universities of Pisa, Madrid and the Technical University of Munich (TUM). Furthermore, Enapter is cooperating in different research projects with the German Aerospace Center (DLR), the Norwegian University of Science and Technology (NTNU) and the Forschungszentrum Jülich. We highlight the cooperation with Professor Hubert Gasteiger, one of the world's leading researchers in the field of electrochemistry and a professor at TUM. He is a member of the Enapter Advisory Board. We see Enapter as excellently positioned to sustainably defend their competitive edge through patents and further R&D.

- **Modular and scalable product** Enapter's product conception is based on modularity and scalability. The company's latest product, the EL 2.1 electrolyser is small, compact and produces 0.5 Nm^3 of hydrogen per hour with a power consumption of 2.4 kW. The modularity means that by combining many units, large electrolysers can be put together on a kilowatt or megawatt scale. Enapter thus imitates the development of the computer industry (from the large, individual expensive mainframe to the small standard PC) and in the solar industry. The latter has made the solar module an unrivalled cheap commodity through mass production. By combining a large number of solar modules (modularity) which today individually achieve an output of up to 500 watts, the output of solar power plants can be scaled up into the megawatt and even gigawatt range (1 GW = 1,000 MW = 1,000,000 kW = 1,000,000,000 W).

Enapter also implements the modularity at the stack level. The stack is the heart of the electrolyser. There, hydrogen is produced from electricity and water. In the future, around 400 stacks will be combined in a container solution with a total input power of around 1 MW and a hydrogen production of around 200 Nm^3 per hour.

- **Hardware and software hand-in-hand** As in other areas of the economy and society, a strong digitalisation trend can also be observed in the energy industry. In addition to the hardware, a modern energy system is based on software that enables simple, smooth and secure communication between the system and its environment and is suitable for predictive maintenance and the use of artificial intelligence. Here Enapter relies on the competence of its founder Sebastian-Justus Schmidt, a successful software entrepreneur who sold his company in 2011 for a double-digit million amount. He has hired a software team for Enapter that has developed energy management system software that meets the latest digital communication and control requirements.

Weaknesses

- **Enapter is a small company with limited resources** With currently around 100 employees and a small production facility in Pisa, Italy, Enapter is currently a small company whose resources (R&D, production, marketing & sales) are limited.

- **Short track record** Enapter was started in 2017 and therefore only has a very short company history. However, the experience in the field of AEM electrolysis is much more extensive, as Enapter took over technology, patents and key employees from Heliocentris Italy (ACTA S.p.A.) in 2017. ACTA was founded in 2004 and had a leading position in the research and development of AEM electrolysis.

- **Low capitalisation** Enapter recently raised funds (€4.2m) for corporate financing through a Series A round. The available funds are not at all sufficient to set up a site for mass production of electrolysers or for the planned company growth. Enapter is therefore dependent on external investors.

Opportunities

- **The market for green hydrogen will grow exponentially** The market for green hydrogen is currently still very small (global capacity: approx. 250 MW). The need to decarbonise the entire energy supply to mitigate climate change and the enormous global efforts to establish an industrial production of green hydrogen lead to a very strong and sustainable surge in demand for electrolysers which should be in the gigawatt range in the next few years. Enapter should benefit significantly from this.

- **Hydrogen strategy of the German federal government** The federal government has decided to invest an amount of €7bn to establish industrial production of green hydrogen in Germany. A total capacity of 5 GW will be created by 2030, and another 5 GW will be added by 2035, but no later than 2040. Enapter plans to set up its mass production facility in Germany and is thus facing a very positive regulatory environment.

- **Cost reduction through mass production** Enapter's product conception does not rely on large, individually designed industrial systems but on a standardised electrolyser or stack that is manufactured as a commodity such as a PC or a solar module. Mass production will drastically reduce costs through scaling, standardisation and automation and should enable hydrogen production at competitive costs.

THREATS

- **Mass production could run into technical implementation problems** Up until now, Enapter's electrolysers have been manufactured in small-scale production using a manufactory design. The construction of a production facility that enables vertically integrated mass production of the electrolysers is technically and organisationally demanding. Enapter relies on machine builders to deliver the necessary machines on time, the machines to produce the targeted output in the time and quality intended, and the interaction of the individual production steps to function well.

- **Product quality could be below expectations in the long term** So far, Enapter's electrolysers have worked very well in practice. However, only around 320 stacks and electrolysers have been delivered, of which around 135 are of the latest generation EL 2.0/2.1. Thus, the small number of systems used, and the relatively short running times of most electrolysers only allow limited reliable statements about the long-term product quality (stability, availability, durability, efficiency).

- **Technological innovations and increasing competition** The market for electrolysers is at the beginning of a strong and sustainable growth phase. The great opportunities that this market offers will attract new competitors and intensify competition. The still young electrolysis technologies PEM, AEM and SO (Solid Oxide) are likely to be characterised by many innovations in the next few years. It cannot be ruled out that other competitors will gain an advantage over Enapter with innovative technologies, processes, and products.

VALUATION

We calculate the fair value of Enapter on the basis of a DCF model and a peer group analysis.

DCF MODEL

The DCF model discounts free cash flows generated in the future to the present value (PV). We use a three-phase model that estimates phase 1 up to and including 2026E in detail. For phase 2 from 2027E to 2034E, free cash flows are determined based on assumptions about the most important model-relevant parameters (sales, EBIT, depreciation, CAPEX, working capital). The third phase calculates the terminal value.

We use the Weighted Average Cost of Capital (WACC) concept to calculate the discount rate. This determines the discount rate by the weighted average of the cost of equity and debt. We calculate the cost of equity using the capital asset pricing model and add the risk-free interest rate and the market risk premium multiplied by the company-specific risk factor.
We assume 0.2% as the risk-free interest rate. This estimate is based on long-term returns on government bonds that are considered safe. The 10-year German federal bond is currently yielding around -0.5%, and 10-year US Treasuries are currently yielding 0.7%. We note that central banks' very expansionary monetary policy, which also includes the purchase of government bonds on the market, contributes strongly to lowering their yields.
We consider the company-specific risk factor in a proprietary model which includes factors such as earnings quality, management strength, financial risk, competitive position, corporate governance, transparency in the publication of financial figures, company size and regulatory security. We calculate a company-specific risk factor of 2.2 for Enapter.
For the market risk premium, we assume a value of 5.0% determined in scientific empirical studies. This results in a cost of equity rate of 0.2% + 2.2 * 5.0% = 11.2%.
We assume a debt interest rate of 3.5% for the cost of debt. This seems low for a young energy technology company but the very positive regulatory environment for green hydrogen at the moment makes state subsidies for the procurement of debt very likely which should result in a relatively low interest rate. With an assumed tax rate of 30%, this results in an after-tax debt interest of 2.5%.
We assume a long-term target capital structure of 95% equity and 5% debt. This weighting results in a WACC of 10.8% which we use as the discount rate.

The assumptions for the first phase (2020E-2026E) are explained in detail in the "Financial History and Outlook" chapter. For the second phase (2027E-2034E) we make the following assumptions:

- Revenue growth decreases from 24% in 2027E to 4% in 2034E. The high sales growth in 2027E and the following years is justified by the fact that the full utilisation of the production capacity has not yet been reached in our model.
- The EBIT margin increases from 13.8% to 15.0%. Economies of scale through the higher capacity utilisation are the main reason for the margin increase.
- The tax rate is 30% throughout.

The third phase calculates the terminal value. This is based on the following assumptions:

- Sales growth is 4%. This comparatively high value is justified by the high growth in demand for green hydrogen expected for the next decades. This is the result of the growing understanding fuelled by the negative effects of climate change that only complete decarbonisation of the energy supply can mitigate global warming. With the current state of technology this can only succeed if fossil fuels are completely replaced by hydrogen and renewable electricity. In the Paris Climate

Agreement of 2015, almost 200 countries agreed to limit global warming to "well below" two degrees Celsius compared to the pre-industrial era, combined with efforts to limit it to 1.5 degrees Celsius. At the end of 2019, the EU had agreed in principle to achieve climate neutrality by 2050.

- The terminal EBIT margin is 15%.
- The terminal tax rate is 30%.

The following figure shows the determination of the fair value of Enapter.

Figure 1: Valuation model for Enapter

DCF valuation model **All figures in EUR '000**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**
Net sales	**2,752**	**9,253**	**34,838**	**68,305**	**94,154**	**118,311**	**146,862**	**182,109**
NOPLAT	**-5,373**	**-6,715**	**-9,935**	**-2,524**	**4,056**	**9,593**	**16,470**	**17,603**
+ depreciation & amortisation	258	986	6,788	6,734	6,630	6,615	6,667	6,788
Net operating cash flow	-5,115	-5,729	-3,147	4,211	10,686	16,208	23,136	24,391
- total investments (CAPEX, WC, Other)	-1,027	-36,487	-29,956	-7,560	-7,697	-8,847	-10,569	-12,699
Capital expenditures	*-686*	*-36,116*	*-64,097*	*-4,098*	*-5,324*	*-6,281*	*-7,290*	*-8,410*
Working capital	*-341*	*-372*	*-859*	*-3,461*	*-2,373*	*-2,565*	*-3,279*	*-4,289*
Other	*0*	*0*	*35,000*	*0*	*0*	*0*	*0*	*0*
Free cash flows (FCF)	-6,142	-42,217	-33,103	-3,349	2,989	7,361	12,568	11,692
PV of FCF's	**-5,966**	**-37,026**	**-26,211**	**-2,394**	**1,929**	**4,288**	**6,610**	**5,552**

All figures in thousands	
PV of FCFs in explicit period (2020E-2034E)	5,993
PV of FCFs in terminal period	150,128
Enterprise value (EV)	156,120
+ Net cash / - net debt (pro forma)	59,693
+ Investments / minority interests	0
Shareholder value	215,814
Diluted number of shares	28,737
Fair value in EUR	7.51

WACC	10.8%
Cost of equity	11.2%
Pre-tax cost of debt	3.5%
Tax rate	30.0%
After-tax cost of debt	2.5%
Share of equity capital	95.0%
Share of debt capital	5.0%

WACC \ Terminal growth rate	2.5%	3.0%	3.5%	4.0%	4.5%	5.0%	5.5%
6.8%	18.02	19.74	21.98	25.03	29.43	36.33	48.69
7.8%	13.43	14.36	15.51	16.97	18.87	21.46	25.19
8.8%	10.41	10.96	11.61	12.40	13.37	14.61	16.22
9.8%	8.29	8.63	9.03	9.49	10.05	10.72	11.54
10.8%	6.75	6.97	7.22	**7.51**	7.85	8.24	8.71
11.8%	5.58	5.73	5.90	6.09	6.30	6.55	6.83
12.8%	4.69	4.79	4.90	5.03	5.17	5.33	5.51
13.8%	3.98	4.05	4.13	4.22	4.31	4.42	4.54

* for layout purposes the model shows numbers only to 2027, but runs until 2034

Source: First Berlin Equity Research

The present value of free cash flows for the explicit period (phase 1 and 2) is €6.0m. The present value of free cash flows in the terminal period (terminal value) is €150.1m. The share of the terminal value in the enterprise value is 96%. The sum of the values from both periods results in an enterprise value of €156.1m.

To determine the shareholder value, the net debt/net cash position must be deducted/added. As of 30 June 2020, S&O Beteiligungen AG, which was acquired by BluGreen and is scheduled to be renamed Enapter AG, had liquid funds of €1.0m and no financial liabilities. As of 30 April 2020, BluGreen had liquid funds of €0.7m and also did not have any financial liabilities. This results in a net cash position of €1.7m. We add €6.2m from the planned capital increase and the present value of the €59.0m capital increase we modelled for 2021. This leads to a pro forma net cash position of €59.7m. Adding this figure to the EV results in shareholder value of €215.8m. Following the planned capital increase in kind (20m shares) the share count will be 21,237,800. The planned capital increase for cash will add 1,031,500 shares. The capital increase we have modelled for 2021 will add the present value of

7,375,000 shares. This leads to a diluted number of shares of 28,737,449. Our DCF-based fair value estimate is thus €7.51 per share.

PEER GROUP ANALYSIS

For the peer group analysis, we select the most important listed companies with a clear focus on the production of electrolysers. These include ITM Power Plc, McPhy Energy S.A., and Nel ASA, which are portrayed in more detail in the "Competitive Position" chapter.

We also take the most important fuel cell manufacturers into account, as they are likely to benefit from the trend towards (green) hydrogen in the same way as the electrolysis providers. Fuel cell technology is the reverse of electrolysis technology. Hydrogen is converted into electricity and water in an electrochemical reaction in the fuel cell. Fuel cells are used for stationary and mobile power supply and to power vehicles (forklifts, cars, buses, trucks, trains, ships). The most important listed fuel cell manufacturers are Ballard Power, PlugPower, FuelCell Energy, Ceres Power, PowerCell Sweden, and SFC Energy. The peer group comparison is based on analyst consensus estimates for the years 2020-2022 (source: Bloomberg).

Figure 2: Peer group analysis

Peergroup - Key Figures

Company	LC	Price	MC	EV	EPS			Sales			EBITDA			EBIT		
		in LC	in LC m	in LC m	20e	21e	22e	20e	21e	22e	20e	21e	22e	20e	21e	22e
ITM Power	GBp	282.00	1,346.4	1,290.4	-0.05	-0.02	-0.02	3.7	16.2	36.4	-16.7	-9.5	-4.7	-18.7	-10.0	-4.9
McPhy Energy	EUR	24.50	493.8	477.9	-0.43	-0.30	-0.13	15.9	30.8	47.0	-6.7	-4.4	0.4	-7.7	-9.0	-5.2
NEL	NOK	18.72	26,347.3	23,907.4	-0.14	-0.11	0.01	668.7	1,053.4	1,583.7	-182.6	-75.6	159.3	-277.1	-196.6	9.3
Ballard Power Systems	USD	15.91	3,886.6	3,734.1	-0.18	-0.14	-0.07	115.8	151.7	194.6	-32.0	-22.1	-4.5	-31.1	-25.5	-18.5
Plug Power	USD	13.56	5,447.6	5,965.6	-0.29	-0.24	-0.14	308.9	405.8	582.1	9.2	48.4	96.0	-63.3	-20.7	17.0
FuelCell Energy	USD	2.62	626.0	819.6	-0.31	-0.24	-0.26	72.5	90.6	115.7	-12.0	-4.5	8.7	-30.7	-26.4	-16.8
Ceres Power	GBp	588.00	1,008.0	948.2	-0.07	-0.04	-0.01	20.6	26.6	29.4	-9.1	-5.4	0.3	-14.0	-11.3	-11.5
Powercell Sweden	SEK	235.00	12,189.2	11,785.7	-1.26	-0.86	0.34	113.5	250.0	407.5	-68.8	-36.6	27.0	-76.4	-42.6	20.5
SFC Energy	EUR	14.84	195.2	195.9	-0.40	0.10	0.33	52.7	68.2	84.7	-2.2	6.5	10.4	-5.0	2.5	6.3

Source: Bloomberg

Peergroup - Valuation Multiples

Company	LC	Price	MC	EV	P / E			EV / Sales			EV / EBITDA			EV / EBIT		
		in LC	in LC m	in LC m	20e	21e	22e	20e	21e	22e	20e	21e	22e	20e	21e	22e
ITM Power	GBp	282.00	1,346.4	1,290.4	neg.	neg.	neg.	348.27	79.53	35.45	neg.	neg.	neg.	neg.	neg.	neg.
McPhy Energy	EUR	24.50	493.8	477.9	neg.	neg.	neg.	30.15	15.51	10.17	neg.	neg.	1,327.37	neg.	neg.	neg.
NEL	NOK	18.72	26,347.3	23,907.4	neg.	neg.	1,872.00	35.75	22.69	15.10	neg.	neg.	150.13	neg.	neg.	2,561.60
Ballard Power Systems	USD	15.91	3,886.6	3,734.1	neg.	neg.	neg.	32.25	24.62	19.19	neg.	neg.	neg.	neg.	neg.	neg.
Plug Power	USD	13.56	5,447.6	5,965.6	neg.	neg.	neg.	19.31	14.70	10.25	646.47	123.16	62.14	neg.	neg.	350.24
FuelCell Energy	USD	2.62	626.0	819.6	neg.	neg.	neg.	11.30	9.05	7.09	neg.	neg.	93.78	neg.	neg.	neg.
Ceres Power	GBp	588.00	1,008.0	948.2	neg.	neg.	neg.	46.03	35.67	32.27	neg.	neg.	2,917.58	neg.	neg.	neg.
Powercell Sweden	SEK	235.00	12,189.2	11,785.7	neg.	neg.	691.18	103.84	47.14	28.92	neg.	neg.	436.51	neg.	neg.	574.91
SFC Energy	EUR	14.84	195.2	195.9	neg.	145.49	44.97	3.72	2.87	2.31	neg.	30.11	18.87	neg.	79.43	31.08
Average					n.a.	145.49	869.38	70.07	27.98	17.86	646.47	76.64	715.20	n.a.	79.43	879.46
Median					n.a.	145.49	691.18	32.25	22.69	15.10	646.47	76.64	150.13	n.a.	79.43	462.57

Source: Bloomberg

Since the consensus estimates 2020E-2022E for EBITDA, EBIT and EPS of most peer group companies are negative, a valuation of Enapter on the basis of multipliers such as EV/EBITDA, EV/EBIT and P/E is not possible. The only multiplier available is EV/sales. The peer group's median EV/sales value for 2021E is 22.7 and 15.1 for 2022E (see figure 2). This shows that investors are currently prepared to pay a high premium for exposure to hydrogen-based future technologies. Based on our Enapter sales estimate for 2021E of €9.3m this would result in a fair EV of €9.3m * 22.7 = €211.1m. Our Enapter sales estimate for 2022 is €34.8m. Based on this estimate and the median sales multiplier for 2022E of 15.1 the result would be a fair EV of €34.8m * 15.1 = €525.9m. For our peer group valuation we use the 2022E EV/sales multiplier as it is much lower than the 2021E figure and thus more conservative. Furthermore, the 2022E EV/sales multipliers of the individual companies are more homogeneous than the 2021E figures. According to our model, Enapter's pro forma net cash position is €59.7m resulting in a fair shareholder value of €585.7m. Based on

our calculated diluted number of shares of 28.74m, the peer group based fair value per share would be €20.38.
Due to the short track record, the current state of development and the comparatively low level of transparency of Enapter, it is likely that investors will demand a high discount on the Enapter valuation based on the EV/sales multiplier. We apply a 50% discount resulting in a peer group-based fair value of €10.19 per share (see figure 3).

Figure 3: Peer group-based valuation model of Enapter

Peer group-based fair value	
EV/sales multiplier 2022E	15.1
Enapter's sales 2022E	34.8 €m
Fair EV	525.9 €m
Net cash position (pro forma)	59.7 €m
Fair shareholder value	585.7 €m
Diluted number of shares	28.74 m
Fair value per share	20.38 €
Discount 50%	10.19 €
Fair value per share	10.19 €

Source: First Berlin Equity Research

We derive our price target from both our DCF-based and the peer group-based valuation and weigh both with 50%. This results in a €8.90 price target (see figure 4).

Figure 4: Price target calculation

in €	
Fair value DCF model	7.51 €
Fair value peer group	10.19 €
Mean	8.85 €
Price target	8.90 €

Source: First Berlin Equity Research

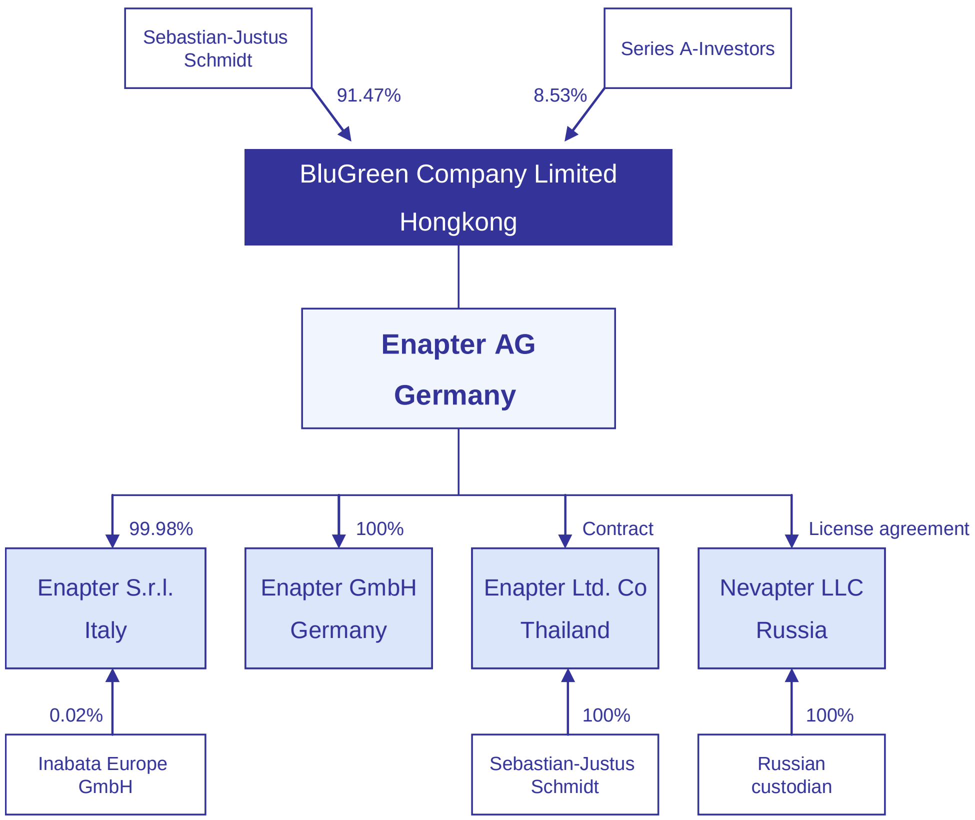
COMPANY PROFILE

Enapter is a manufacturer of electrolysers, i.e. plants that produce hydrogen from water and electricity. Enapter was started in 2017 and in the same year took over the core technology, patents and key employees of the Italian ACTA S.p.A. ACTA was a leader in anion exchange membrane electrolysis with more than 10 years of experience in this field. At the end of August 2020, Enapter had 106 employees. To date, Enapter has delivered more than 320 stacks and electrolysers, of which ca. 135 are of the latest generation (EL 2.0/2.1). The company has received several prestigious awards for its technology. Enapter is located in Berlin, and the stock trades on the General Standard of the German Stock Exchange, currently under the name S&O Beteiligungen AG.

LEGAL STRUCTURE

Enapter AG will emerge from the rebranded, listed S&O Beteiligungen AG (EGM: 8 Oct 2020), of which BluGreen acquired a 61.5% stake. The assets of BluGreen will be brought into S&O Beteiligungen via a capital increase by contribution in kind. The holding BluGreen Company Ltd. in Hong Kong holds the group's intellectual property rights and is the majority shareholder of Enapter S.r.l. and Enapter GmbH. Sebastian-Justus Schmidt, main owner of BluGreen, chose Hong Kong as the headquarters because of his good business experience there. Hong Kong provides a safe, well-regulated, and transparent legal framework for the company's holding company and intellectual property. In Hong Kong no significant taxes on the relocation or sale of assets are levied. The Holding BluGreen is main shareholder of the future Enapter AG, which will hold the group’s intellectual property rights and will be the main shareholder of Enapter S.r.l. and Enapter GmbH.

Figure 5: Planned legal structure of Enapter



Source: First Berlin Equity Research, Enapter

Enapter S.r.l. is based in Pisa, Italy and emerged from the ACTA. The electrolyser production and research & development are located there. Series production started at the end of 2019.

Enapter GmbH is based in Berlin, Germany and is responsible for government relations, marketing and public relations. As of August 2020 Berlin houses a managing director, 11 full-time employees and one part-time employee.

Enapter Ltd. is the Thai subsidiary and can be 100% foreign owned. It belongs to Sebastian-Justus Schmidt who started the Enapter project in Thailand. The branch is responsible for business development and technical support for the Asian market. For tax reasons, BluGreen is not the owner of Enapter Ltd. but the sole beneficiary through contractual provisions.

Nevapter LLC develops the software. The company, based in Saint Petersburg, Russia, is not owned by BluGreen but is held by a Russian trustee due to legal ownership regulations in Russia. The produced intellectual property including the source code is regularly transferred to BluGreen via license agreements. This makes BlueGreen the sole owner of the intellectual property.

ENAPTER'S AEM ELECTROLYSIS TECHNOLOGY

With the acquisition of the core technology and patents of ACTA in November 2017, Enapter has a unique patented electrolysis technology that has been significantly improved and commercialised in recent years. The company has repeatedly received prestigious awards for its technology:

- Shell New Energy Challenge 2018 (2nd place);
- dena/World Energy Council Start up Energy Transition (SET) Award, category low-energy power production, 2019;
- Handelsblatt Energy Award, category industry, 2019/2020.

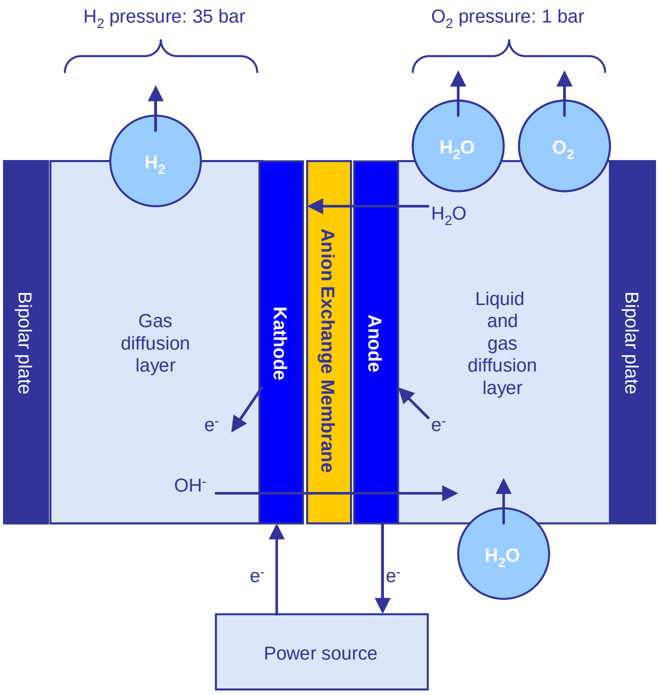
In research, AEM electrolysis demonstrates an enormous cost reduction potential of > 75% of stack costs compared to PEM electrolysis through the use of cheaper components which opens the way to hydrogen production costs of < 2 $/kg (PI Hoon T. Chung (2019), p. 2). However, the relatively low efficiency of AEM electrolysis and the relatively short life time of AEM electrolysis cells have hitherto prevented the commercial breakthrough of this technology. Enapter has removed these obstacles in several years of research and development work.

The electrolysis takes place in the heart of the electrolyser, the stack, which consists of a large number of successive electrolysis cells that are electrically connected to one another by bipolar plates. In the electrolysis cells, water is split into hydrogen and oxygen in an electrochemical reaction by means of a power supply. Each electrolytic cell consists of:

- a cell frame;
- a circumferential seal;
- two bipolar plates;
- two transformers for current;
- an anion exchange membrane; and
- two electrodes, on the one hand the anode (positive pole, accepting electrons), on the other hand the cathode (negative pole, releasing electrons).

The membrane separates the cell into an anodic and a cathodic half-cell. Permeable layers enable the gases and electrolytes to be transported (see figure 6 overleaf).

Figure 6: Stylised cross section of an AEM electrolysis cell



Source: First Berlin Equity Research, Enapter

The anode cell half is filled with weakly alkaline, diluted (one percent) potash hydroxide solution, i.e. potassium hydroxide (KOH) dissolved in water. The solution functions as an electrolyte, i.e. it is electrically conductive due to oppositely charged, mobile ions. During the electrolysis process, the anode cell half is filled with purified water. Oxygen is produced in the anode cell half ($4OH^- \rightarrow 2H_2O + O_2 + 4e^-$). The cathode cell half contains no liquid and under pressure (usually 35 bar) produces very dry and pure (99.9%) hydrogen from water which penetrates from the anode cell half into the membrane ($4H_2O + 4e^- \rightarrow 4OH^- + 2H_2$). It is important that the membrane is saturated with water but the cathodic half-cell remains dry. The hydrogen is thus drier and therefore purer compared to alternative electrolysis technologies (proton exchange membrane and alkaline electrolysis), where the cathode cell halves are also filled with liquid. The membrane, which consists of a polymer and separates the two cell halves, only transports the anions (OH^-) from the cathodic to the anodic cell half. This explains the term anion exchange membrane (AEM).

THE FLAGSHIP PRODUCT: THE ELECTROLYSER EL 2.1

In February 2020, the company launched the EL 2.1. The electrolyser is roughly the size of a microwave and weighs 55 kg (see figure 7). The device has a power consumption of 2.4 kW and a water consumption of 0.4 l per hour. The EL 2.1 produces 500 Nl or 0.5 Nm^3 hydrogen per hour. Extrapolated to one day, this results in 12 Nm^3 which corresponds to 1.0785 kg H_2. The device is currently being sold at a price of around €9,000.

Figure 7: Electrolyser EL 2.1

Source: First Berlin Equity Research, Enapter

The EL 2.1 is based on the company's proprietary and patented anion exchange membrane electrolysis with dry cathode. The main advantages are:

- The use of inexpensive and simple materials. Hydrogen production takes place in a weakly alkaline environment where the corrosive effect is relatively low. For example, the 1% potassium hydroxide solution used in Enapter's AEM electrolysers contains approximately twenty times less KOH than traditional alkaline electrolysers. This enables the use of inexpensive, simple materials (e.g. stainless steel instead of titanium, use of metals from the non-platinum metal groups that are much cheaper compared to platinum group metals).
- The production of very pure or dry hydrogen (99.9%). In many applications, this saves additional costly cleaning steps and thus often makes additional drying devices superfluous.
- The compression of the hydrogen in the stack to approx. 35 bar. In many applications, this saves additional costly compression steps and often makes additional compression devices superfluous.
- High level of safety in production and use. The corrosive effect of the electrolyte is at the level of common household means and is therefore significantly lower in comparison to electrolytes from other electrolysis technologies. This lowers the dangers for people when handling them in production and in use.
- High tolerance to water pollution. While other electrolysis technologies require de-ionised water, the conductivity (= contamination) of which should not exceed one microsiemens/cm, AEM electrolysis is much more tolerant of contamination which significantly reduces the costs of the water management system. AEM electrolytic cells can tolerate water with a conductivity of up to 20 microsiemens/cm. Rainwater has an average conductivity of 30 µS / cm.

- The high efficiency of almost 63% (calculated on the basis of the lower heating value of hydrogen, which is 33.3 kWh/kg). This is a top value in the small electrolyser segment. The EL 2.1 does not have to shy away from comparison with larger systems either since here it also belongs to the top group.

SOFTWARE-DEFINED ENERGY MANAGEMENT SYSTEM (SDEMS)

The performance of the AEM electrolyser is absolutely remarkable but the hardware only represents the first half of the overall narrative. Only when combined with Enapter's proprietary software that is an integral part of every electrolyser, does the electrolyser become an easy-to-use consumer product for everyone. One should keep in mind that the founder of Enapter was a very successful software entrepreneur. You can imagine Enapter's electrolyser as a hardware-software hybrid. It is the software that makes the hardware properties so impressive. It turns the electrolyser into a digital energy production unit that not only controls the electrolyser but also complex, multi-part energy systems more efficiently, reliably and sustainably. This digital transformation enables energy production costs to be reduced and individual energy needs to be forecast. The energy management system:

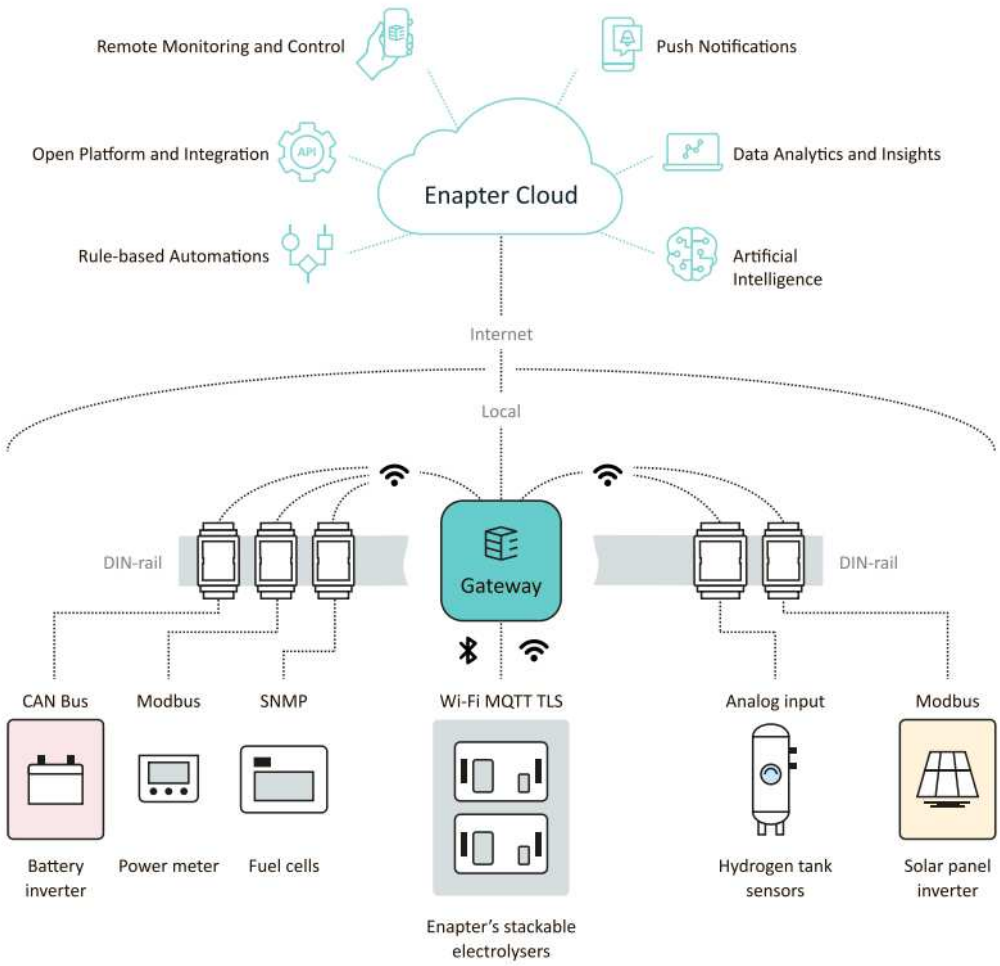
- configures, controls and monitors the connected devices;
- visualises the energy flows and parameters of the energy system;
- specifies operating strategies (rules);
- receives automatic over-the-air (OTA) firmware updates;
- integrates all energy devices, sensors and components;
- gives the user easy access via mobile applications (iOS or Android) or via Deskop web interfaces;
- is cloud-based and enables the use of artificial intelligence.

Enapter's software team has developed universal communication modules (UCM) that translate the protocols of various energy devices into a uniform, transparent and accessible language. The pre-installed UCMs enable immediate monitoring and control not only of the electrolyser but can also take control of connected devices such as PV systems, batteries, fuel cells and storage tanks and thus manage the entire energy system. This is achieved via extensions that send data to the Enapter Gateway and the Enapter Cloud via a secure wireless connection. The data are collected, saved, processed, analysed, and visualised in the highly secure Enapter Cloud.

The Enapter Gateway is the main control unit for managing the energy system. It collects all data from the energy devices connected via UCMs. The gateway analyses and processes the data based on the Enapter Rule Engine, a subsystem that executes if-then rules defined by the user. The gateway software is based on the Yocto project. This is an open source project by the Linux Foundation, the aim of which is to create tools and processes that can be used to create Linux distributions for embedded and IoT software that are independent of the underlying architecture of the embedded hardware (see figure 8 overleaf).

The ability to control complete decentralised energy systems increases the marketability of the electrolysers, as the buyer does not have to worry about integrating the device into his energy system. Enapter's software philosophy is based on openness, expandability, and collaboration.

Figure 8: Architecture of the software defined Energy Management System



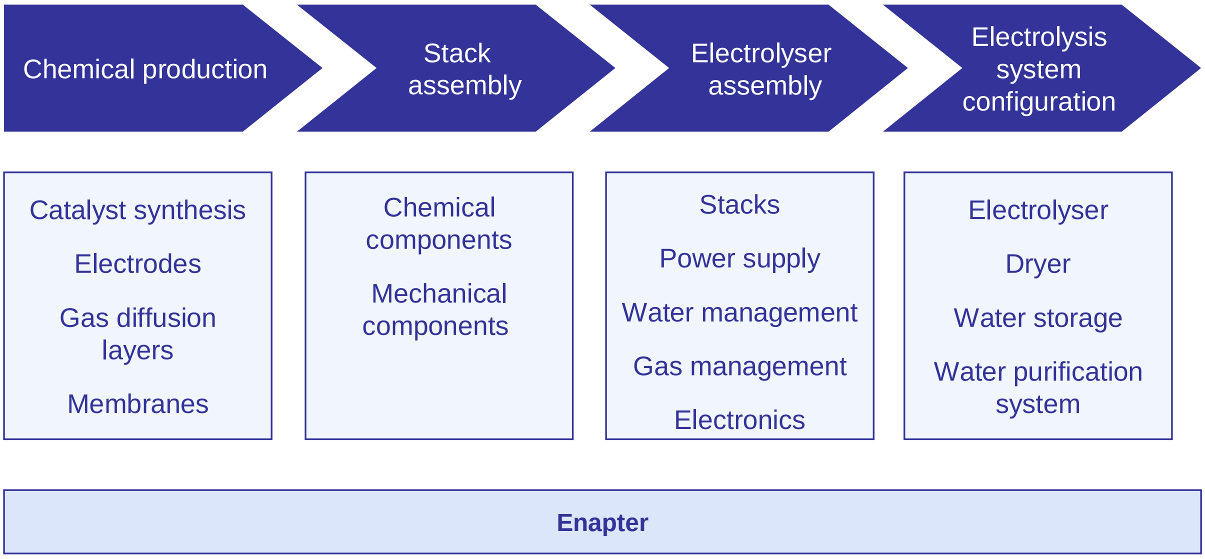
Source: First Berlin Equity Research, Enapter

POSITIONING ON THE VALUE CHAIN

Thanks to vertical integration, Enapter covers the entire value chain from chemical production to electrolysis system configuration (see figure 9 overleaf). The company is thus largely protected from being dependent on suppliers for the key components.

With its vertically integrated production, Enapter differentiates itself from most other players in the hydrogen industry. Enapter masters every aspect of its core product, from synthesising their proprietary catalysts, the development of its own membrane to in-house electrodes and gas diffusion layers. Enapter uses this to produce its unique Membrane Electrode Assemblies (MEA), assembles the stacks according to in-house designs and builds the electrolyser itself. In addition, there is the extremely powerful proprietary software that controls and monitors the system.

Figure 9: Enapter's position on the value chain



Source: First Berlin Equity Research, Enapter

<u>Chemical production:</u>
The chemical production includes the catalyst synthesis, manufacture of the electrodes, the gas diffusion layers, and the membranes. Catalysts are synthesised from raw materials, processed into pastes or inks, and applied to the nickel or carbon electrodes. The gas diffusion layers are made from nickel foam in a mechanical process. The foam is cut, pressed and given its final shape as a disc. Enapter's membrane team has developed proprietary membranes which are based on in-house membrane chemistry. These membranes can be produced at a lower cost than commercially available membranes. Currently, Enapter manufactures low quantities of its membranes manually in the laboratory. In principle, the company also uses membranes from external suppliers and plans to cooperate with them when production will be ramped-up.

<u>Stack manufacture:</u>
Components from chemical production are assembled to electrolysis cells. Many electrolysis cells are placed next to one another, connected in a bipolar manner, and form a cylindrical electrolysis block (stack). This requires frames, steel bipolar plates, end plates made of stainless steel, and seals made of synthetic rubber which Enapter procures from suppliers.

<u>Electrolyser manufacture:</u>
Stacks and the other components required for hydrogen production (including control electronics module, water tank, gas pipes, pumps, heat exchanger, sensors, power supply unit) are put together in a chassis to form the electrolyser. Enapter relies on prefabricated parts that can be installed quickly.

<u>Electrolysis system configuration:</u>
At the customer's request, the electrolyser can also be supplied together with auxiliary systems that can be easily connected to the electrolyser. These auxiliary systems include an external water tank, a hydrogen dryer to increase the degree of purity, a water purification system and standardised cabinets that house the subsystems.

ELECTROLYSER PRODUCTION AND DISTRIBUTION

Enapter's product conception and production process imitates the development process in photovoltaics: A simple, modular product, the production costs of which are dramatically reduced through scaling, standardisation, and automation in mass production. This should lead to competitive green hydrogen production costs. Currently, Enapter is still producing in series production at the Pisa site which began at the end of 2019. The monthly output is ca. 50 electrolysers.

Figure 10: Production site in Pisa, Italy

Source: First Berlin Equity Research, Enapter

Figure 11: Production hall, inside view

Source: First Berlin Equity Research, Enapter

The future location for mass production will be built in Germany and reach an annual output of 100,000 electrolysers per year. Production will take place on three to four production lines with six stations at which the prefabricated individual parts are assembled. On average, an electrolyser should roll off the production line every three minutes. The investments for this amount to approx. €100m.

Direct sales and partner programme

So far, Enapter has largely sold its electrolysers directly. In July 2020, the company launched its partner program to bring its products to market quickly and worldwide. With initially 14 certified partners, the regions Europe, Asia, North America and Oceania are served. Enapter offers its partners in-depth training on the integration of the electrolysers in various applications as well as training on the Energy Management System software.

Customer structure

Enapter has over 100 customers in 34 countries from very different industries. These include:

- Operators/manufacturers of storage solutions;
- Laboratories/research facilities;
- Industry, e.g. ammonium, automobile, airplane, food;
- Real estate;
- Microgrid operators.

The main areas of application so far are:

- Electricity storage (residential and industrial buildings);
- Scientific use;
- Power-to-Gas (production of synthesis gas or methane);
- Mobility;
- Industrial use.

INTELLECTUAL PROPERTY

Enapter's Intellectual Property (IP) consists of registered (patents, trademarks) and unregistered (designs, software, database, technical know-how) rights. We concentrate on the analysis of the essential patents.

We consider the most important patent to be the approved patent for a "device for producing hydrogen on request by means of electrolysis of aqueous solutions from a dry cathode", which we call in short the "dry cathode patent". According to the abstract of the European Patent Office, this invention relates to a device for the electrolytic production of hydrogen which can operate discontinuously or associated with strong power fluctuations and provide dry pressurised directly hydrogen, with high purity. The high degree of purity (99.9%) is achieved without liquid separation.

This patent protects Enapter's anion exchange membrane electrolysis technology very well against imitation, as the dry cathode concept does not depend on a specific membrane type or a particular catalyst formulation. Any alternative dry cathode anion exchange membrane electrolysis technology is likely to constitute a patent infringement. The patent should therefore offer Enapter a long-term defendable competitive advantage.

The pending patent "Liquid Degassing - Means and Method" is about the separation of oxygen from the circulating electrolyte, so that the gaseous oxygen can efficiently escape and is not pumped into the stack again. We see in this patent essentially an additional safeguard of the existing patent portfolio.

Figure 12: Patents

Patents	Number	Jurisdiction	Status	Expiry Date
Dry cathode	EP 2451992	main European countries	granted	9 July 2030
Dry cathode	CN 102471900	China	granted	9 July 2030
Dry cathode	US 9340882	USA	granted	14 Sep 2031
Dry cathode	IN 314785	India	granted	9 July 2030
Liquid degassing means and method	PCT/EP2020/066399	International (PCT)	pending	12 June 2040
Device for the production of hydrogen (ionomer and or binder free)	PCT/EP2020/067658	International (PCT)	pending	24 June 2040
Electrochemical cell and method of processing a gaseous stream containing hydrogen	PCT/EP2020/071161 GB 2011619.0	International (PCT) UK	pending	27 July 2040
Ion Exchange Membrane and Method of Manufacturing an Ion Exchange Membrane	GB 2005155.3	UK	pending	7 April 2041

Source: First Berlin Equity Research, Enapter

The pending patent "Device for the production of hydrogen (ionomer and/or binder-free)" relates to the formulation of the membrane electrode unit, especially the ink formulations for the anode and cathode catalysts. This patent is also a helpful addition to the existing patent portfolio and protects Enapter's self-developed membrane technology similar to the patent "ion exchange membrane and method for producing an ion exchange membrane".

The pending patent on an "electrochemical cell and method of processing a gaseous stream containing hydrogen" could become another important patent. This invention uses Enapter's AEM technology to electrochemically purify and compress hydrogen to up to 2,000 bar. Electrochemical compressors have clear advantages over traditional mechanical compressors such as fewer moving parts, no risk of contamination by lubricants, no noise emissions, low maintenance and very low material costs. We assume that with the development of a global hydrogen economy, the demand for hydrogen compressors will grow strongly. For example, hydrogen is currently compressed to 700 bar for cars and 350 bar for larger vehicles such as buses. Enapter plans a prototype for 2020 and a commercial product for 2022. If Enapter succeeds in commercialising the AEM hydrogen compressor, the company could gain a significant share of the hydrogen compressor market. In our assessment, the patent and the sales and earnings opportunities associated with the technology are not taken into account due to the very early development stage.

RESEARCH & DEVELOPMENT ACTIVITIES

AEM electrolysis is still in the early stages of its development and offers extensive innovation potential. R&D activities are therefore the basis for further technical improvements and thus the expansion of the technological lead. Enapter employs a total of around 50 people in the R&D team which has a first-class reputation. A large number of research collaborations with external partners support the accumulation of knowledge. This includes:

- participation in a consortium with SINTEF, EVONIK, Shell and NTNU as part of the EU program *Fuel Cell and Hydrogen Joint Undertaking* (FCH JU) to develop new materials for AEM electrolysis.
- the cooperation with *Professor Hubert Gasteiger*, professor for technical electrochemistry at the Technical University of Munich (TUM). Mr Gasteiger is a

member of the Enapter Advisory Board and is recognised worldwide for his electrochemical research.

- the long-term cooperation with the German Aerospace Centre (DLR), mainly through joint research projects since ACTA times. A new project for scaling and long-term characterisation of the Enapter electrolysers with the consortium partners DLR, Evonik, and EWE Gasspeicher was submitted to the Projektträger Jülich (PTJ) in August 2020.
- the research partnership with the *University of Pisa* that is an important talent pool due to its proximity to Enapter's production facility.
- the partnership with the *University of Madrid* in modelling fluid dynamics which is useful for stack development.

THREE CASE STUDIES ON THE USE OF ENAPTER'S ELECTROLYSERS

Enapter's electrolysers are used in very different applications:

- Storage of renewable electricity, e.g. for island solutions;
- Backup power, e.g. in telecommunications, signalling technology, hospitals;
- Industrial applications, e.g. in ammonium production;
- Power-to-heat, e.g. hydrogen heat for residential houses;
- Power-to-gas, e.g. the production of green methane;
- Mobility (hydrogen-powered drones and airplanes);
- Research, e.g. for hydrogen production in laboratories.

In three short case studies, we show examples of how Enapter's electrolysers are used.

Case study 1: Phi Suea House: Self-sufficient solar energy supply for an apartment building

The Phi Suea House (see figure 13 overleaf) was built in 2015 as the world's first off-grid solar-hydrogen apartment building. The energy supply is based 100% on solar power which is produced in an 86 kWp roof system. A hybrid battery electrolyser system stores unused electricity. The hydrogen produced in four Enapter electrolysers is stored in three 1,000 l tanks which can hold a total of 30,000 Nl at 30 bar or 7.5 kg of hydrogen. When the sun is not shining, the hydrogen is converted into electricity in two 2.5 kW fuel cells if necessary. The house produces an average of 140,000 kWh per year and thus saves almost 100 t of CO_2. Enapter's energy management system controls and monitors the entire energy system. This gives the house residents full control, transparency and the ability to plan their energy consumption. Energy-efficient construction materials as well as energy-intelligent architecture and design make the house a showcase project for sustainable living.

Figure 13: The Phi Suea house in Thailand

Source: First Berlin Equity Research, Enapter

Case study 2: DNV GL - power to heat - hydrogen heat for residential buildings

In June 2019, the first hydrogen project for residential heating was officially opened in Rozenburg near Rotterdam in the Netherlands (see figure 14). Enapter used eight AEM electrolysers. The modularity of the overall system ensures a high degree of flexibility. Enapter's Energy Management System Software automatically adjusts the hydrogen production rate of the entire system according to the demand. The hydrogen generated is transported via an existing natural gas pipeline that is approved for hydrogen to three central boilers that heat 25 apartments. The project is led by DNV GL in a joint initiative. The main players of the consortium are Bekaert Heating, Remeha, DNV GL, Rotterdam municipality, housing association Ressort Wonen, and system operator Stedin. The project has attracted a lot of attention as the Netherlands want to move away from fossil fuels for heating in the future. For many property developers and district energy planners, the project is therefore a very good example of how a sustainable energy supply for the Netherlands can be achieved.

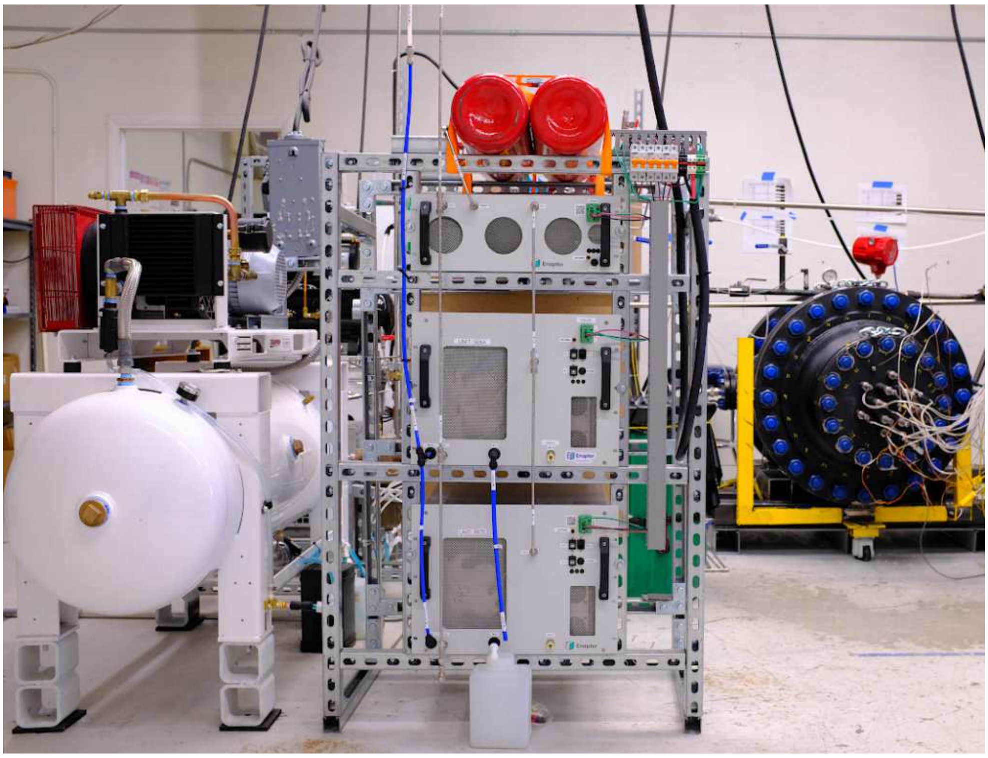
Figure 14: Local hydrogen heat for residential buildings in Rozenburg, Netherlands

Source: First Berlin Equity Research, Enapter

Case study 3: Starfire Energy - industrial ammonia production

Starfire Energy is developing a flexible, carbon-free way to produce anhydrous ammonia (NH_3) for energy storage and fuel. The company assumes that NH_3 is much easier to store and transport than hydrogen. Starfire Energy is currently building a 10 kg / day NH_3 synthesis system using its low-pressure rapid ramp NH_3 process. The system includes hydrogen production using an electrolyser, nitrogen production using pressure swing adsorption, NH_3 synthesis and the storage of liquid NH_3. Using modular systems to reduce business risk, Starfire values the AEM electrolyser in terms of its own scaling plan. After the delivery of an initial order for two EL 2.0s, the company now wants to build another block with 20 units. Orders for 200 electrolysers are planned for 2021, followed by the purchase of containers with 200 units. If successful, sales talks for 20,000+ units p.a. are planned from 2023 on.

Figure 15: Starfire's ammonia production



Source: First Berlin Equity Research, Enapter

ELECTROLYSIS TECHNOLOGIES IN COMPARISON

We have already described AEM electrolysis in the previous chapter. For a better understanding of the strengths and weaknesses of this technology, we give a brief overview of the most frequently used electrolysis technologies in this chapter. These include:

- alkaline electrolysis (ALK-EL);
- Proton Exchange Membrane electrolysis (PEM-EL);
- Solid-Oxide Electrolysis Cell (SOEC).

The SOEC is the only high temperature electrolysis technology and is just at the beginning of commercialisation. Sunfire GmbH is one of the leading companies offering this technology. SOEC works at operating temperatures of approx. 500-1000 °C and uses ceramics as an electrolyte. Since steam is needed for electrolysis, the SOEC needs a heat source. The advantages of the SOEC are high efficiency and the possibility of operating the system in reverse mode as a fuel cell. The greatest challenges are temperature-related wear on the material and high investment costs (IEA 2019: 2,800-5,600 USD/kW_e). Since we do not currently see the SOEC as a competitor to Enapter's AEM technology, no in-depth analysis is carried out here.

Alkaline electrolysis is a mature technology that has been commercialised since the 1920`s and is used particularly in the fertiliser and chlorine industries. Its advantages lie in relatively low investment cost (IEA 2019: 500-1,400 USD/kW_e), relatively high efficiency (IEA 2019: 63-70%) and the relatively long service life of the stacks (IEA 2019: 60,000-90,000 hours). However, the technology has several disadvantages:

- <u>Low flexibility</u>: Long start-up and shutdown times are not compatible with volatile electricity production from sun and wind.
- <u>Low current density</u>: The relatively low current density (Hydrogen Europe 2020: approx. 0.6 A/cm^2) leads to a high system footprint of approx. 100 m^2/MW_e, i.e. the systems take up a lot of space.
- <u>Low pressure</u>: Hydrogen production usually takes place under relatively low pressure (IEA 2019: 1-30 bar) which often requires subsequent costly compression.
- <u>Strongly corrosive electrolyte</u>: The use of highly corrosive potassium hydroxide solution as an electrolyte represents a potential hazard and causes disposal and recycling costs.

First introduced by General Electric in the 1960s, PEM-EL is designed to overcome the disadvantages of ALK-EL. However, widespread commercialisation has only started in recent years. PEM-EL uses pure water as the electrolyte and is relatively compact due to a high current density (>2 A/cm^2) with a system footprint of approx. 50 m^2/MW_e (Hydrogen Europe 2020). PEM-EL can generate hydrogen under high pressure (IEA 2019: 30-60 bar without additional compression) and offers flexible operation. The electrolyser can be operated at different power input levels (zero to maximum) and reacts quickly to power supply shortages. This enables it to be used for grid stabilisation. The advantages of the PEM-EL come at the price of some disadvantages:

- <u>Expensive precious metals and membrane materials</u>: The electrode catalysts require expensive precious metals such as platinum and iridium. In addition, expensive membrane materials are used that have a shorter lifespan. According to the IEA, the investment costs are currently around 1.100-1.800 USD/kW_e.
- <u>Shorter stack life</u>: Stack life is at least 30,000 hours compared to at least 60,000 hours for ALK-EL.

Like the PEM-EL, Enapter's AEM technology uses a polymer membrane. The name of both technologies are derived from the different types of ions that are allowed to pass through the membrane. PEM lets through positively charged ions (protons), AEM negatively charged ions (anions) pass through the membrane.
Enapter has succeeded in combining the advantages of the ALK-EL and the PEM-EL and in limiting the previous disadvantages of the AEM technology.

- Inexpensive materials: Like the ALK-EL, the AEM-EL uses inexpensive catalyst materials and does not require any expensive precious metals. While both the ALK-EL and the PEM-EL work in strongly corrosive environments, the AEM uses a weakly alkaline one percent potassium hydroxide solution which further reduces material costs. The use of inexpensive materials opens up the possibility of mass production at lower costs than for PEM and ALK by 2024.
- Flexibility: AEM and PEM are similarly flexile and so the former technology is very well suited for operation with volatile green electricity.
- High pressure: Similar to the PEM- the AEM-EL produces hydrogen at high pressure (35 bar) which reduces the cost of additional compression.
- High water pollution tolerance: While both the ALK-EL and PEM-EL require pure (de-ionised) water, the AEM-EL can also work with less pure water, and so water purification costs are lower.
- High level of safety in production and use: The corrosive effect of the electrolyte is at the level of common domestic cleaners and is therefore significantly lower than that of the ALK-EL. This reduces the dangers for people when handling them in production and in use.
- Plant footprint: The area required by Enapter's AEM-EL in the planned container size with around 30 m^2/MW should even be lower than that of the PEM-EL.

Figure 16: Comparison of ALK-, PEM-, and AEM electrolysis technologies

	ALK	PEM	AEM
Power consumption (kWh/kg H_2 at nominal power)	50-58	55-63	53
Electrical efficiency (Lower Heating Value)	63-70%	56-60%	63%
Necessary minimum power (in % of nom. power)	15%	5%	<0.1%
Peak power (for 10 min)	100%	160%	120%
Hydrogen output pressure (bar)	1-30	30-80	35
Operating temperature (°C)	60-80	50-80	45
Water consumption (l/kg)	9-15	9-15	12
Water purity (MicroSiemens/cm)	< 1µS/cm	< 1µS/cm	< 20µS/cm
System lifetime (years)	20	20	20
Stack lifetime (k hours)	60-90	30-90	30
Stack degradation (%/1000 h)	0.12%	0.19%	0.25%
Availability	98%	98%	99%
Start-up time	1 - 10 min	1 s - 5 min	1 s - 5 min
Ramp-up/down per second	0.2-20%	100%	100%
Shut-down time	1-10 min	seconds	seconds
Footprint (m^2/MW)	95-100	48-50	30

Source: First Berlin Equity Research, FCH 2 JU (2017), p. 48f., Tractebel (2018), p. 46ff., IEA (2019), p. 44f., Hydrogen Europe (2020), p. 26f., Enapter

The disadvantage of the relatively short stack life (approx. 30,000 h) is compensated for by the fact that future stack costs should decrease so much through mass production that the price advantage compensates for the shorter life time. Furthermore, the stacks can be exchanged during operation. In larger systems with many stacks, the electrolyser continues to work with the remaining stacks without any problems. By the end of 2022, Enapter aims to increase the stack life time by technical improvements to 40,000 – 60,000 hours.

The cost per kg of hydrogen for the EL 2.1 is already below the costs for consumers of small quantities of hydrogen (see also the chapter "The hydrogen market") if an electricity price of 50 €/MWh and a capacity factor of 50% (i.e. 4.380 operating hours p.a.) are assumed. For the mass-produced successor model EL T, Enapter assumes that the cost will be more than halved from the current €9.51/kg to €4.24/kg in 2024. Enapter plans to reduce the cost per kg for large systems (AEM Multicore) to less than €3.00 by 2030. Then the green hydrogen would be as inexpensive as hydrogen produced from fossil resources (see figure 17).

Figure 17: Enapter's hydrogen costs in €/kg 2020 - 2030

Source: First Berlin Equity Research, Enapter

We note that the electricity cost for water electrolysis is the decisive factor in hydrogen cost, since the share of electricity in the total cost can amount to up to 80%. Currently, the awards in tenders for large solar projects in Germany are around 50 €/MWh and for wind parks around 60 €/MWh. Internationally, Power Purchase Agreements (PPAs) are concluded in sunny and windy regions for 20-30 €/MWh. This means that the cost for green electricity is already in a range that should make the future production of green hydrogen competitive. If Enapter realises the cost-cutting potential through mass production as planned, the company should produce hydrogen more cheaply than large 2 MW PEM electrolysers even with its small electrolysers from 2025.

COMPETITIVE POSITION

We see listed companies with a focus on the production of electrolysers as the main competitors. These include the British ITM Power, the French McPhy Energy, and the Norwegian NEL. These companies have a strong technological base, access to growth financing through the stock market, and are more agile than large corporations.

Large corporations such as Siemens, Thyssenkrupp via its joint venture Thyssenkrupp Uhde Chlorine Engineers (TKUCE) and the US engine manufacturer Cummins which took over the electrolyser and fuel cell manufacturer Hydrogenics in 2019 are also important competitors with many years of technological experience.

ITM Power offers PEM electrolysers with an input power of approx. 0.7 MW, 1.3 MW and 2 MW. The hydrogen output is respectively 270 kg, 540 kg and 800 kg per day. The 2 MW module can be scaled up to larger units thanks to its modular design. In addition, ITM owns and operates around 11 hydrogen filling stations. The company has more than 190 employees and is currently building the world's largest electrolyser factory in Sheffield, England, with a final capacity of 1,000 MW. In fiscal year 2018/19, which ended in April 2019, sales were GBP 4.6m and EBIT GBP -9.3m.

McPhy Energy offers alkaline electrolysers of small to medium capacity that produce 0.4 to 12 Nm^3/h hydrogen, as well as larger alkaline electrolysers (20 to 800 Nm^3/h). McPhy's largest module has an input power of 4 MW and can be scaled up to larger units thanks to its modular design. The company also offers hydrogen filling stations and storage solutions. McPhy has three production sites in Europe (France, Italy, and Germany) and around 100 employees. In 2019, McPhy increased its sales by 43% to €11.8m. EBIT was at €-6.4m.

Nel ASA is a Norwegian company that sells both alkaline and PEM electrolysers as well as complete hydrogen filling stations. The company began commercial sales in the 1970s and has installed more than 3.500 units. Nel has production facilities in Norway (alkaline EL), the USA (PEM-EL) and Denmark (hydrogen filling stations) and more than 300 employees. The annual production capacity for PEM electrolysers is 40 MW. So far, the company has delivered more than 2.700 PEM systems. The production capacity for alkaline electrolysers at the end of 2019 was also 40 MW. A new production facility is to expand this capacity by 360 MW with the option of increasing the capacity of the new factory to over 1 GW. The alkaline electrolysers are offered in different sizes. The A150 produces 50-150 Nm^3/h. The largest electrolyser has a hydrogen output of 2.400-3.880 Nm^3/h. The PEM electrolyser M100 produces 103 Nm^3/h. The modular design enables larger units with a hydrogen output of up to 4,000 Nm^3/h. In 2019 turnover was NOK 570m (+ 17% y/y), and EBIT amounted to NOK -255m.

All competitors produce significantly larger electrolysers than Enapter and are keen to further expand the capacity of their systems. The main area of application is central large industrial solutions. Enapter, on the other hand, wants to penetrate the markets for small, decentralised solutions for end consumers first. In this respect, we assume that the aforementioned electrolyser manufacturers will not stand in the way of Enapter’s expansion for the time being. Only when Enapter begins to offer larger solutions will the company encounter noticeable competition.

FINANCIAL SITUATION AND OUTLOOK

FINANCIAL SITUATION

Since no consolidated figures are available so far, we use the 2019 annual financial statements of the Italian Enapter S.r.l. which generates most of the group's turnover. In 2019 this was €0.9m EBIT and net earnings were €-1.9m.

At the end of 2019, Enapter S.r.l.'s balance sheet total was €6.0m. Intangible assets comprised €2.5m and property, plant and equipment €1.2m. The cash position was €0.4m which, due to the lack of financial debt, is also the net cash position. Equity totalled €2.8m. The main liability was trade payables with a value of €2.3m. A cash flow statement was not available.

FINANCIAL OUTLOOK

Profit and Loss Statement

The start of series production in 2019 and the planned start of mass production in 2022 should increase sales significantly this year and during the next few years. We forecast €2.8m for 2020E, €9.3m for 2021E, and €34.8m for 2022E. Sales should increase to €147m by the end of 2026E. Figure 18 shows the product sales on which the total sales will be based.

Figure 18: Sales development 2020E-2026E

in €k	2020E	2021E	2022E	2023E	2024E	2025E	2026E
EL 2.1	1,260	0	0	0	0	0	0
EL 4.0	0	3,360	2,450	0	0	0	0
EL T	0	0	6,250	10,440	12,000	17,280	21,120
Container 25Nm	380	720	7,000	12,240	15,840	18,432	21,427
Multicore 100Nm	0	800	3,900	6,000	8,400	9,360	10,368
Multicore 200Nm	0	0	0	7,200	8,800	12,000	18,000
Stack	385	2,130	8,400	18,000	31,000	35,100	42,000
Cabinet	144	495	1,651	3,715	4,954	7,430	9,907
Dryer	240	864	2,520	4,860	5,400	7,128	8,640
Water purification system (WPS)	120	411	1,369	3,079	4,106	6,159	8,212
Water tank module (WTM)	103	353	1,178	2,651	3,534	5,301	7,068
Services	120	120	120	120	120	120	120
Total revenue	**2,752**	**9,253**	**34,838**	**68,305**	**94,154**	**118,311**	**146,863**

Source: First Berlin Equity Research, Enapter

The EL 2.1 electrolyser will be replaced by the EL 4.0 in 2021 and mass production of the EL T will begin in 2022E. The sale of large electrolysers such as the Container 25Nm and the Multicore 100Nm & 200Nm will gradually increase after their respective product launches. The pure stack business will develops into the main sales driver in coming years. In our model, we assume that stack production will increase from 290 units (2020) to 1.380 units (2021), just under 17,000 units (2023) and just under 60,000 units (2026). A description of the individual products listed in figure 18 can be found in the "Products" chapter.

The gross profit margin fluctuates between approx. 38% and. 44% depending on the composition of the product mix (see figure 19 overleaf). The sustained high gross margin is explained by the strong and very well secured competitive position as well as vertical integration. The cost savings on every value chain step generate additional margin for Enapter and not for suppliers or customers.

The high increases in sales with a sustained high gross margin and a disproportionately low increase in personnel costs and other operating expenses lead to a gradual increase in the operating margin. We assume that Enapter will post negative EBITDA until the end of 2022. From 2023 the company will be EBITDA-positive and will increase the EBITDA margin from 6.2% (2023) to 17.0% in 2026. We expect positive EBIT for 2024 (EBIT margin: 4.6%). We expect the EBIT margin to rise to 12.4% by the end of 2026. The net result will also reach positive territory at €3.2m (net margin: €3.6%) in 2023 and will rise to €16.0m by the end of 2026 (net margin: 10.9%).

Figure 19: Profit and loss statement

in €m	2020E	2021E	2022E	2023E	2024E	2025E	2026E
Sales	2.75	9.25	34.84	68.31	94.15	118.31	146.86
Growth	*196.2%*	*236.2%*	*276.5%*	*96.1%*	*37.8%*	*25.7%*	*24.1%*
Gross profit	1.19	3.57	13.10	29.03	40.86	51.11	64.03
Margin	*43.2%*	*38.6%*	*37.6%*	*42.5%*	*43.4%*	*43.2%*	*43.6%*
EBITDA	-5.12	-5.73	-3.15	4.21	10.86	16.68	24.92
Margin	*-185.9%*	*-61.9%*	*-9.0%*	*6.2%*	*11.5%*	*14.1%*	*17.0%*
EBIT	-5.37	-6.72	-9.93	-2.52	4.23	10.07	18.25
Margin	*-195.3%*	*-72.6%*	*-28.5%*	*-3.7%*	*4.5%*	*8.5%*	*12.4%*
EBT	-5.37	-6.72	-10.28	-3.24	3.53	9.49	17.79
Marge	*-195.3%*	*-72.6%*	*-29.5%*	*-4.7%*	*3.8%*	*8.0%*	*12.1%*
Net result	-5.37	-6.72	-10.28	-3.24	3.36	9.02	16.01
Margin	*-195.3%*	*-72.6%*	*-29.5%*	*-4.7%*	*3.6%*	*7.6%*	*10.9%*
EPS (diluted, in €)	-0.24	-0.23	-0.35	-0.11	0.11	0.30	0.54

Source: First Berlin Equity Research, Enapter

Balance sheet

Enapter AG will be created through the takeover of S&O Beteiligungen AG by BluGreen, which took place in August 2020, and the contribution of BluGreen's assets through a capital increase in kind. The S&O balance sheet thus becomes the balance sheet of Enapter AG, even though it does not reflect Enapter's business before the takeover. We show the S&O H1/20 balance sheet in the appendix. The intrinsic value of S&O Beteiligungen AG at the time of the takeover was €890,000 and consisted primarily of bank deposits. S&O's share capital was €1,237,800. According to the agenda of the extraordinary general meeting scheduled for 8 October 2020, the capital increase in kind will amount to €20 million. 20 million shares will be issued at €1.00. This will increase the share capital to 21,237,800 shares. As a counter-position on the assets side, we use the position "goodwill".

A capital increase for cash is then planned as a first step to finance growth. By issuing 1,031,500 shares at €6.00 per share, Enapter intends to raise €6,189,000. We assume that Enapter will raise €59m through a further capital increase in 2021 and will then receive the remaining €35m for the investment in the mass production facility via state subsidies.

We expect total assets to rise from €29m at the end of 2020 to €153m in 2026. Investments in the construction of the mass production facility in 2021 and 2022 will increase property, plant and equipment from just under €2m at the end of 2020 to almost €9m by the end of 2023. The two capital increases in 2020 and 2021 will increase equity to €78m by the end of 2021. For 2022 we assume that a bank loan of €20m will be taken out to further finance growth. The loan and a declining cash position will result in net debt of €15m at the end of 2022 (see figure 20 overleaf).

Figure 20: Balance sheet 2020E-2026E

in €m	2020E	2021E	2022E	2023E	2024E	2025E	2026E
Intangible goods & Goodwill	23.41	23.36	23.57	24.10	24.78	25.56	26.43
Property, plant & equipment	1.76	36.94	94.04	90.87	88.88	87.76	87.52
Non-current assets, total	**25.21**	**60.34**	**117.65**	**115.01**	**113.70**	**113.37**	**113.99**
Inventories	1.07	1.56	2.98	5.38	7.43	9.54	11.97
Receivables	1.13	1.77	2.86	5.61	7.97	10.31	13.17
Cash and cash equivalents	1.61	18.39	4.94	1.87	2.16	3.95	14.06
Current assets, total	**3.83**	**21.74**	**10.80**	**12.89**	**17.59**	**23.82**	**39.21**
Equity	25.79	78.08	67.79	64.55	67.91	76.92	92.94
Equity ratio	*88.8%*	*95.1%*	*52.8%*	*50.5%*	*51.7%*	*56.1%*	*60.7%*
Financial debt (long-term)	0.00	0.00	20.00	18.00	16.00	14.00	12.00
Financial debt (short-term)	0.00	0.00	0.00	3.00	3.00	0.00	0.00
Net debt	-1.61	-18.39	15.06	19.13	16.84	10.05	-2.06
Net Gearing	*-6.2%*	*-23.6%*	*22.2%*	*29.6%*	*24.8%*	*13.1%*	*-2.2%*
Payables	2.36	3.11	4.76	6.46	8.49	10.38	12.38
Balance sheet total	**29.04**	**82.08**	**128.45**	**127.90**	**131.29**	**137.19**	**153.21**

Source: First Berlin Equity Research, Enapter

Cash flow statement

We assume negative operating cash flows until the end of 2022. Break-even will be reached in 2023E and the company will generate rising operating cash flows in the following years (see figure 21). In 2020-2022 investment in the new mass production facility adds up to €100m. The largest part (€64m) is to be invested in 2022E. These high investments lead to high negative free cash flow during this period. From 2024E we assume positive and rapidly rising free cash flows. Cash flow from financing activities reflects two equity increases (2020E: €6.2m and 2021E: €59m). In 2022E, funds of €20m will be received from a bank loan and €35m from investment grants.

Figure 21: Cash flow statement 2020E-2026E

in €m	2020E	2021E	2022E	2023E	2024E	2025E	2026E
Operating cash flow	-5.46	-6.10	-4.36	0.03	7.61	13.07	19.40
CAPEX	-0.69	-36.12	-64.10	-4.10	-5.32	-6.28	-7.29
Free cash flow	-6.14	-42.22	-68.45	-4.07	2.29	6.78	12.11
Cash flow from investing	-0.69	-36.12	-64.10	-4.10	-5.32	-6.28	-7.29
Cash flow from financing	6.19	59.00	55.00	1.00	-2.00	-5.00	-2.00
Net cash flow	0.05	16.78	-13.45	-3.07	0.29	1.78	10.11

Source: First Berlin Equity Research, Enapter

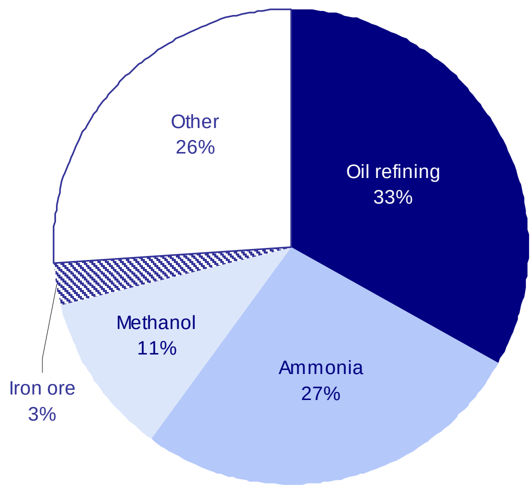
THE HYDROGEN MARKET

CURRENT HYDROGEN DEMAND

In its 2019 study "The Future of Hydrogen", the International Energy Agency (IEA) estimates the global demand for pure hydrogen at more than 70m t per year. Oil refineries and fertiliser manufacturers account for the largest share of this total. Further 45m t per year are used in the steel and methanol industries but without hydrogen being separated from other gases beforehand (mixed hydrogen).

Today, hydrogen is mainly used in industrial applications (see figure 22). The four main uses (both pure and mixed) account for 74% of total hydrogen consumption. These are oil refining (33%), ammonia production (27%), methanol production (11%) and the direct reduction of iron ore (3%). Further uses for hydrogen are in float glass, polysilicon, semiconductors, electronics, food, and chemical production (other: 26%).

Figure 22: The most important hydrogen uses



Source: First Berlin Equity Research, IEA

Today's market can be roughly divided into three large segments:

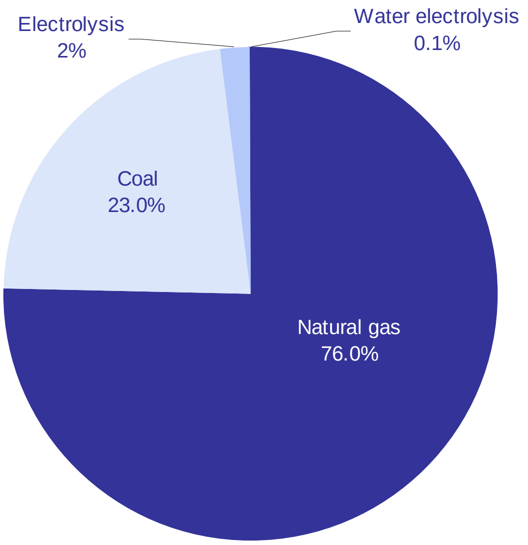
- bulk buyers (pipeline connection);
- medium-sized customers (large tanks on site);
- smaller customers (delivery of hydrogen bottles).

Over 80% of the hydrogen produced today is delivered directly to large customers via pipelines at prices of around 1-3 USD/kgH_2. Less than 5% is brought to the customer in large trucks and pumped into large tanks. Only 1% is delivered to smaller customers in hydrogen bottles. In this segment, where demand is 700,000 tonnes of hydrogen p.a., the price is around 10-60 €/kg due to high transport and logistics costs. We see this segment as Enapter's addressable market for the next few years until scaling of production lowers costs such that larger customers can also be targeted. Assuming that stack production is increased from less than 300 in 2020 to over 16,000 stacks in 2023 this would still be a negligibly small market share at around 39 MW.

CURRENT HYDROGEN PRODUCTION

Hydrogen production takes place for the most part by reforming gas and coal, which results in high CO_2 emissions. Only 2% is generated through electrolysis, the largest part of it as a by-product of chlorine-alkali electrolysis for the production of chlorine and caustic soda. The share of water electrolysis is less than 0.1% (see figure 23). But it is precisely this technology that offers huge future potential because it can produce green, i.e. CO_2-free hydrogen from water and renewable power. According to the 2019 study "Green Hydrogen Production: Landscape, Projects and Costs" by Wood Mackenzie, the global installed capacity for the production of green hydrogen was approx. 250 MW. The 2020-2025 project pipeline for new water electrolyser capacities was 3.2 GW in December 2019, i.e. more than 12 times the installed base. By March 2020, this project pipeline had increased to 8.2 GW.

Figure 23: Hydrogen production share based on type of production



Source: First Berlin Equity Research, IEA 2019, rounding differences result in a value > 100%

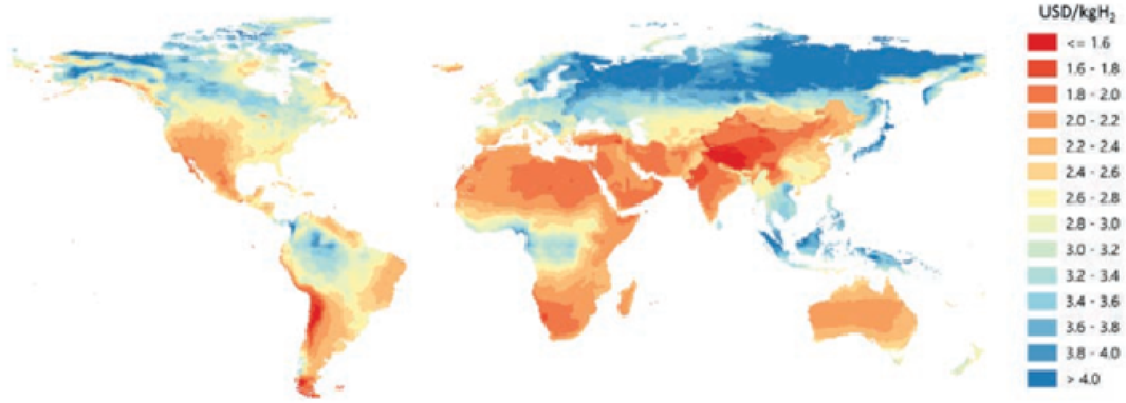
Large amounts of green electricity are needed to produce green hydrogen. To replace current hydrogen production with water electrolysis, renewable power of ca. 3,600 TWh would be required annually. This is more than the EU's annual total power production.

COST OF HYDROGEN PRODUCTION

The cost of producing hydrogen varies significantly depending on the type of production and region. According to the IEA, the costs of hydrogen from natural gas are around 1-3 USD / kgH_2, from coal around 1-2 USD / kgH_2 and from renewable energies around 3.0-7.5 USD / kgH_2. Important cost parameters are the costs of fossil fuels, renewable power, and CO_2.

For water electrolysis to be competitive with gas reforming (using CCUS (carbon capture & underground storage)), electricity prices of USD 10-40 / MWh with a full load of 3,000–6,000 h are necessary according to the IEA. The following figure shows that hydrogen cost of 1.6-4.0 USD / kgH_2 can be achieved in view of the falling costs of wind power and PV. The assumptions for this are electrolyser CAPEX = USD 450/kW_e, electrolyser efficiency (LHV) = 74%; PV CAPEX = USD 400–1,000/kW and onshore wind CAPEX = USD 900–2,500/kW, depending on the region, discount rate = 8%.

Figure 24: Long-term hydrogen cost from PV/wind hybrid plants



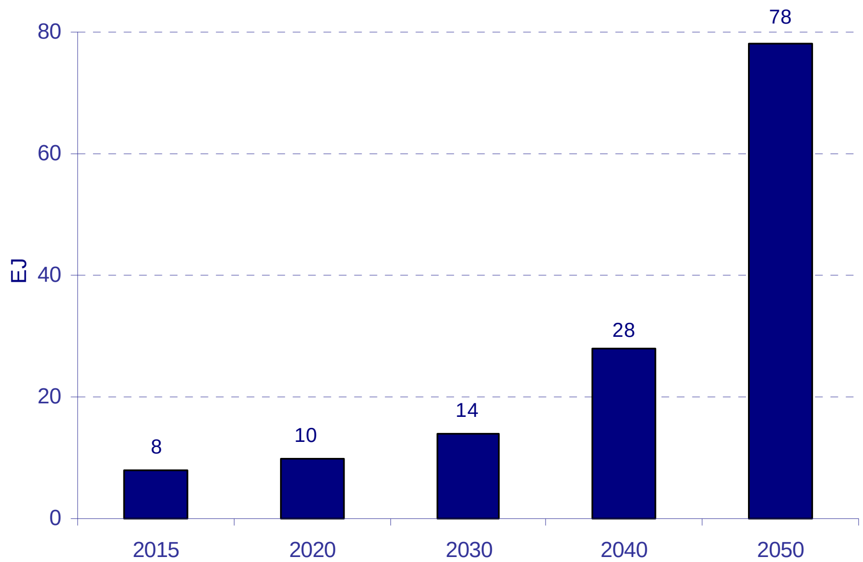
Source: First Berlin Equity Research, IEA 2019

Transport and storage costs play an important role in the competitiveness of hydrogen. If hydrogen is used near where it is produced, transport and storage costs tend towards zero. If, on the other hand, hydrogen is transported over long distances, transport and distribution costs can be more than three times the hydrogen production costs.

FUTURE HYDROGEN DEMAND

In their study "Hydrogen. Scaling up", the Hydrogen Council estimates global hydrogen demand for 2020 at 10 EJ (exajoules). Converted, this corresponds roughly to the value given by the IEA (10 EJ results in approx. 70m t H_2 if the upper heating value of hydrogen is used as a basis (1 kg H_2 = 142 MJ, or 1 GJ = 7 kg H_2). The Hydrogen Council expects hydrogen demand to increase eightfold by 2050 (see figure 25). This would correspond to an average growth rate of around 7% p.a. (CAGR 2020-2050). In 2050, hydrogen could account for one fifth of global final energy consumption, save 6 Gt CO_2 and eliminate local emissions such as sulphur, nitrogen oxides (SO_x & NO_x), and particulates.

Figure 25: Hydrogen Council scenario: hydrogen demand 2015-2050



Source: First Berlin Equity Research, Hydrogen Council 2017

There are two major growth markets for green hydrogen:

- Substitution of hydrogen produced from fossil fuels;
- New markets.

The substitution of fossil hydrogen, which is necessary to contain global warming, is a huge growth market. The current production of green hydrogen is negligible at 0.1% of the total market. With an annual production of 70m t of hydrogen, this is only 70,000 t. Assuming average growth of 40% p.a. for a decade (CAGR 2020-2030: 40%), a very aggressive assumption for such a long period of time, green hydrogen production would only reach an annual production of 20m t.
The use of green hydrogen in new markets also has large potential. These include in particular:

- Storage of electricity;
- Building electricity and heating;
- Transportation.

Storage of electricity: Electricity production is increasingly based on volatile wind and solar power. Hydrogen is very suitable for storing large amounts of electricity over long time periods. Therefore, hydrogen will play a growing role as a storage medium for renewable electricity (Power-to-Gas, PtG) and is essential to achieving an energy system that is based on 100% renewable energies. By 2030, 250-300 TWh of excess electricity from renewable sources could be stored in the form of hydrogen. In addition, hydrogen could produce around 1,500 TWh of green power.

Building electricity and heating: Existing gas infrastructure can be used to supply buildings with electricity and heat. In low concentrations, hydrogen can already be fed into the natural gas grid without major technical measures. Depending on the gas network and the local natural gas composition, hydrogen can replace 5-20% of the natural gas volume. With the appropriate technical upgrade to the natural gas network infrastructure, entire cities can also be converted to a pure hydrogen supply, as it is planned for the English city of Leeds by 2029 in the “H21 Leeds City Gate” project.

Transportation: The transport sector has the highest hydrogen potential (22 EJ or more than 150m t of hydrogen). Fuel cell vehicles are already commercially available today, e.g. forklifts, cars, buses, trucks, and trains. Heavy goods traffic in particular is very well suited for hydrogen since refuelling is quick compared to electricity, and hydrogen vehicles have a significantly greater range than purely battery-operated vehicles. This is due to the significantly higher energy density of hydrogen tanks compared to batteries (currently approx. 6 MJ/kg versus approx. 0.3 MJ/kg, in the long term approx. 9 MJ/kg versus 1.1 MJ/kg for batteries). According to the Hydrogen Council, a global fleet of 400m cars, 15-20m trucks and around 5m buses could run on hydrogen by 2050. In the respective transportation segments this would correspond to an average of around 20-25% of the total transport. In the transportation sector, the Hydrogen Council expects green hydrogen in large vehicles to become competitive for long distances by 2025.

HYDROGEN STRATEGIES EVOLVING FAST – WORLDWIDE

According to the "Path to Hydrogen Competitiveness" study published by the Hydrogen Council in early 2020, 18 governments, whose economies account for 70% of the world's gross domestic product, have developed detailed strategies for developing hydrogen-based energy solutions.

Germany presented its national hydrogen strategy in June 2020. The German federal government anticipates domestic hydrogen demand of 90-110 TWh by 2030 (currently: approx. 55 TWh). In order to cover part of this demand, green hydrogen generation plants with a total output of up to 5 GW are to be built by 2030. Assuming 4,000 full load hours and an average electrolyser efficiency of 70%, this output corresponds to hydrogen production of 14 TWh p.a. A further 5 GW are to be added for the period up to 2035, at the latest by 2040. The Federal Government is providing €7bn for the market ramp-up of hydrogen technologies and an additional €2bn for international hydrogen partnerships.

In July 2020 the EU Commission presented its plan "A Hydrogen Strategy for a Climate-Neutral Europe" which envisages the installation of 6 GW of green hydrogen electrolysers by 2024 and 40 GW by 2030.

As early as 2017, Japan decided on an ambitious plan for the transition of energy production and consumption to hydrogen by 2050 with concrete interim goals for 2030 ("Strategic Road Map for Hydrogen and Fuel Cells)". This hydrogen strategy of the Ministry of Economy, Trade and Industry (METI), updated again in 2019, is intended to lead to the establishment of a hydrogen society. 800,000 fuel cell cars and 1,200 buses are expected to be on the roads by 2030. Ca. 5.3m fuel cells are planned for electricity and heating in the housing sector.

PRODUCTS

Up until now, Enapter has been producing standardised, compact electrolysers and selling additional products such as:

- a cabinet;
- a dryer;
- a water tank module;
- a water purification system.

All systems are standardised and easy to connect to one another. In the future, several products of various sizes are to be manufactured on the company's own production platform. This includes:

- the EL 2.1 electrolyser, the current flagship product;
- the successor EL 4.0 (planned introduction: May 2021);
- the successor models EL T/X (planned introduction: from 2022);
- the AEM stack;
- the AEM Multicore, a large electrolyser consisting of several hundred stacks, the size of which is basically variable due to the modularity principle (e.g. 200 stacks, 400 stacks).

THE FLAGSHIP: ELECTROLYSER EL 2.1

We have already presented the properties and advantages of the electrolyser EL 2.1 in the “Company Profile” chapter. The most important properties are repeated at this point:

- standardised 19 inch system;
- size: 48 x 59 x 31 cm;
- weight: 55 kg (without water);
- CE certification;
- power consumption: 2.4 kW;
- water consumption: 0.4 l per hour;
- hydrogen production: 500 Nl or 0.5 Nm^3 hydrogen per hour. Extrapolated to one day, this results in 12 Nm^3, which corresponds to 1.0785 kg H_2;
- hydrogen purity: 99.9% direct, 99.999% with dryer;
- hydrogen output pressure: up to 35 bar;
- requirement for water purity: < 20 MicroSiemens/cm;
- price: currently approx. €9,000.

The electrolyser consists of a stack, the power supply unit, a gas management system, a water tank, a heat exchanger and the system electronics.

Figure 26: Electrolyser EL 2.1

Source: First Berlin Equity Research, Enapter

PREVIOUS PRODUCT DEVELOPMENT

To illustrate the progress in product development over the recent years, a comparison of the EL 2.1 with Enapter's first product, the EL 500, which is still largely shaped by the development work of ACTA, and the EL 2.0 introduced in January 2019 is helpful. One thing has remained essentially the same: The hydrogen production in all three devices is 0.5 Nm^3 hydrogen per hour. Even a visual comparison shows two major advances (see figure 27):

1. While the EL 500 also had a separate control module, this is integrated in the electrolyser from version 2.0.
2. Enapter's electrolyser has become significantly smaller and more compact.

Figure 27: From EL 500 to EL 2.1

Source: First Berlin Equity Research, Enapter

The EL 500 required a significant installation effort, but starting with version 2.0 this has been greatly simplified. For the EL 500, all sides had to be accessible for air, electricity and gas connections. Version 2.0 started to feature a front-to-back airflow. The energy management software that has been integrated since version 2.0 enables remote control and easy integration into energy systems. The stack used in version 2.0 is 40% smaller than its predecessor. The efficiency of the EL 2.1 has been increased significantly which leads to 8% lower energy consumption. An improved interface design allows components to be exchanged during operation. Software updates can be carried out OTA (over the air).

A price comparison (EL 500: €15,900, EL 2.0: €11,000, EL 2.1: €9,000) shows a decrease of 43% and is an indicator of the cost reductions achieved over approx. three years. We consider the technical improvements already achieved in hardware and software and the cost reductions achieved in the given period to be an excellent performance.

FURTHER PRODUCTS

Cabinet CAB 2.1

The 19-inch housing Cabinet CAB 2.1 can accommodate up to five EL 2.1s and a dryer (see figure 28). Several cabinets can be connected to form larger systems.

Figure 28: Cabinet CAB 2.1

Source: First Berlin Equity Research, Enapter

Dryer DRY 2.0

Enapter's dryer is a hybrid temperature / pressure swing adsorption system. It consists of cartridges that are filled with a strongly adsorbent material. The dryer operates completely maintenance-free. During operation, one cartridge collects the moisture from the hydrogen flow from the electrolyser while the other cartridge is heated and regenerated. The dryer can increase the purity of the hydrogen from approx. 99.9% to more than 99.999% and fits into a 19-inch standard cabinet.

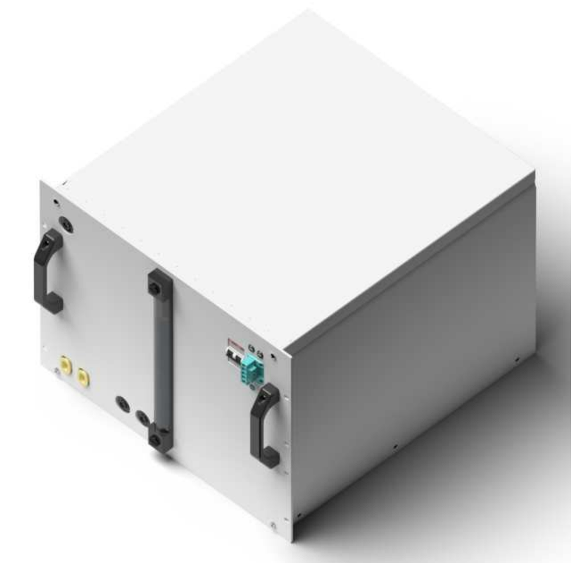
Figure 29: Dryer DRY 2.0

Source: First Berlin Equity Research, Enapter

Water tank module WTM 2.0

Enapter's water tank module is a storage for 35 l of clean water for electrolysis. The frame fits into a 19-inch cabinet. The tank can be filled by Enapter's water purification system or another source of pure water. It also contains a pump system to supply up to 30 electrolysers with clean water.

Figure 30: Water tank module WTM 2.0



Source: First Berlin Equity Research, Enapter

Water purification system (WPS)

Enapter's water purification system can be filled with purified rainwater or tap water. A simple reverse osmosis process with resin filters provides the required water quality. The water for the electrolyser must be desalinated and have a conductivity of less than 20 µS/cm.

Figure 31: Water purification system (WPS)

Source: First Berlin Equity Research, Enapter

FUTURE RANGE OF PRODUCTS

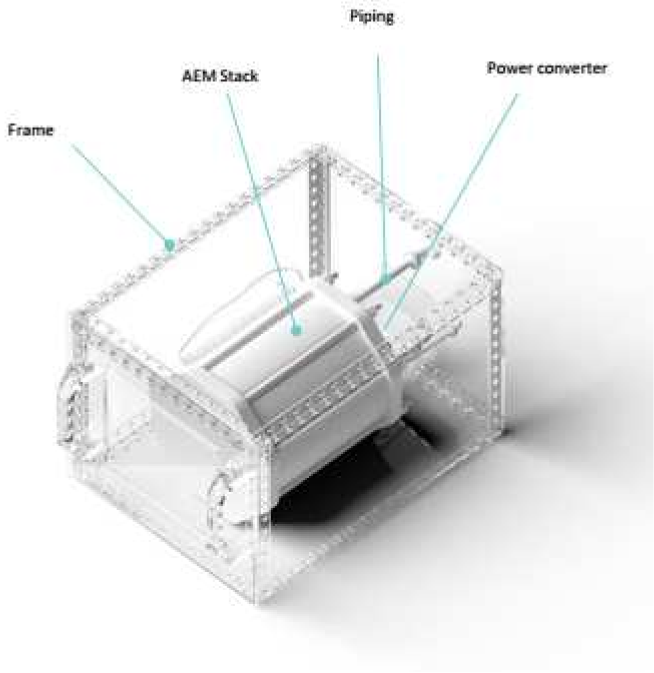
The future product range includes the sale of electrolysers as well as stack modules. The stacks become the building block for electrolysers of very different sizes.

Future electrolysers will be complete electrolysis systems that are built around the AEM stack. The next electrolyser version (EL 4.0) is planned for May 2021, the successor models EL T/X in the following years. Future versions will be smaller and lighter than their predecessors but will still contain a stack with a hydrogen production of 500 Nl per hour, as this production quantity is suitable for small to medium-sized applications.

The AEM stack module

The stack is the central building block of every electrolyser (see figure 32 overleaf). By standardising the stack, it can be mass-produced, which should reduce costs significantly. A standardised stack module can be used in electrolysers with a wide range of capacities – from small kW systems to large MW applications. A modular use of many AEM stacks offers maximum operating time, since the stacks can be exchanged during operation without electrolyser downtime.

Figure 32: The AEM stack module



Source: First Berlin Equity Research, Enapter

AEM Multicore 200 Nm^3

With the AEM Multicore, 400+ AEM stacks can be integrated in a 40-foot container. The AEM Multicore 200 Nm^3 will have a capacity of approx. 1 MW and produces 200 Nm^3/h. Several AEM Multicores can be interconnected and thus act as a unit to form multi-megawatt systems. The interchangeability of the stacks during operation increases the reliability of the overall system and reduces downtime.

Figure 33: AEM Multicore 200 Nm^3

Source: First Berlin Equity Research, Enapter

MANAGEMENT

Sebastian-Justus Schmidt

Mr Schmidt is the chairman of Enapter. The basis of Enapter is his vision of global decarbonisation which will only be achievable via the price of hydrogen and a green hydrogen eco system. Mr Schmidt has a reputation as one of the German software pioneers in the video and audio technology and in the area of mobile software. He was founder and CEO of SPB Software, which was acquired in 2011 by the US-listed company Yandex for a double-digit million amount. Until 2013, Mr Schmidt was Executive Vice President and GM Mobile at Yandex. When he built his solar house in Thailand, he recognised the possibilities of water electrolysis and started Enapter in 2017.

Jan-Justus Schmidt

Jan-Justus Schmidt is responsible for R&D, heads the operational business in Pisa and is responsible for the general management of the group. Mr Schmidt started Enapter together with his father and Ms Cowan. Before that, he was the leading project manager at Phi Suea House and was responsible for the technical design and implementation of the world's first solar-hydrogen apartment building. Mr Schmidt holds an MEng in Aerospace Engineering from Sheffield University in the UK and an MBA from Hong Kong University of Science and Technology.

Thomas Chrometzka

Thomas Chrometzka has been working for Enapter since 2019 and is responsible for strategy, market and business development. From 2013 to 2019 he worked for the German Society for International Cooperation (GIZ), headed the energy portfolio in Thailand and a team of 10 employees. Mr Chrometzka advised governments and companies on strategy, policy and business model. He built up the smart energy start-up support initiative, Nexus SEA, and the data-as-a-service start-up Groots. From 2007 to 2013 Mr Chrometzka worked for the German Solar Industry Association (BSW) and managed its international relations.

Vaitea Cowan

Vaitea Cowan is Head of Enapter’s Communications. She worked for the Phi Suea House project and is a co-founder of Enapter. Ms Cowan is very well connected in the hydrogen market and uses her network to promote Enapter’s technology. She has repeatedly represented the company successfully at award ceremonies. Together with Jan-Justus Schmidt, she was counted among the Forbes 30 under 30 in the energy sector at the beginning of 2020. She graduated from the John Molson School of Business at Concordia University in Montreal, Canada.

Dr Antonio Filpi

Mr Filpi has been with Enapter since 2018 and heads the chemistry and R&D department. His focus is on improving AEM technology and upscaling chemical production. He has more than 15 years experience in electrochemical industry R&D. Mr Filpi worked at Enapter’s predecessor ACTA from 2005 to 2010.

Nikolay V. Krasko

Mr Krasko is responsible for Enapter’s software products. Previously, he was CTO at SPB Software. He has more than 15 years experience in software development with a focus on architecture, developing online TV services and content delivery networks for large telecom companies like MTS, A1 (Velcom), Lebara, and broadcasters like Amediateka (HBO). He holds an MA in IT, Computer Systems, and Networks from St. Petersburg State Marine Technical University.

SHAREHOLDERS & STOCK INFORMATION

Stock Information	
ISIN	DE000A255G02
WKN	A255G0
Bloomberg ticker	BUF1 GR
No. of issued shares	1,237,800
Transparency Standard	General Standard
Country	Germany
Sector	Cleantech
Subsector	Hydrogen

Source: Börse Frankfurt, First Berlin Equity Research

Shareholder Structure	
BluGreen	61.5%
Deutsche Balaton AG	32.3%
Free Float	6.2%

Source: Enapter AG

INCOME STATEMENT

All figures in EUR '000	2018A*	2019A*	2020E	2021E	2022E	2023E	2024E	2025E	2026E
Revenues	**710**	**929**	**2,752**	**9,253**	**34,838**	**68,305**	**94,154**	**118,311**	**146,862**
Cost of goods sold	1,020	2,869	1,563	5,681	21,739	39,275	53,291	67,201	82,830
Gross profit	**-310**	**-1,940**	**1,189**	**3,572**	**13,099**	**29,030**	**40,863**	**51,110**	**64,032**
Personnel costs	877	1,533	4,698	6,612	10,343	15,219	17,299	18,899	20,434
Other operating income	0	0	0	0	0	0	0	0	0
Other operating expenses	186	99	1,606	2,689	5,903	9,600	12,701	15,529	18,682
EBITDA	**-976**	**-1,689**	**-5,115**	**-5,729**	**-3,147**	**4,211**	**10,863**	**16,682**	**24,916**
Depreciation and amortisation	109	195	258	986	6,788	6,734	6,630	6,615	6,667
Operating income (EBIT)	**-1,085**	**-1,884**	**-5,373**	**-6,715**	**-9,935**	**-2,524**	**4,233**	**10,068**	**18,249**
Net financial result	0	0	0	0	-350	-718	-700	-578	-455
Non-operating expenses	0	0	0	0	0	0	0	0	0
Pre-tax income (EBT)	**-1,085**	**-1,884**	**-5,373**	**-6,715**	**-10,285**	**-3,241**	**3,533**	**9,490**	**17,794**
Income taxes	0	0	0	0	0	0	177	475	1,779
Minority interests	0	0	0	0	0	0	0	0	0
Net income / loss	**-1,085**	**-1,884**	**-5,373**	**-6,715**	**-10,285**	**-3,241**	**3,356**	**9,016**	**16,015**

Ratios									
Gross margin	-43.7%	-208.8%	43.2%	38.6%	37.6%	42.5%	43.4%	43.2%	43.6%
EBITDA margin on revenues	-137.5%	-181.8%	-185.9%	-61.9%	-9.0%	6.2%	11.5%	14.1%	17.0%
EBIT margin on revenues	-152.8%	-202.8%	-195.3%	-72.6%	-28.5%	-3.7%	4.5%	8.5%	12.4%
Net margin on revenues	-152.8%	-202.8%	-195.3%	-72.6%	-29.5%	-4.7%	3.6%	7.6%	10.9%
Tax rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.0%	5.0%	10.0%
Expenses as % of revenues									
Personnel costs	123.5%	165.0%	170.7%	71.5%	29.7%	22.3%	18.4%	16.0%	13.9%
Depreciation and amortisation	15.4%	21.0%	9.4%	10.7%	19.5%	9.9%	7.0%	5.6%	4.5%
Other operating expenses	26.2%	10.7%	58.4%	29.1%	16.9%	14.1%	13.5%	13.1%	12.7%
Y-Y Growth									
Revenues	n.a.	30.8%	196.2%	236.2%	276.5%	96.1%	37.8%	25.7%	24.1%
Operating income	n.a.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	137.8%	81.3%
Net income/ loss	n.a.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	168.6%	77.6%

* 2018 and 2019 figures: Enapter S.r.l.

BALANCE SHEET

All figures in EUR '000	2018A*	2019A*	H1/20**	2020E	2021E	2022E	2023E	2024E	2025E	2026E
Assets										
Current assets, total	**1,699**	**2,285**	**1,057**	**3,831**	**21,744**	**10,801**	**12,887**	**17,588**	**23,820**	**39,212**
Cash and cash equivalents	748	424	584	1,609	18,392	4,940	1,873	2,162	3,946	14,058
Short-term investments	0	20	457	20	20	20	20	20	20	20
Receivables	555	979	0	1,131	1,775	2,863	5,614	7,973	10,314	13,168
Inventories	396	862	0	1,071	1,557	2,978	5,380	7,433	9,540	11,966
Other current assets	0	0	16	0	0	0	0	0	0	0
Non-current assets, total	**1,273**	**3,745**	**0**	**25,208**	**60,338**	**117,647**	**115,011**	**113,705**	**113,372**	**113,994**
Property, plant & equipment	961	1,209	0	1,758	36,937	94,038	90,870	88,878	87,765	87,523
Goodwill & other intangibles	300	2,492	0	23,406	23,356	23,565	24,097	24,783	25,563	26,427
Other assets	12	44	0	44	44	44	44	44	44	44
Total assets	**2,972**	**6,030**	**1,057**	**29,039**	**82,081**	**128,448**	**127,898**	**131,293**	**137,191**	**153,207**
Shareholders' equity & debt										
Current liabilities, total	**2,455**	**3,228**	**312**	**3,247**	**4,005**	**5,657**	**10,348**	**12,387**	**11,269**	**13,270**
Short-term debt	0	0	0	0	0	0	3,000	3,000	0	0
Accounts payable	2,283	2,336	125	2,355	3,113	4,765	6,456	8,495	10,377	12,378
Current provisions	112	158	57	158	158	158	158	158	158	158
Other current liabilities	60	734	131	734	734	734	734	734	734	734
Long-term liabilities, total	**0**	**0**	**0**	**0**	**0**	**55,000**	**53,000**	**51,000**	**49,000**	**47,000**
Long-term debt	0	0	0	0	0	20,000	18,000	16,000	14,000	12,000
Deferred revenue	0	0	0	0	0	0	0	0	0	0
Other liabilities	0	0	0	0	0	35,000	35,000	35,000	35,000	35,000
Minority interests	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Shareholders' equity	**517**	**2,802**	**745**	**25,792**	**78,076**	**67,791**	**64,550**	**67,906**	**76,922**	**92,936**
Share capital	10	100	1,238	22,269	29,644	29,644	29,644	29,644	29,644	29,644
Capital reserve	0	0	0	5,158	56,783	56,783	56,783	56,783	56,783	56,783
Other reserves	1,591	4,231	0	4,231	4,231	4,231	4,231	4,231	4,231	4,231
Treasury stock	0	0	0	0	0	0	0	0	0	0
Loss carryforward / retained earnings	-1,085	-1,529	-493	-5,866	-12,582	-22,867	-26,108	-22,752	-13,736	2,278
Total consolidated equity and debt	**2,972**	**6,030**	**1,057**	**29,039**	**82,081**	**128,448**	**127,898**	**131,293**	**137,191**	**153,207**
Ratios										
Current ratio (x)	0.69	0.71	n.m.	1.18	5.43	1.91	1.25	1.42	2.11	2.95
Quick ratio (x)	0.53	0.44	n.m.	0.85	5.04	1.38	0.73	0.82	1.27	2.05
Net debt	-748	-444	n.m.	-1,629	-18,412	15,040	19,107	16,818	10,034	-2,078
Net gearing	-144.7%	-15.8%	n.m.	-6.3%	-23.6%	22.2%	29.6%	24.8%	13.0%	-2.2%
Return on equity (ROE)	-209.9%	-67.2%	n.m.	-20.8%	-8.6%	-15.2%	-5.0%	4.9%	11.7%	17.2%
Days of sales outstanding (DSO)	285.3	384.6	n.m.	150.0	70.0	30.0	30.0	30.9	31.8	32.7
Days inventory outstanding	141.7	109.7	n.m.	250.0	100.0	50.0	50.0	50.9	51.8	52.7
Days in payables (DIP)	817.0	297.2	n.m.	550.0	200.0	80.0	60.0	58.2	56.4	54.5

* 2018 und 2019 figures: Enapter S.r.l., ** H1/20-balanace sheet: S&O Beteiligungen AG, acquired by BluGreen

CASH FLOW STATEMENT

All figures in EUR '000	2018A*	2019A*	2020E	2021E	2022E	2023E	2024E	2025E	2026E
EBIT	**-1,085**	**-1,528**	**-5,373**	**-6,715**	**-9,935**	**-2,524**	**4,233**	**10,068**	**18,249**
Depreciation and amortisation	109	195	258	986	6,788	6,734	6,630	6,615	6,667
EBITDA	**-976**	**-1,333**	**-5,115**	**-5,729**	**-3,147**	**4,211**	**10,863**	**16,682**	**24,916**
Changes in working capital	0	1,009	-341	-372	-859	-3,461	-2,373	-2,565	-3,279
Other adjustments	0	0	0	0	-350	-718	-877	-1,052	-2,234
Operating cash flow	**-976**	**-324**	**-5,456**	**-6,101**	**-4,356**	**32**	**7,613**	**13,065**	**19,403**
Investments in PP&E	0	0	-658	-36,023	-63,749	-3,415	-4,451	-5,270	-6,142
Investments in intangibles	0	0	-28	-93	-348	-683	-873	-1,011	-1,148
Free cash flow	**-976**	**-324**	**-6,142**	**-42,217**	**-68,453**	**-4,067**	**2,289**	**6,784**	**12,113**
Acquisitions & disposals, net	0	0	0	0	0	0	0	0	0
Other investments	0	0	0	0	0	0	0	0	0
Investment cash flow	**0**	**0**	**-686**	**-36,116**	**-64,097**	**-4,098**	**-5,324**	**-6,281**	**-7,290**
Debt financing, net	0	0	0	0	20,000	1,000	-2,000	-5,000	-2,000
Equity financing, net	0	0	6,189	59,000	0	0	0	0	0
Dividends paid	0	0	0	0	0	0	0	0	0
Other financing	0	0	0	0	35,000	0	0	0	0
Financing cash flow	**0**	**0**	**6,189**	**59,000**	**55,000**	**1,000**	**-2,000**	**-5,000**	**-2,000**
FOREX & other effects	0	0	0	0	0	0	0	0	0
Net cash flows	**-976**	**-324**	**47**	**16,783**	**-13,453**	**-3,067**	**289**	**1,784**	**10,113**
Cash, start of the year	0	748	424	1,609	18,392	4,940	1,873	2,162	3,946
Cash, end of the year	**-976**	**424**	**471**	**18,392**	**4,940**	**1,873**	**2,162**	**3,946**	**14,058**
Y-Y Growth									
Operating cash flow	n.a.	n.m.	n.m.	n.m.	n.m.	n.m.	23922.7%	71.6%	48.5%
Free cash flow	n.a.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	196.4%	78.6%
Financial cash flow			n.m.	853.3%	-6.8%	-98.2%	n.m.	n.m.	n.m.

* 2018 und 2019 figures: Enapter S.r.l.

REFERENCES

Chung, P. I. Hoon T. (2019): *High-Performance Ultralow-Cost Non-Precious Metal Catalyst System for AEM Electrolyzer*. Los Alamos National Laboratory (commissioned by the US Department of Energy).
https://www.hydrogen.energy.gov/pdfs/review19/p158_chung_2019_o.pdf.

Fuel Cells and Hydrogen Joint Undertaking (FCH 2 JU) (2018): *Addendum to the Multi-Annual Work Plan 2014 – 2020*. Endorsed by the Governing Board on 15 June 2018, pp 1-55.

Hydrogen Council (2017): *Hydrogen Scaling up. A Sustainable Pathway for the Global Energy Transition*.

Hydrogen Council (2020): *Path to Hydrogen Competitiveness. A Cost Perspective*.

Hydrogen Europe (2020): *Strategic Research and Innovation Agenda*. Final Draft.

International Energy Agency (IEA) (2019): *The Future of Hydrogen. Seizing Today's Opportunities*. Report prepared by the IEA for the G20, Japan.

IRENA (2019): *Innovation Landscape Brief: Renewable Power-to-Hydrogen*. International Renewable Energy Agency. Abu Dhabi.

Min Kyung Cho et al. (2017): *A Review on Membranes and Catalysts for Anion Exchange Membrane Water Electrolysis Single Cells*. Journal of Electrochemical Science and Technology 8 (3); pp. 183-196.
https://www.jecst.org/journal/view.php?doi=10.33961/JECST.2017.8.3.183

Rashid, Md Mamoon et al. (2015): *Hydrogen Production by Water Electrolysis: A Review of Alkaline Water Electrolysis, PEM Water Electrolysis and High Temperature Water Electrolysis,* International Journal of Engineering and Advanced Technology (IJEAT), ISSN: 2249 – 8958, Volume 4 Issue 3, pp. 80-93.

Smolinka, Tom et al. (2018): *Studie IndWEDe: Industrialisierung der Wasserelektrolyse in Deutschland: Chancen und Herausforderungen für nachhaltigen Wasserstoff für Verkehr, Strom und Wärme*. Fraunhofer-Institut für Solare Energiesysteme ISE. Koordination: Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie – NOW GmbH. Auftraggeber: Bundesministerium für Verkehr und Nationale Infrastruktur (BMVI). Berlin, pp. 1-200.

Tractebel Engineering (2017): *Study on Early Business Cases for H2 in Energy Storage and More Broadly Power to H2 Applications. Funded by FCH 2 JU*, pp. 1-222.

Wood Mackenzie (2019): *Green Hydrogen Production: Landscape, Projects, and Costs*. Authored by Ben Gallagher.

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Amtsgericht Berlin Charlottenburg HR B 103329 B
UST-Id.: 251601797
Ggf. Inhaltlich Verantwortlicher gem. § 6 MDStV
First Berlin Equity Research GmbH

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The production of this recommendation was completed on 21 September 2020 at 11:44

Person responsible for forwarding or distributing this financial analysis: Martin Bailey

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PRICE TARGET DATES

Unless otherwise indicated, current prices refer to the closing prices of the previous trading day.

AGREEMENT WITH THE ANALYSED COMPANY AND MAINTENANCE OF OBJECTIVITY

The present financial analysis is based on the author's own knowledge and research. The author prepared this study without any direct or indirect influence exerted on the part of the analysed company. Parts of the financial analysis were possibly provided to the analysed company prior to publication in order to avoid inaccuracies in the representation of facts. However, no substantial changes were made at the request of the analysed company following any such provision.

ASSET VALUATION SYSTEM

First Berlin's system for asset valuation is divided into an asset recommendation and a risk assessment.

ASSET RECOMMENDATION

The recommendations determined in accordance with the share price trend anticipated by First Berlin in the respectively indicated investment period are as follows:

Category		1	2
Current market capitalisation (in €)		0 - 2 billion	> 2 billion
Strong Buy[1]	An expected favourable price trend of:	> 50%	> 30%
Buy	An expected favourable price trend of:	> 25%	> 15%
Add	An expected favourable price trend of:	0% to 25%	0% to 15%
Reduce	An expected negative price trend of:	0% to -15%	0% to -10%
Sell	An expected negative price trend of:	< -15%	< -10%

[1] The expected price trend is in combination with sizable confidence in the quality and forecast security of management.

Our recommendation system places each company into one of two market capitalisation categories. Category 1 companies have a market capitalisation of €0 – €2bn, and Category 2 companies have a market capitalisation of > €2bn. The expected return thresholds underlying our recommendation system are lower for Category 2 companies than for Category 1 companies. This reflects the generally lower level of risk associated with higher market capitalisation companies.

RISK ASSESSMENT

The First Berlin categories for risk assessment are low, average, high and speculative. They are determined by ten factors: Corporate governance, quality of earnings, management strength, balance sheet and financial risk, competitive position, standard of financial disclosure, regulatory and political uncertainty, strength of brandname, market capitalisation and free float. These risk factors are incorporated into the First Berlin valuation models and are thus included in the target prices. First Berlin customers may request the models.

RECOMMENDATION & PRICE TARGET HISTORY

Report No.:	Date of publication	Previous day closing price	Recommendation	Price target
Initial Report	21 September 2020	€6.50	Buy	€8.90

INVESTMENT HORIZON

Unless otherwise stated in the financial analysis, the ratings refer to an investment period of twelve months.

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At the time of publication of this financial analysis it is not certain whether, when and on what occasion an update will be provided. In general First Berlin strives to review the financial analysis for its topicality and, if required, to update it in a very timely manner in connection with the reporting obligations of the analysed company or on the occasion of ad hoc notifications.

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Legally required information regarding

- **key sources of information in the preparation of this research report**
- **valuation methods and principles**
- **sensitivity of valuation parameters**

can be accessed through the following internet link: https://firstberlin.com/disclaimer-english-link/

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