



Press release Smoltek Nanotech Holding AB (publ)

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*This press release is an English version of the previously published Swedish version, which has interpretive precedence.*

## Smoltek updates on the company's strategic objectives

**Smoltek Nanotech Holding AB (publ) ("Smoltek") today announces an update and a clearer definition of the company's strategic objectives, with continued focus on industrialization and commercialization within its two business areas ultra-thin capacitors for the semiconductor industry and high performing cell material for electrolyzers used in hydrogen gas production. Assuming that the company is able to sign commercial agreements with industrial partners, as well as finance and complete the phases described in these strategic objectives, the company sees potential to complete the industrialization of processes for high volume production as well as the first generic product, in 2024 within the business area ultra-thin capacitors for the semiconductor industry and in 2026-2027 for the business area high performing cell material for electrolyzers used in hydrogen gas production.**

Smoltek's strategic objective is built on a structure for refinement of business opportunities and customer value based on the company's unique patent portfolio. Since Håkan Persson assumed the CEO position in October 2021, the company has continued to work on its ongoing effort to industrialize and commercialize its two current business areas – ultra-thin capacitors for the semiconductor industry and high performing cell material to PEM electrolyzers (proton exchange membrane electrolysis) for hydrogen gas production. At the same time, the company's strategic objectives have been updated, which has resulted in a clearer description of the company's path to commercialization.

To be able to achieve these strategic objectives it is required, per business area, that the company is able to sign commercial agreements with industrial partners and that the phases/interim goals described can be financed and completed within their set time frames. Smoltek will follow up on the company's updated strategic objectives, current phases and interim goals per business area in the company's quarterly interim reports to provide the market with an updated and fair overview of the company's potential to reach the market and to describe the factors of uncertainty and risks that exists in each of the business areas.

**Smoltek's CEO Håkan Persson comments:**

*“Smoltek continues to evolve from an innovation company to an innovation driven industrial company, and we are now taking yet another step in this direction by more clearly defining our strategic objectives within our two business areas. For us to be able to offer complete production processes and products adjusted to meet customer requirements, in addition to licensing our concepts, is something that we see a clear demand for among our collaboration partners and potential customers, in particular in the semiconductor industry where we are closest to reach the market. And this is something that we are now creating the possibilities to be able satisfy in an excellent way, assuming that we are able to complete the phases and interim goals which are defined in this updated strategy. To control the production process in collaboration with subcontractors and sell products in large volumes is at the same time creating a very strong financial potential for us. We will however continue to use a licensing model in cases where this is deemed to be the most beneficial approach. It is also important to highlight that the production processes that we are now creating have excellent potential to be expanded to more products within existing business areas, and also to more business areas over time.”*

A summary of the company's status, as well as strategic objectives and roadmap, per business area follows below.

**Business area: Ultra-thin capacitors for the semiconductor industry**

Smoltek's ongoing industrial evaluation collaboration with a large global manufacturer of capacitors, conducted in the Group company Smoltek Semi, reached a new phase during the spring of 2022. On April 29, 2022 it was announced that the agreement has been further extended, until the end of June 2022. Furthermore, it was announced that the partners have initiated negotiations on a Memorandum of Understanding, MoU. This MoU covers joint development of an industrial mass production process for Smoltek's patented, ultra-thin carbon nanofiber (CNF-MIM) capacitors. The companies expect to reach an MoU by the end of June 2022. Smoltek has a very positive view on the possibilities to reach a commercial collaboration with this partner. The MoU covers the company's first product, ultra-thin decoupling capacitors for application processors in for example mobile phones, based on the extensive evaluation and development work carried out so far within the framework of the existing collaboration.

The market for application processors is growing in line with the market for mobile phones. The number of application processors produced is in the magnitude of 1.5 billion units per year, with an expected annual growth of 3.6% according to market data from Strategy Analytics (*Smartphone Apps Processor Market Share Tracker Q4 2020: 5G and 5 nm APs Drive Growth*). Every application processor requires 5-10 decoupling capacitors. This means that the market for these capacitors is deemed to consist of 7.5-15 billion capacitors per year.\*

Smoltek ordered an industrial machine for large scale manufacturing of carbon nanofibers during the first quarter of 2022, with the aim to install it at a contract manufacturer (foundry) in 2023. The industrialization of production processes as well as the first generic product is continuing as planned and is currently in a design phase with planned completion in 2023. The design phase will be followed by a planned engineering phase and a qualification phase, which are planned to be completed in 2024. The company’s aim is to be able to start accepting volume orders by the end of 2024. The work is based on the requirement that the company is able to secure a complete supply chain for the production of ultra-thin capacitors. Smoltek’s process step and supply chain for the production of these capacitors will also, assuming that the first product model can be completed, be able to be used for volume production of more upcoming products within the capacitor family for ultra-thin capacitors.

Smoltek’s objective is to complete the commercialization of the first product within the family for ultra-thin capacitors together with a large manufacturer of capacitors, which will then be able to buy the product in large volumes for integration into its solutions and customer offerings. Smoltek’s medium term objective for 2027 is to reach a sales volume of 400 MSEK for its family of ultra-thin capacitors, with an expected gross profit margin of approx. 20%, which corresponds to a market share of around 20% of the addressable market.\*

To be able to handle a continued substantial industrialization and commercialization process in this business area, Smoltek has created a recruitment plan for Smoltek Semi. This recruitment plan covers an ambitious expansion of resources in 2022-2024 within in the subareas: Sourcing, Supply, Quality Assurance, Product Management, Industrialization, Customer Engineering, Customer Projects and Business Development/Sales.

**Strategic objectives/roadmap for business area: Ultra-thin capacitors for the semiconductor industry**

Process och product development	Foundational development	Design phase	Engineering phase	Qualification phase	Volume production
Decoupling capacitor for mobile application processors	Completed	2021-2023	2023	2023-2024	2024-

*All of the above phases and interim goals within this segment of the press release are subject to risks. Risks related to Smoltek’s ability to successfully sign an agreement with a commercial partner and the financing and completion of all of the phases and interim goals in the development before large scale production and sales can be initiated. Smoltek has conducted extensive research, development and tests related to its technology and the industrial machine’s expected capacity and performance. Ordering the industrial machine and scaling up the production process is subject to risks related to the financing required to purchase and fully equip the machine for mass production, as well as its actual capacity and performance. Delays regarding the time frame or adjustments of phases or interim goals could occur, and Smoltek cannot guarantee that these phases, interim goals and objectives can be completed and that any income from externally financed process development and/or sales revenue can be received.*

## **Business area: High performing cell material for electrolyzers used in hydrogen gas production**

Smoltek's high performing cell material is expected to be able to contribute to a two to three times reduction in the size of the electrolyzer and reduce the amount of the exceptionally expensive catalyst material iridium needed by up to 80%. More information on the technology and its potential can be found in the whitepaper\*\* on this business area that Smoltek has published on the company's website. After achieving technical verification (proof-of-concept) for its high performing, nanofiber-based cell material for PEM electrolyzers in November 2021, as announced in the press release published on November 3, 2021, Smoltek is now in discussions with potential industrial partners ahead of the continued development of the cell material. The company's objective is to present a collaboration with a large industrial entity/manufacturer in 2023. The objective is also that such an agreement shall be possible to convert into a commercial agreement for sales of the cell material in large volumes.

Within the process and product development, Smoltek's objective is to complete a number of optimized demonstrators in 2022 and to, together with a commercial partner, complete a product prototype in 2023 and a pilot facility for production in 2024. If these objectives are achieved, the company aims to order a machine for large scale industrial manufacturing of carbon nanofibers and at the same time adjust the product and process based on the commercial partner's requirements in 2024-2025, followed by scaling up to mass production in 2026-2027. Compared to Smoltek's ultra-thin capacitors, the company's high performing cell material to PEM electrolyzers has a longer time to market. At the same time, the market for cell material to PEM electrolyzers on the anode side is deemed to be valued at, according to combined data from Reuters and Fortune Business Insights, approx. 3.5 billion SEK 2026 and approx. 50 billion SEK 2030.\*\*\* Smoltek is therefore operating based on the conservative assumption that the company's cell material can initially be integrated in the anode side of a new generation of PEM electrolyzers from one to two commercial manufacturers. This is deemed by Smoltek to correspond to a market share of approx. 3-4% within the cell material to the anode side for PEM electrolyzers, and sales of just above 200 MSEK in 2027 with an expected profit margin of at least 20%.

In addition to the current focus on cell material to PEM electrolyzers, which can be extended also to cell material for the cathode side, there is a possibility to develop the cell material for usage within closely related application areas, such as fuel cells. Here, the market size is estimated to grow to a similar size in 2030 as the anode side for PEM electrolyzers. Smoltek therefore sees its cell material as an excellent second product family with potential to significantly increase the company's total sales volume, profit and thus position as a strong and innovative industrial company over time.

## **Strategic objectives/roadmap for business area: High performing cell material for electrolyzers used in hydrogen gas production**

Process and product development	Demonstrator for cell optimization	Product prototype/ pilot facility	Customer customization/ purchase of machine	Scale-up to mass production
Cell material for PEM electrolyzers	2021-2022	2023-2024	2024-2025	2026-2027

*All of the above phases and interim goals and objectives within this segment of the press release are subject to risks related to Smoltek's ability to successfully sign agreement/s with one to two customers, finance each phase and that the company is able to achieve its goals related to performance of the product and reliability and production capacity within each phase. If the company is unable to achieve this, delays and an increased financing need can occur. Smoltek cannot guarantee that these phases, interim goals and objectives can be completed and that volume production and sales can be initiated, and that any sales revenue can be received.*

### **Smoltek's Chairman of the Board Peter Augustsson comments:**

*"Smoltek's board is encouraged by the fact that we have now come so far in our ongoing industrialization and commercialization process that we are able to present updated strategic objectives with a time plan for how to potentially reach volume production and large-scale sales within our two business areas. We are convinced that a potential implementation of this strategy could create significant shareholder value over time, while Smoltek at the same time can contribute to solving important challenges in the semiconductor industry and the production of fossil-free hydrogen gas. By positioning Smoltek as an innovative force in these two areas, which have been highlighted as central to the ongoing green transition in both Sweden and Europe, we are also creating potential to utilize the company's groundbreaking technology platform in the best way possible also in a larger perspective."*

### **Summary of strategic objectives and potential sales volume per business area assuming that all phases/interim goals can be achieved**

Smoltek's updated strategic objectives can be summarized as follows:

- The company's objective is to be able to initiate volume production of ultra-thin capacitors for mobile application processors in for example mobile phones in 2024
- The company's objective is to be able to initiate volume production of a high performing cell material to PEM electrolyzers in 2025, and scale up to mass production in 2026-2027
- The company deems it as possible to reach a potential total sales volume of approx. 600 MSEK in 2027, with a potential gross profit margin of approx. 20%

Assuming that all phases and interim goals up until 2027 can be achieved according to plan, the company then sees a possible potential for continued rapid growth. The expansion of the production capacity, in particular for the cell material area, is deemed to be of key importance for the continued total expansion as this market is expected to grow very rapidly at least up until 2030.

### **Smoltek's objectives in total and per business area up until 2027**

Year	2022	2023	2024	2025	2026	2027
Ultra-thin capacitors (decoupling capacitor for mobile application processors)	0	0	15	50	200	400
High performing cell material for PEM electrolyzers	0	0	0	10	70	200
Sales (in total)	0	0	15	80	270	600
Gross profit margin (in total)	0%	0%	0%	15%	17%	20%

All forecasts within this segment of the press release are based on Smoltek's knowledge of relevant markets and the company's technology as well as expected production capacity. Figures in MSEK and percent. All of the above phases and interim goals and objectives per business area described in this segment of the press release are subject to risks related to Smoltek's ability to successfully sign agreement/s with commercial partner/s and the financing and completion of all of the phases and interim goals in the development before volume production/large scale sales can be initiated. Delays regarding the time frame or adjustments of phases or interim goals could occur, and Smoltek cannot guarantee that these phases, interim goals and objectives can be completed and that any income from externally financed process development and/or sales revenue can be received.

#### Source references/forecast data

\* The market size regarding decoupling capacitors for application processors in mobile phones is based on market data from *Smartphone Apps Processor Market Share Tracker Q4 2020: 5G and 5 nm APs Drive Growth, Strategy Analytics, March 2021*, combined with widely known information on the number of decoupling capacitors per application processor in mobile phones from leading manufacturers. Smoltek deem the addressable market for the company's product to be a subset of the total market, and in this addressable market for example Apple units are excluded.

Smoltek's assessment of expected production capacity is based on the ongoing and well-defined industrialization and commercialization process outlined in the table Roadmap: Business area ultra-thin capacitors for the semiconductor industry, as well as conducted research, development and tests related to the company's technology, and expected, fully expanded capacity and performance of the industrial machine for manufacturing of carbon nanofibers that the company ordered during the first quarter of 2022.

\*\* <https://www.smoltek.com/smoltek-innovation>

\*\*\* The market size regarding cell material for electrolyzers used in hydrogen gas production is based on combined market data from Reuters two events Hydrogen 2022 conference in June (8-9) and Hydrogen North America in October (12-13), and [Hydrogen Insights July 2021 Update, Hydrogen Council & McKinsey & Company, 2021](#). According to Reuters, the value for the global electrolyzer market is 0.4 billion USD in 2022, 3.5 billion USD in 2026 and 53 billion SEK in 2030. A rough estimate of the total addressable market for Smoltek's cell material for the anode side of PEM electrolyzers: 40% of the market is related to PEM electrolyzers (Fortune Business Insight, 2021), of which half is estimated to be for the anode

side, and half of this is assumed to be input material which could be replaced by Smoltek's cell material. This amounts to approx. 10% of the total market for electrolyzers.

Smoltek's objective for sales volume in 2027 assumes that the company signs a commercial agreement with one to two manufacturers of PEM electrolyzers and integrates the company's technology in the anode side of these manufacturers next generation of PEM electrolyzers. This is deemed by Smoltek to correspond to a market share of 3-4% of this specific segment during mass production, which the company has as its ambition to reach during 2027 in accordance with the presented roadmap.

**For further information:**

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Smoltek develops process technology and concepts for applications based on carbon nanotechnology to solve advanced materials engineering problems in several industrial sectors. The company protects its unique technology through an extensive and growing patent portfolio consisting of around 100 applied for patents, of which 73 have been granted. Smoltek's share is listed on Spotlight Stock Market under the short name SMOL. Smoltek is a development company and forward-looking statements regarding time to market, production volume and price levels should be interpreted as forecasts and not commitments.