BESLUT

Datum för beslut:
2025-01-17

Diarienummer:
KTH-RPROJ-0276016

Beslut om ett strategiskt initiativ, KTH Battery 3PC: On open arena focusing Process, Production, Product and Circularity for Large-Scale Production of Batteries

Detta beslut har undertecknats elektroniskt.

Beslutet

KTH:s vicerektor för forskning beslutar att:

- Finansiera *KTH Battery 3PC: On open arena focusing Process, Production, Product and Circularity or Large-Scale Production of Batteries* med 1,5 mnkr centrala medel under 2025.
- Utse Christophe Duwig, CBH-skolan, som ansvarig forskningsledare för satsningen.
- Återrapportering enligt utvärderingskriterier, för dialog om fortsatt bidrag ska vara Forskningsberedningen tillhanda 15 januari 2026.

Ärendet

KTH:s initiativ för forskningssatsningar inrättades enligt förslag från Översyn av KTH:s särskilda forskningssatsningar (Dnr: KTH-RPROJ-0276016). Förslaget innebär att centrala medel ska kunna användas till direkt finansiering av tre- till femåriga forskningsinitiativ med det huvudsakliga målet att dra in externa forskningsanslag.

Under föregående år har Forskningsberedningen arbetat vidare med att konkretisera förslaget, och kommit fram till ett antal kriterier för ett KTH Strategiskt initiativ samt kriterier för utvärdering (Protokoll 10/2024):

Kriterier för KTH Strategiskt initiativ:

- Strategiska forskningsinitiativ är ett sätt för KTH att kraftsamla inom områden där det krävs nya samarbeten som är viktiga utifrån KTH:s vision och mål. Det kan dels vara att förstärka ett område som redan finns eller utveckla ett nytt.
- Strategiska forskningsinitiativ ska kunna initieras av både forskare, KTH:s ledning och forskningsberedningen.
- Strategiska forskningsinitiativ är satsningar med central finansiering på 0,5 - 3 mnkr per år i max fem år.

- Målsättningen för en beviljad satsning är att generera betydande externa bidrag till KTH om totalt minst 100 mnkr. Det kan vara externa bidrag från flera olika finansiärer som tillsammans stärker området för forskningsinitiativet. Utväxlingen blir den viktigaste indikatorn som följs upp årligen.

Kriterier för utvärdering av beviljat KTH Strategiskt initiativ ska ske efter ett år enligt nedan:

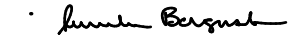
- Projektansökan – En eller flera projektansökningar.
- Kraftsamling - Vilka PI´s är med i projektansökan/ansökningar?
- Förberedelsearbete inför utlysningar.
- Exempel på nya forskningssamarbeten.

Till Forskningsberedningens möte den 22 november inkom förslaget KTH Battery 3PC - On open arena focusing Process, Production, Product and Circularity for Large-Scale Production of Batteries, med professor Christophe Duwig, CBH-skolan, som ansvarig forskningsledare, se bilaga 1.

Baserat på Forskningsberedningens diskussion rekommenderas Vicerektor för forskning att stödja att förslaget beviljas men med mindre budget, 1,5 mnkr för år 2025. En utvärdering ska ligga till grund för diskussion om fortsatt finansiering och i vilken omfattning. (KTH-RPROJ-0276016 Protokoll 9/2024).

Detta beslut har fattats av vicerektor för forskning Annika Borgenstam efter föredragning av forskningsrådgivare Johan Schuber.

Kungl. Tekniska högskolan



Annika Borgenstam, vicerektor för forskning KTH

Johan Schuber, forskningsrådgivare, avdelningen för forskningsstöd inom Verksamhetsstödet

Bilaga 1: projektförslag

Sändlista

För åtgärd:

Christophe Duwig, CBH-skolan

Kopia till:

Skolchef CBH-skolan

Controllergruppen, controller@kth.se

Chefen för avdelningen för forskningsstöd Maria Gustafson

Tf Kommunikationschef Gunilla Iverfelt

Anna Aminoff

Sanna Pehrson, avdelningen för forskningsstöd

Expeditionsdatum:

2025-01-17

KTH Battery 3PC: On open arena focusing Process, Production, Product and Circularity for Large-Scale Production of Batteries

PI Christophe Duwig Process Technology, CBH
Co-PI Magnus Burman Engineering Mechanics, SCI
Total direct funding requested 3 mnkr for 2025-2026 (phase 1) + 3 mnkr for 2027-2029.

Purpose

Today, the ability to produce, in a circular manner, batteries at very large-scale (GWh production per year) is instrumental to sustainable energy transition and well in line with KTH's vision. KTH should take the lead for research, education and life-long learning of batteries with focus on process, production and product in an integrated and circular manner. European industry will see an increased need of research and skills within automated and rapid discrete manufacturing. With 42 GWh-scale factories to be built in Europe, there is a sizable need of researchers, experts, engineers as well as innovative solutions for creating a suitable industrial eco-system.

The current situation in Europe is very competitive and the European commission is re-drafting the European priorities with the Strategic Technologies for Europe Platform (STEP). The **coming European policies** (draft are already public) **will extend to supporting large scale, low cost and vertically integrated circular production, batteries for stationary electricity storage**.

With this as a background we propose that **KTH Battery 3PC will be established as an open and dynamic arena** for research enabling sustainable battery production through comprehensive multi-disciplinary research with focus on **Processes, Production and Recycling challenges as well as Product deployment for circularity.** By leveraging existing strengths in battery technology, production engineering, process technology and digitalization, KTH will foster new partnerships and become a central player in Process and Production for sustainable energy storage solutions, driving innovation and societal impact with dedicated testbeds on campus. KTH will also be established as a pioneer and leading actor in education and life-long-learning dedicated to large-scale battery production.

Why at KTH

Due to the rapid technical developments within the battery area, there is high international competition for researchers with expertise in the field. Hence, it is vital for universities to be recognized and establish a strong brand for attracting national/international investments and research fundings. We observe that top universities (in Sweden and in Europe) are preparing internal investments with aim to create research environments that will attract both talents, funding as well as mobilizing researchers. From our survey, we realize that the research focus on battery chemistry and battery materials is very strong both in a Swedish (e.g. Uppsala University, Chalmers) and European perspective, while other topics receive far less attention. **We have identified a large research opportunity in large-scale manufacturing processes for high-quality, circular and resource efficient production of electrodes, components, cells, and packs.** This need resonates with several actors in Sweden (Northvolt, Novo, Altris, Enerpoly, Scania and Volvo AB) whose ambition is to scale-up production along the value chain and recover material. **Here we see that KTH has a unique opportunity to take a leading role** through unique collaborations between KTH

groups already active in the battery field and leading groups at KTH in production, digitalization (sensing, control, …) and circularity, where our potential academic "competitors" do not have the same scientific breadth.

The opportunity is to take the lead and pioneer the 3PC field. Currently there are more than 20 PhD students at 10+ research groups from all KTH schools active in research projects related to the Battery Value Chain, mostly on the material side and battery usage. However, groups active in the field are somewhat dispersed and there are gaps in our research activities. KTH strength lies in adding **top research groups not currently working on batteries but holding a critical competence, e g large-scale production, digitalization for manufacturing, and processes for material preparation and recycling**.

The current KTH educational offering covers imperfectly the Battery 3PC area. Examples of areas without connection to electrochemistry are large scale manufacturing courses given at ITM, risk/safety courses given at CBH and digitalized factory/automation courses at ITM and EECS, to cite the major tracks only. The synergy between the existing courses is obvious and a first step is to map options within the N5T battery education initiative.

Therefore, there is a clear need for creating an integrated and open environment that brings together competences and researchers and catalyzes novel relevant multi-disciplinary research. **This need is also urgent, and KTH needs to form a faculty team** that can, together with our strategic partners, battery industry, other academic partners and research institutes, establish KTH as a leading player for large-scale circular production.

Research team

The environment will be open and multi-disciplinary and organized around a core of 4 topics:

Process:	Christophe Duwig (Process Technology, CBH)
Production:	Magnus Wiktorsson (Production Engineering, ITM)
Product:	Göran Lindbergh & Rakel Wreland (Applied Electrochemistry, CBH)
Circularity:	Kerstin Forsberg (Resource Recovery, CBH)
Coordination:	Magnus Burman (Engineering Mechanics, SCI)

Inclusiveness is central for the planned platform and as the area grows at KTH, additional groups with relevant expertise will be linked to the initiative. The topics will be complementary and work to attract additional disciplines (digitalization, virtual testing/twins, automation, sensor technologies) and involve infrastructure (labs, testbeds, demonstrators).

Strategy for funding

Research on Battery value chain is receiving an increasing amount of funding on national and European level. Potential funding sources for KTH Battery 3PC are:

- **Horizon Europe** will shift focus to support more large scale manufacturing of batteries including integrated recycling solutions. Relevant calls will be approximately of value 70+ M€/year.
- **BATT4EU** - 4 calls with 2 projects/call to be funded with 8MEUR/yr, added to that one smaller call funding 2 project with 5 MEUR/yr. Topic calls are:
    - Battery material and battery cell
    - Stationary storage
    - Production and recycling
    - Accelerated testing and digital methods within development

- For 2024-2027 the **Swedish government** made a strategic investment (COMPEL) in increased research for three universities (CTH, LU, UU) granting them 45 MSEK for research and infrastructure and 63 MSEK for education and study support. COMPEL does not cover production and processes and KTH needs to be pro-active for motivating a COMPEL2. Northvolt AB has pledged the Ministry of Education for 1.300MSEK/y in research, infrastructure and education.
- **Competence centres**: Vinnova is supporting BASE, led by UU with KTH as an academic partner. After the recent evaluation, the center has now received the go-ahead to apply for continuation for 2025-2029.
- There are discussions with the Swedish Energy Agency for an additional Competence Centre with focus on battery production. The **Swedish Energy Agency's** strategic agenda for 2025-2028 requests additional 2.960 MSEK partly for battery research. It should complement existing programs for Energy Efficient Industry (Industriklivet) and Battery chain value research (approx. 150 MSEK/yr).
- **Impact Innovation** (Vinnova, Energimyndigheten, Formas) has launched the first five programs whereof three are expected to have calls within the scope of KTH Battery 3PC (Advanced Digitalization, Net Zero Industry, Metals and Minerals), offering 3 * 150MSEK/yr.

Budget and funding acquisition:

An initial internal support from KTH is crucial to quickly put KTH's battery initiative on the map, and the first two years' activities focus on external and internal visibility. After that new external funding will provide the opportunity for more long-term competence building, in the form of new undergraduate courses, recruitment of faculty, funding for doctoral students, etc.

Phase I. Year 1-2: 3 MSEK/yr – start-up, coordination, communication, branding and PR material, organization of events, meet-ups, planning of proposals.

- Mobilize KTH researchers active in complementing areas
  - Build an open arena.
  - Organize common get-together events.
  - Initiate targeted open working groups.
- National and International Visibility
  - Branding – build a strong brand with a clear profile.
  - Connection with international large initiatives within e.g. N5T, Norway, France, Canada
  - Communication strategy with external partners.
  - Participation in key conferences, speed-dating and consortium build-up for EU projects.
  - Targeted visits at key stakeholders.
- Initiate 2-3 pioneer projects with strategic relevance
  - Build track record with preliminary results using 2+ young researchers with joint supervision e.g. extending contracts of PhDs who work on process and production and will extend to the field of large-scale battery production.
  - Free time for researchers to contribute to 3PC Pioneer Projects.

Phase II Year 3-5: 3 MSEK from KTH/yr + additional external funding (4-5 MSEK in year 3 going to 15-20 MSEK in year 5) – events, coordination, large projects applications 3-4 national research projects with external financing and 5-6 large international research projects with external financing.

Year 5-10: size of 25-30 MSEK/yr external funding, direct government funding 10 MSEK/yr. A dynamic community of 50+ active KTH researchers holding a strong brand and taking part in all major national and international activities regarding battery production.

KTH internt beslut med e-signatur: kth-proj-0276016_Beslut om ett strategiskt initiativ KTH Battery 3PC: On open arena focusing Process, Production, Product and Circularity for Large-Scale Production of Batteries

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