# Innovate for Sustainable Accelerating Systems (iSAS)

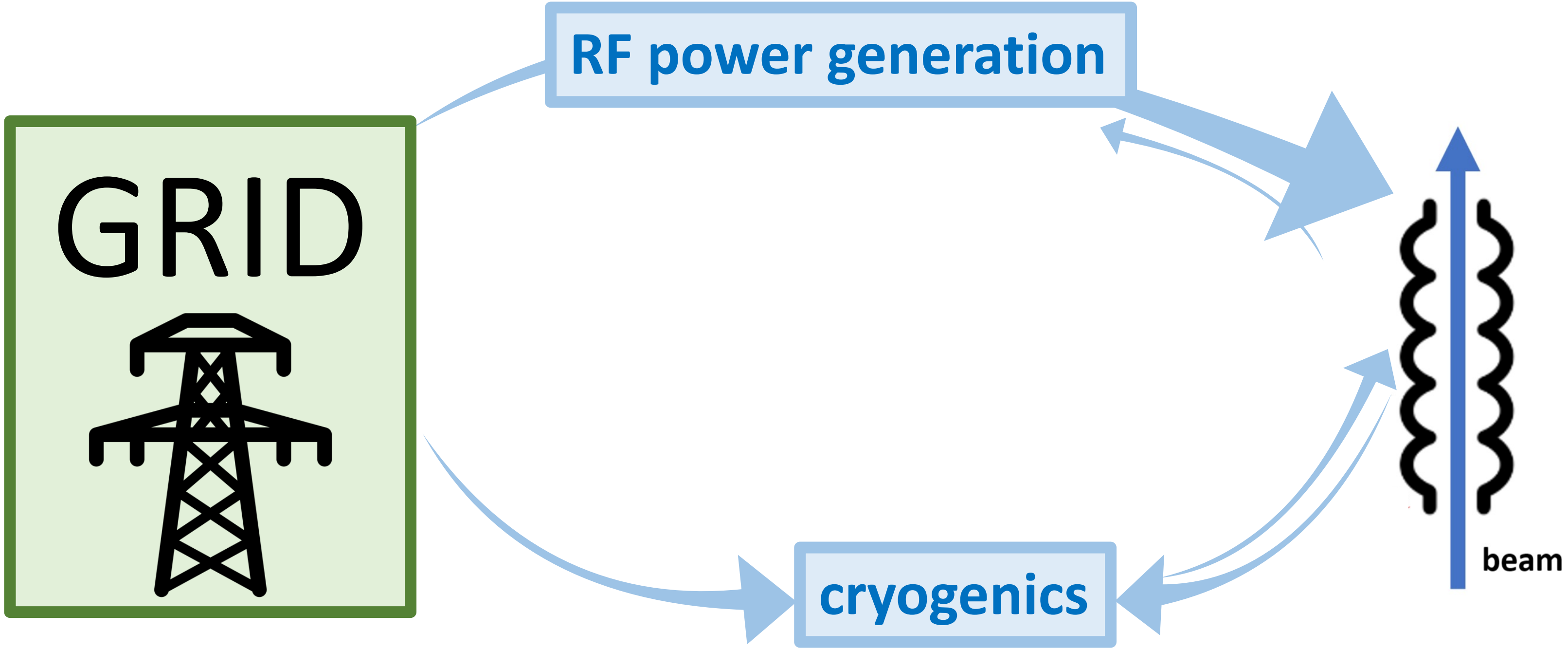
*Jorgen D'Hondt*
*Vrije Universiteit Brussel*

The energy efficiency of present and future accelerators [...] is and should remain an area requiring constant attention.

***A detailed plan for the [...] <u>saving and re-use of energy</u> should be part of the approval process for any major project.***

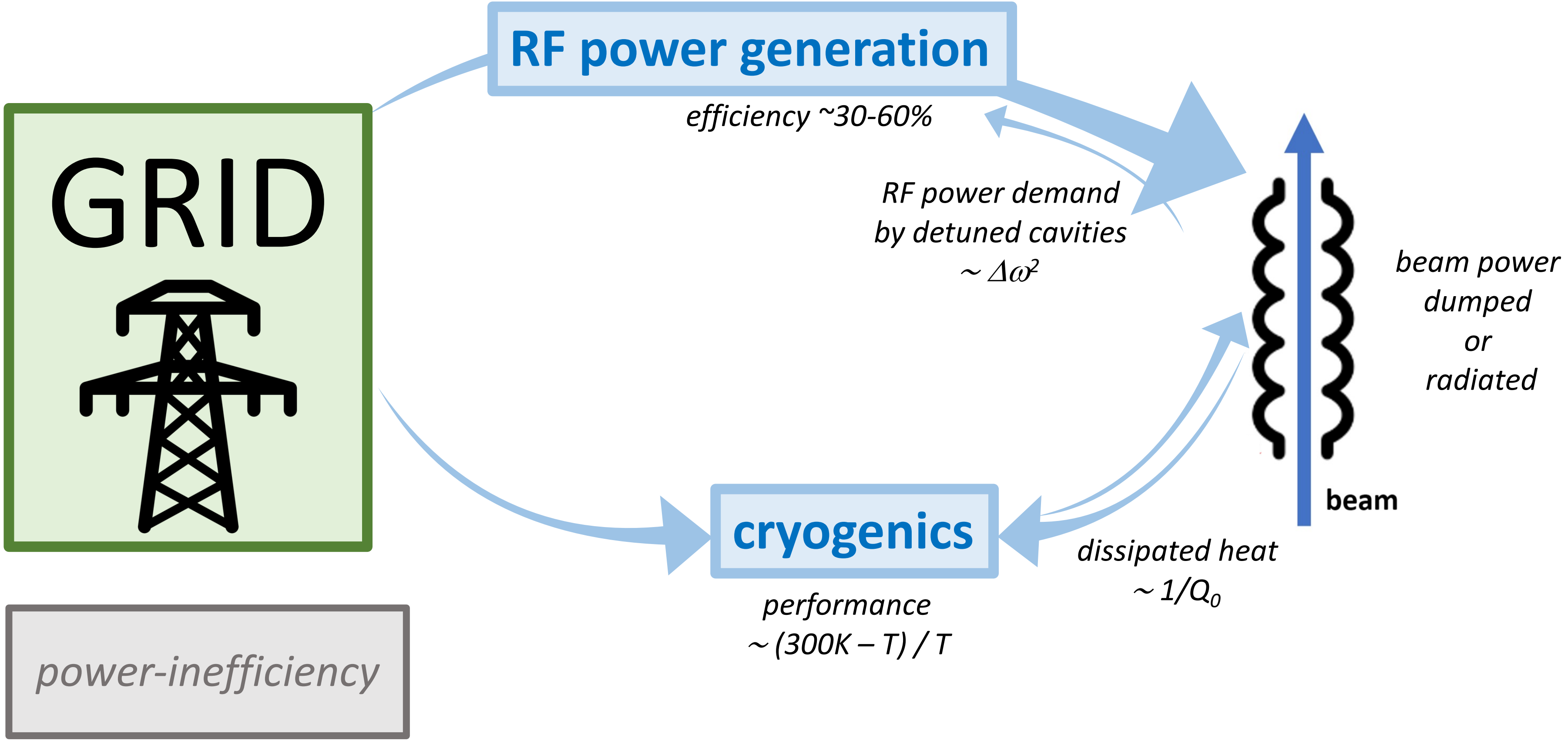
*European Strategy for Particle Physics 2020*

# From Grid to Beam




Picture adopted from M. Seidel (IPAC 2022)

# From Grid to Beam



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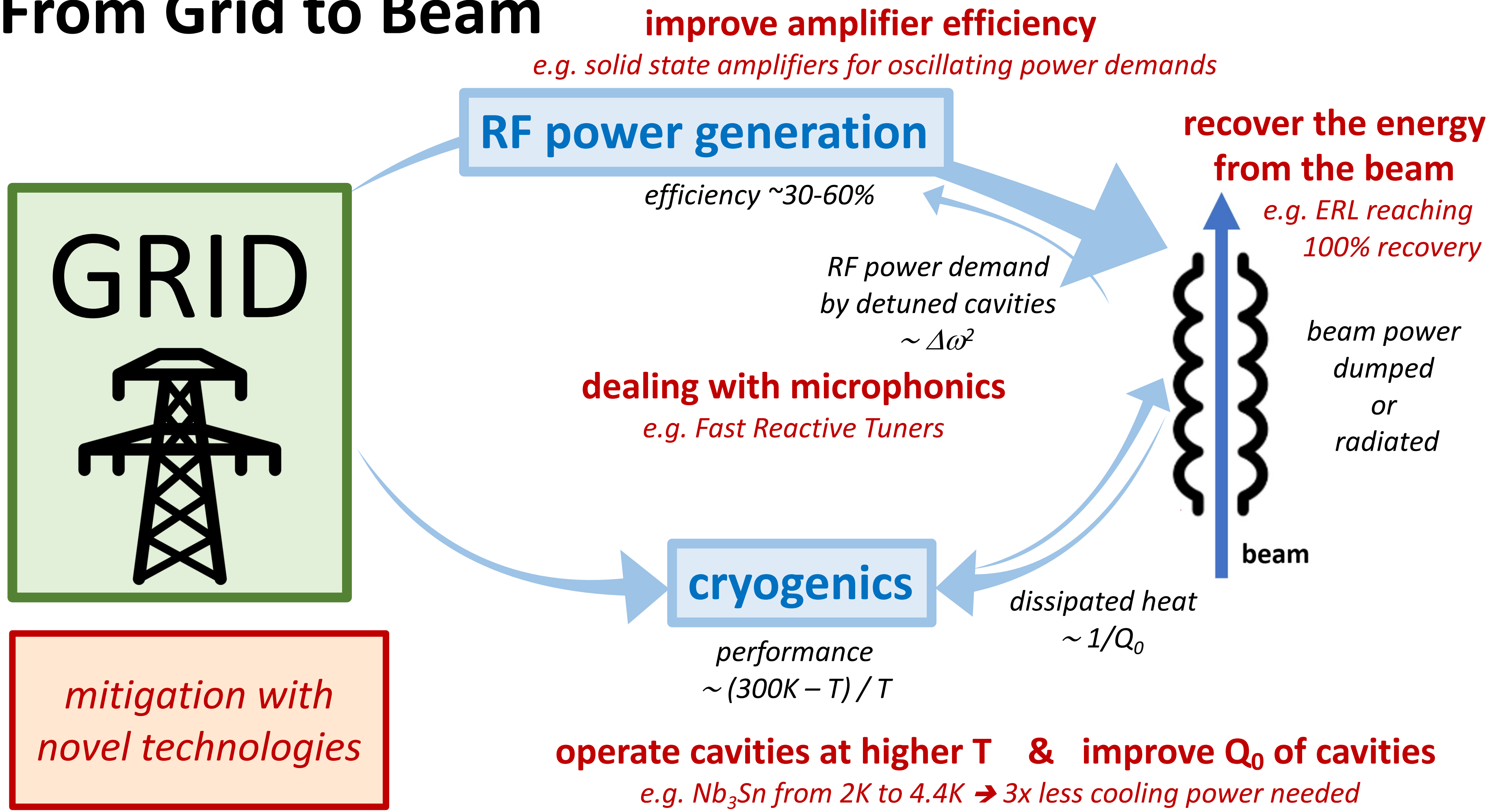

# From Grid to Beam

**improve amplifier efficiency**

*e.g. solid state amplifiers for oscill...*

Accelerating particles will always require a large amount of energy, hence achieving a minimal energy consumption is our unavoidable challenge and duty

**Thought for an overall R&D programme for "Sustainable Accelerating Systems"**

*less energy, less cooling, less power loss, recover beam power*

beam

*dissipated heat*
*~ $1/Q_0$*

*performance*
*~ (300K – T) / T*

**operate cavities at higher T & improve $Q_0$ of cavities**

*e.g. $Nb_3Sn$ from 2K to 4.4K ➔ 3x less cooling power needed*

# From Grid to Beam

improve amplifier efficiency

*e.g. solid state amplifiers for oscill...*

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*less energy, less cooling, less power loss, recover beam power*

**ALARA** = **A**s **L**ow **A**s **R**easonable **A**chievable

*principle enforced for nuclear safety,*
*also for energy consumption ?*

operate...

*e.g. $Nb_3Sn$ from 2K to 4.4K ➔ 3x less cooling power needed*

**from the European Accelerator R&D Roadmap programme together engaged into a concrete R&D project**

*consortium proposal*

***"Innovate for Sustainable Accelerating Systems" (iSAS)***

# “Innovate for Sustainable Accelerating Systems”

## *HORIZON-INFRA-2023-TECH-01-01*

## *New technologies and solutions for reducing the environmental and climate footprint of RIs*

**REGULATIONS**

- **Specific conditions**
  - *Expected EU contribution per project: around 5M EUR.*
  - *Consortia must include at least 3 different research infrastructures, each of them being an ESFRI infrastructure, and/or a European Research Infrastructures Consortium (ERIC) or another research infrastructure of European interest (i.e. a research infrastructure which is able to attract users from EU or associated countries other than the country where the infrastructure is located). Consortia should be built around a leading core of at least 3 world-class research infrastructures and can include a wider set of RIs.*
  - *Other technological partners, including industry and SMEs, should also be involved, thus promoting innovation and knowledge sharing through co-development of new technical solutions for research infrastructures.*
  - *Proposals should built on and explain any synergies and complementarities with previous or current EU grants, including those under other parts of the Framework Programmes.*
- **Expected Outcome**
  - *Reduction of environmental impacts (including climate-related)*
  - *Optimisation of resource and energy consumption integrated through the full life cycle of research infrastructures*
  - *Increased long-term sustainability of European research infrastructures*
- **Scope**
  - *The aim of this topic is to deliver innovative technologies and solutions which reduce the environmental and climate footprint of RIs through the full life cycle of research infrastructures. Proposals should identify common methodologies, among the concerned RIs, to assess environmental impact and strategies to reduce it, as well as efficiency gains in the broader ecosystem.*
  - *Proposals should address the following aspects, as relevant:*
    - *new technologies and solutions for research infrastructures enabling transformative resource efficiency (e.g. energy consumption) and reduction of environmental (including climate-related) impacts, including, when relevant, more sustainable and efficient ways of collecting, processing and providing access to data;*
    - *validation and prototyping;*
    - *training of RI staff for the operation and use of the new solutions;*
    - *action plans to deploy the new developments at wider scale and ensure their sustainability;*
    - *measures to ensure an environmentally effective integration of the solutions in the local contexts;*
    - *societal engagement to foster acceptance of the solutions in the local and regional communities.*

# “Innovate for Sustainable Accelerating Systems”

*HORIZON-INFRA-2023-TECH-01-01*

*New technologies and solutions for reducing the envir…*

- **Specific conditi…**

*…(ERIC) or*
*…where the*
*…echnical*
*…ammes.*

- **S…**

*…print of RIs through the full life cycle of research*
*…assess environmental impact and strategies to reduce it, as well as efficiency*
*…relevant:*
*…and solutions for research infrastructures enabling transformative resource efficiency (e.g. energy consumption) and reduction of environmental (including climate-related) impacts, including, when relevant, more sustainable and efficient ways of collecting, processing and providing access to data;*
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- *measures to ensure an environmentally effective integration of the solutions in the local contexts;*
- *societal engagement to foster acceptance of the solutions in the local and regional communities.*

**4M EUR excl overhead**

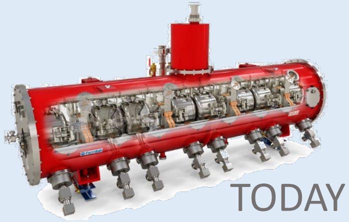
## Create strong and broad impact with a ~~5M~~ EUR EU-project

*develop an impactful and well-motivated project that is a catalyser for the implementation of the Accelerator R&D Roadmap*

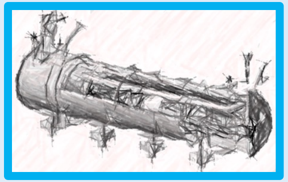
***Goal: develop, prototype and validate the essential energy-saving and energy-recovery technologies required to integrate in the design of a novel sustainable LINAC cryomodule with a broad portfolio of applications in industry and at accelerator research infrastructures***

***Sustain the impactful 20th-century accelerator applications into an energy-low 21st century!***

**INNOVATE TECHNOLOGIES TOWARDS A SUSTAINABLE ACCELERATING SYSTEM**

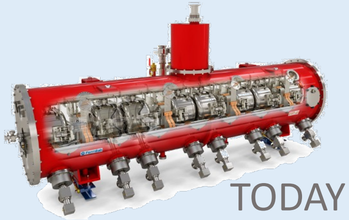


TODAY



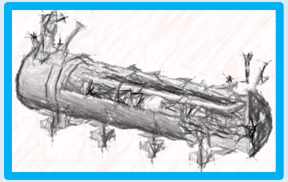
NEW DESIGN

DEVELOP ENERGY-SAVING & ENERGY-RECOVERY TECHNOLOGIES ESSENTIAL TO INTEGRATE IN THE DESIGN OF A SUSTAINABLE LINAC CRYOMODULE



TODAY

INNOVATE TECHNOLOGIES TOWARDS A SUSTAINABLE ACCELERATING SYSTEM



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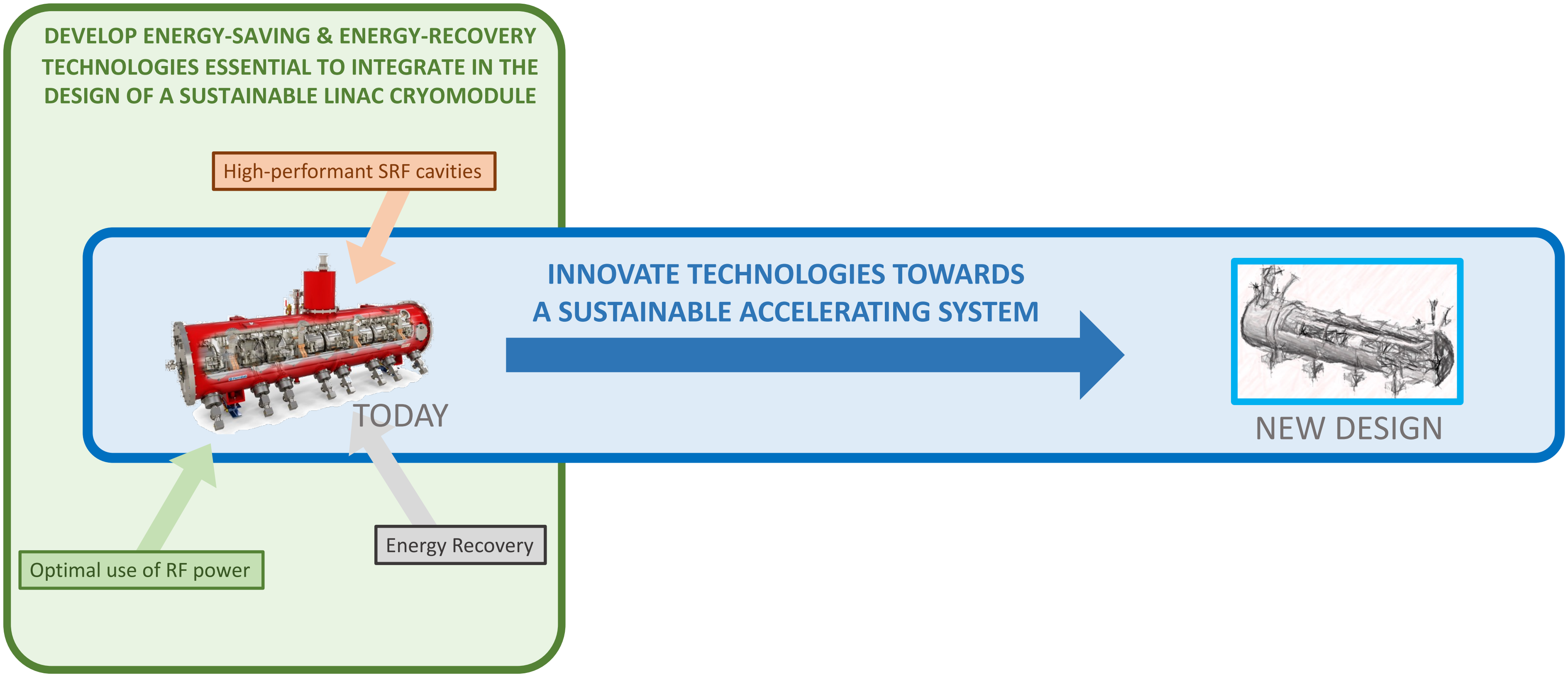
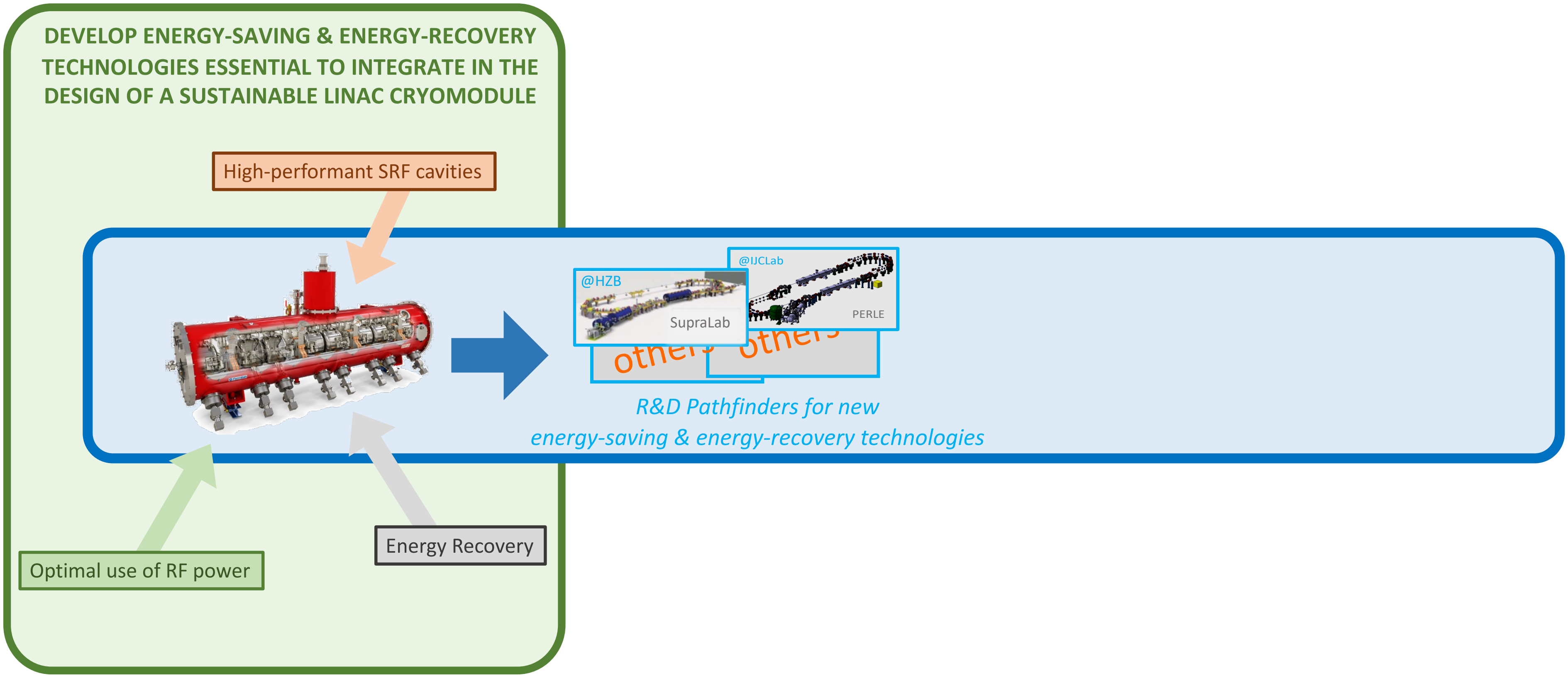


DEVELOP ENERGY-SAVING & ENERGY-RECOVERY TECHNOLOGIES ESSENTIAL TO INTEGRATE IN THE DESIGN OF A SUSTAINABLE LINAC CRYOMODULE
High-performant SRF cavities
INNOVATE TECHNOLOGIES TOWARDS A SUSTAINABLE ACCELERATING SYSTEM
TODAY
NEW DESIGN
Energy Recovery
Optimal use of RF power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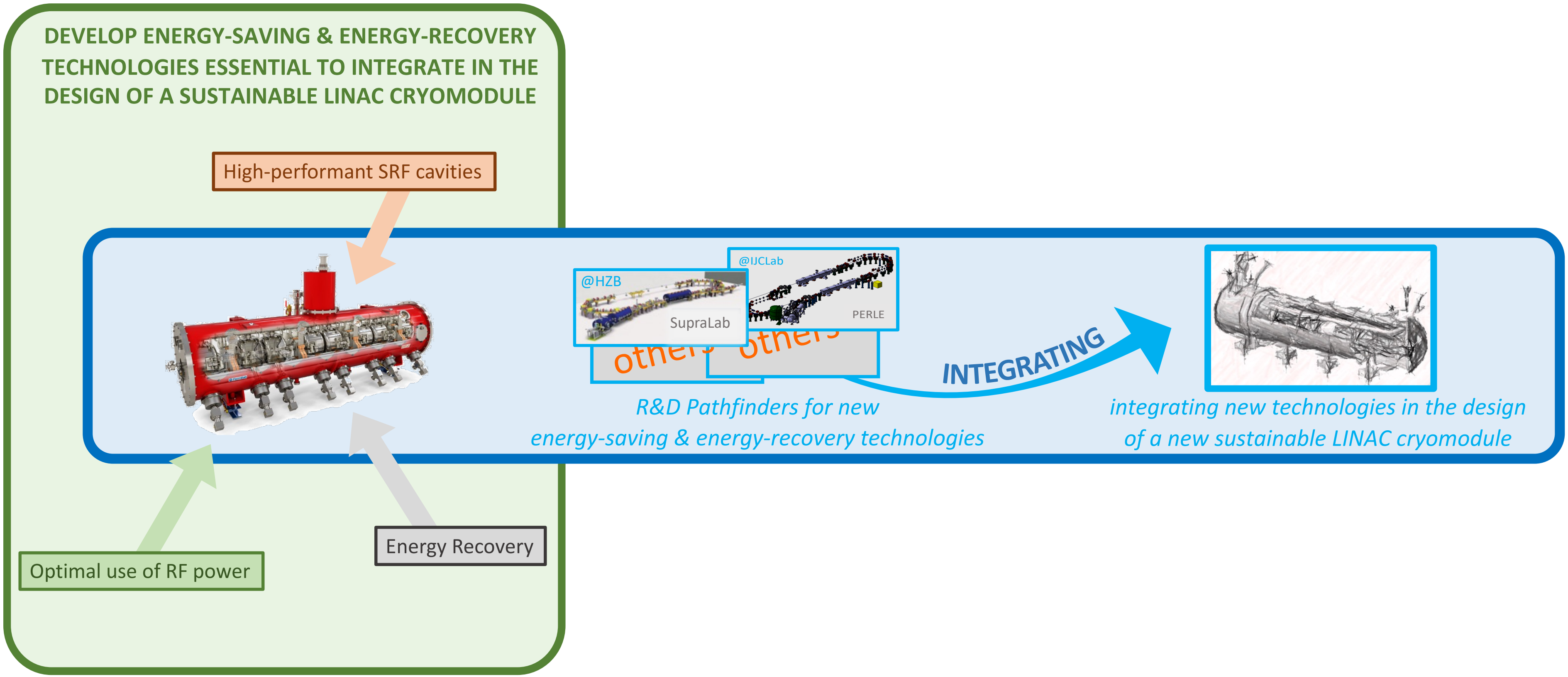
High-performant SRF cavities
@HZB
SupraLab
@IJCLab
PERLE
R&D Pathfinders for new
energy-saving & energy-recovery technologies
Energy Recovery
Optimal use of RF power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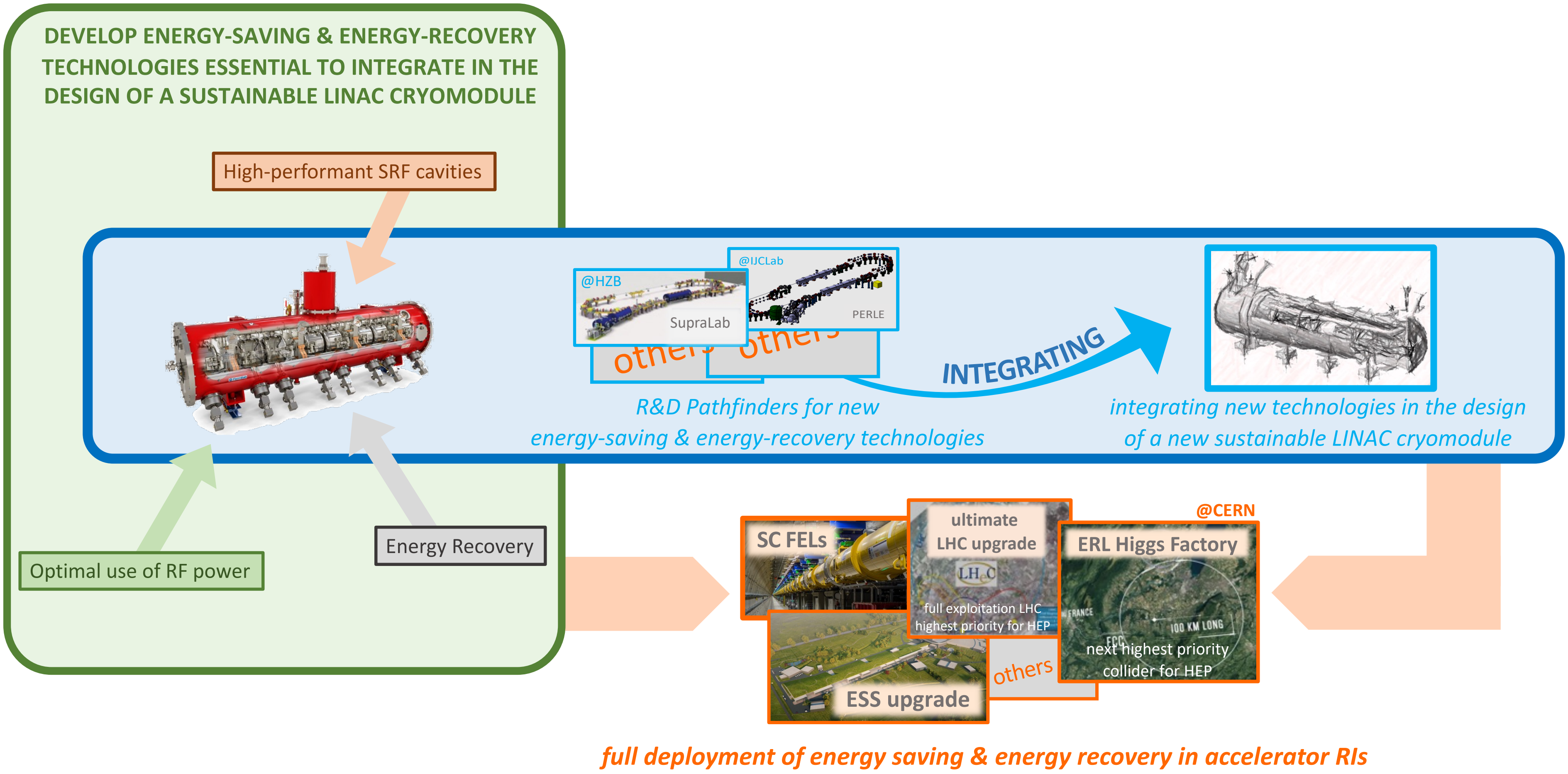
@HZB
SupraLab
@IJCLab
PERLE
others
others
INTEGRATING
R&D Pathfinders for new energy-saving & energy-recovery technologies
integrating new technologies in the design of a new sustainable LINAC cryomodule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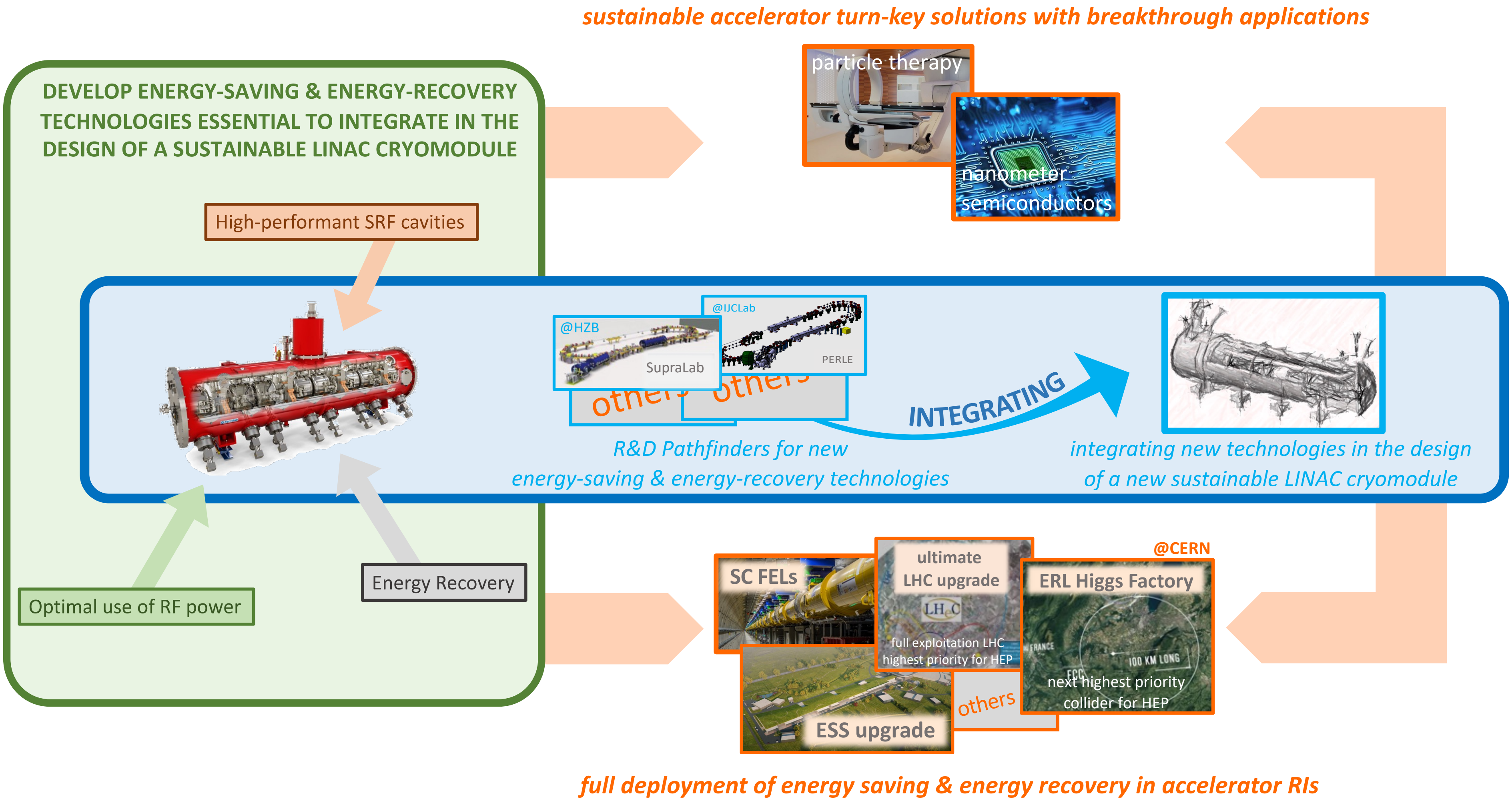
INTEGRATING
R&D Pathfinders for new energy-saving & energy-recovery technologies
integrating new technologies in the design of a new sustainable LINAC cryomodule
SC FELs
ultimate LHC upgrade
full exploitation LHC highest priority for HEP
@CERN
ERL Higgs Factory
next highest priority collider for HEP
ESS upgrade
others
full deployment of energy saving & energy recovery in accelerator RIs



sustainable accelerator turn-key solutions with breakthrough applications
particle therapy
nanometer semiconductors
DEVELOP ENERGY-SAVING & ENERGY-RECOVERY TECHNOLOGIES ESSENTIAL TO INTEGRATE IN THE DESIGN OF A SUSTAINABLE LINAC CRYOMODULE
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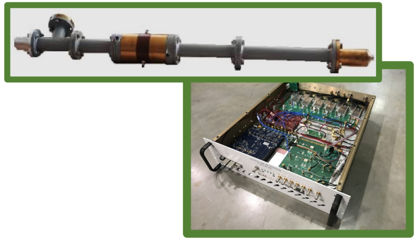
Optimal use of RF power
Energy Recovery
SC FELs
ultimate LHC upgrade
full exploitation LHC highest priority for HEP
@CERN
ERL Higgs Factory
next highest priority collider for HEP
ESS upgrade
others
full deployment of energy saving & energy recovery in accelerator RIs

# "Innovate for Sustainable Accelerating Systems"

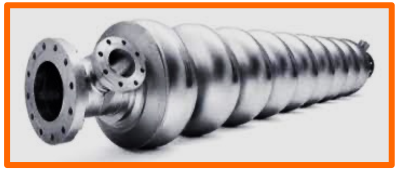
- **AMBITION** – Particle accelerators have become essential instruments to improve our health, environment, safety and high-tech abilities, as well as to unlock new fundamental insights in physics, chemistry, biology, and generally enable scientific breakthroughs that improve our lives. Accelerating particles to higher energies will always require a large amount of energy. In a society where energy sustainability is critical, keeping energy consumption as low as reasonable possible is an unavoidable challenge for both research infrastructures and industry, which collectively operate more than 30.000 accelerators. If you are part of the problem, you must be part of the solution. Accordingly, enhanced collaboration will broaden, expedite and amplify the development and impact of the novel technical solutions. For example, without innovations the annual operation of the next major particle physics collider could, in due time, require up to 4% of the annual energy consumption of a medium-sized European country. The objective of the project is to innovate and reinvent the key technologies of particle accelerating systems such as to minimize energy consumption for all particle accelerators, by developing both specific energy-saving technologies and energy-recovery technologies where energy cannot be saved. This represents a vital transition to sustain applications of the leading 20$^{th}$ century accelerator technology in the 21$^{th}$ century.
- **METHODOLOGY** – With a coherent collaboration between leading European research institutions and industry, several interconnected technologies will be developed, prototyped and tested, each enabling significant energy savings or energy recovery on their own in accelerating particles. Taking into account the developments realised at these unique R&D Pathfinder labs, the novel technologies will be coherently integrated into the design of a new accelerating system optimised for energy savings of the instrument itself and for final energy recovery of the energy given to the accelerated particle beam. Energy saving technologies will be developed and the novel LINAC cryomodule will be designed with in mind a portfolio of forthcoming applications, including energy-saving upgrades of existing research infrastructures. Timescales to innovate, prototype and test new accelerator technologies are understandably long. Therefore, it is essential to collaborate and to enhance the R&D process for energy-sustainable technologies so that they can be implemented without delay and avoiding hampering scientific and industrial progress enabled by accelerating systems.
- **IMPACT** – While several *energy-saving* technologies will be integrated into industrial turn-key solutions with short-term impact on current research infrastructures, this project is also the main pathfinder for the *energy-recovery* capability of future large particle colliders. Both energy-saving and energy-recovery technologies will therefore provide novel opportunities for breakthroughs in fundamental sciences, and in particular enable high-energy particle colliders to go beyond the current frontiers of energy and intensity in an energy-sustainable way. The new technologies will enable the European industry to take a leading role in the semiconductor, particle therapy and free electron laser sectors.

# Innovate for Sustainable Accelerating Systems

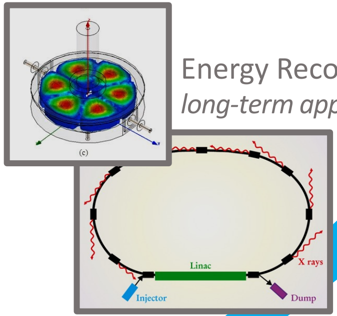
Efficient RF Power use
*short-term applications*



High-performant SRF cavities
*medium-term applications*

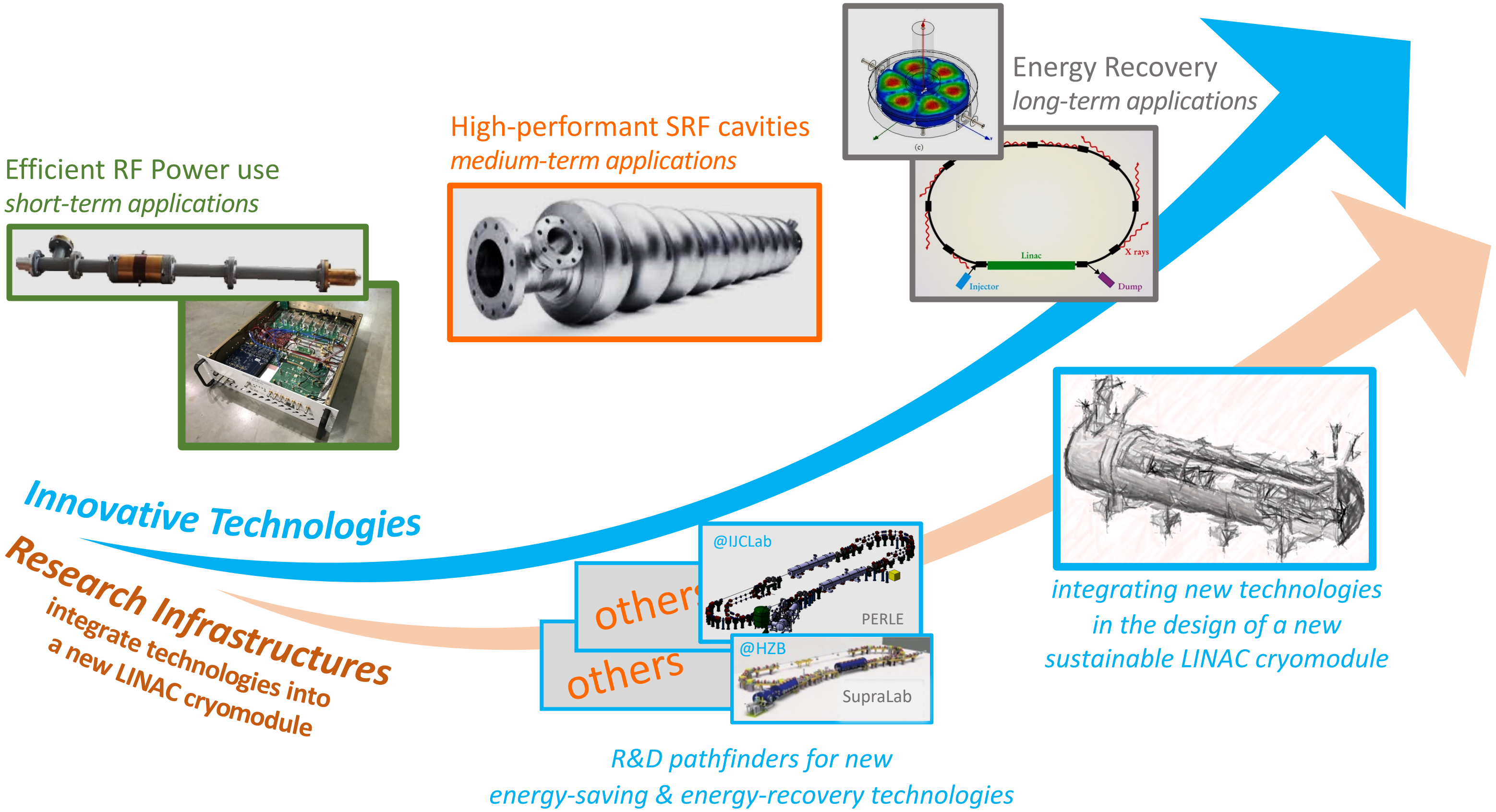


Energy Recovery
*long-term applications*

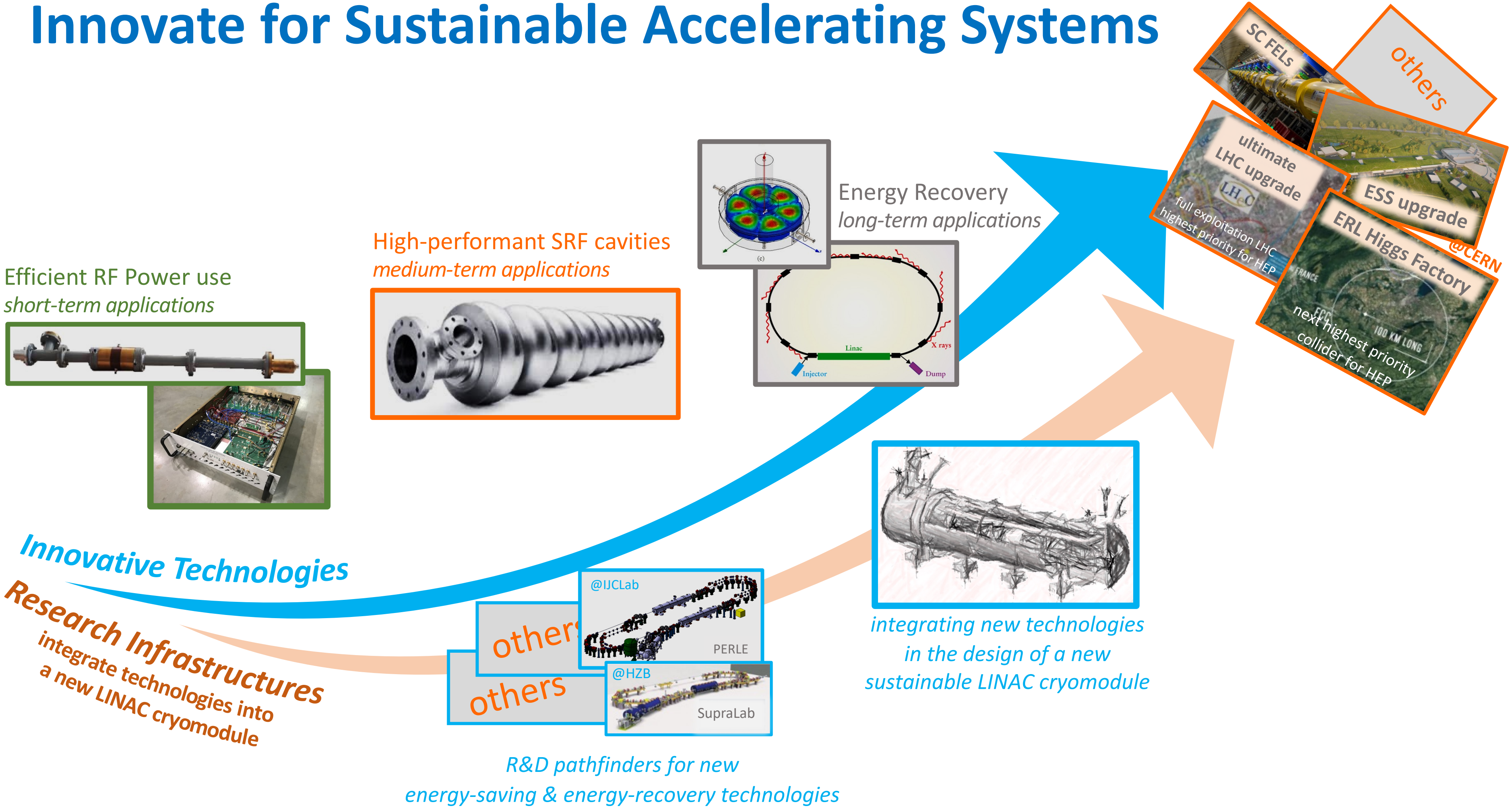



*Innovative Technologies*

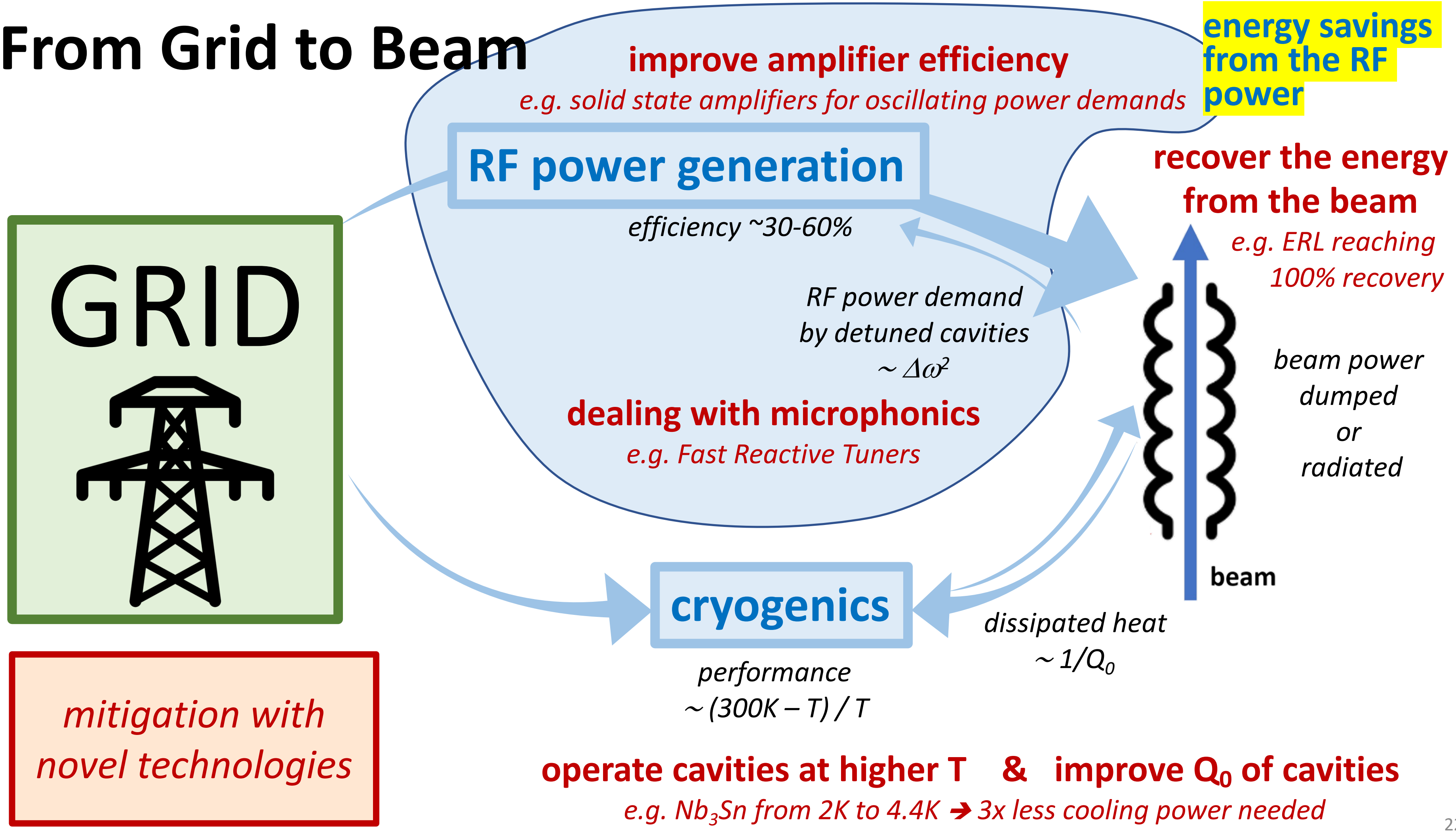
# Innovate for Sustainable Accelerating Systems



# Innovate for Sustainable Accelerating Systems



# From Grid to Beam



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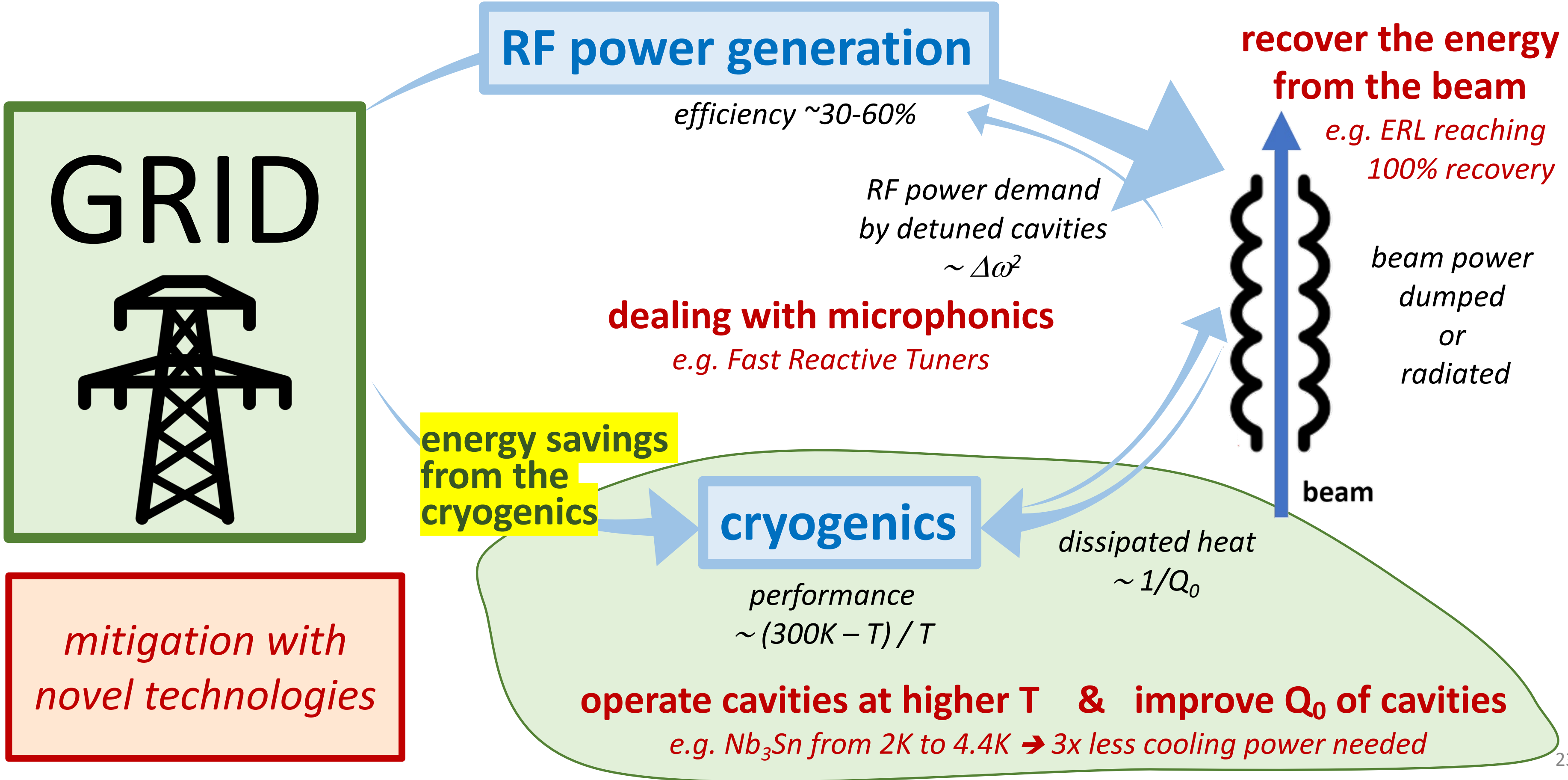
**improve amplifier efficiency**

*e.g. solid state amplifiers for oscillating power demands*



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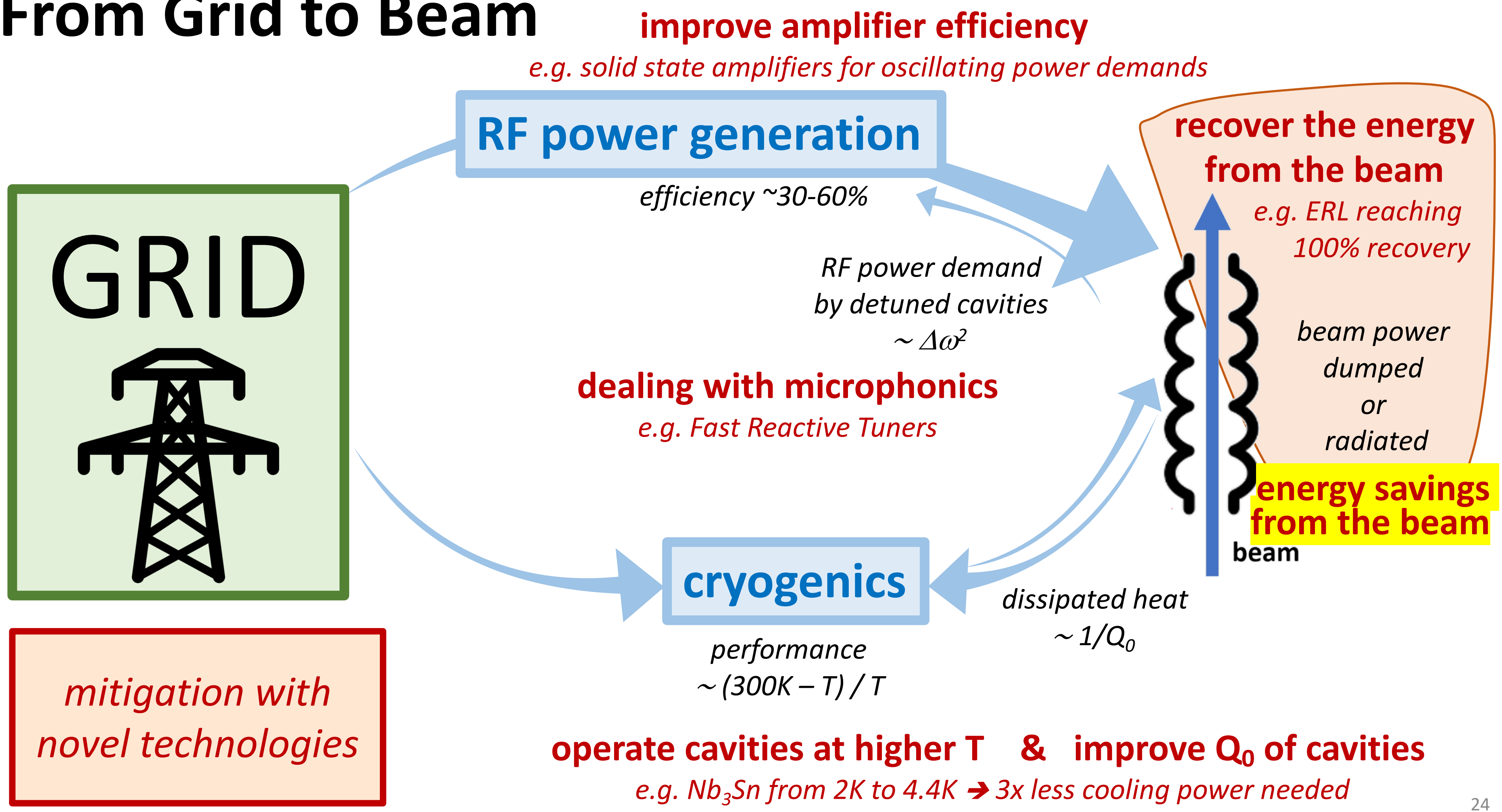

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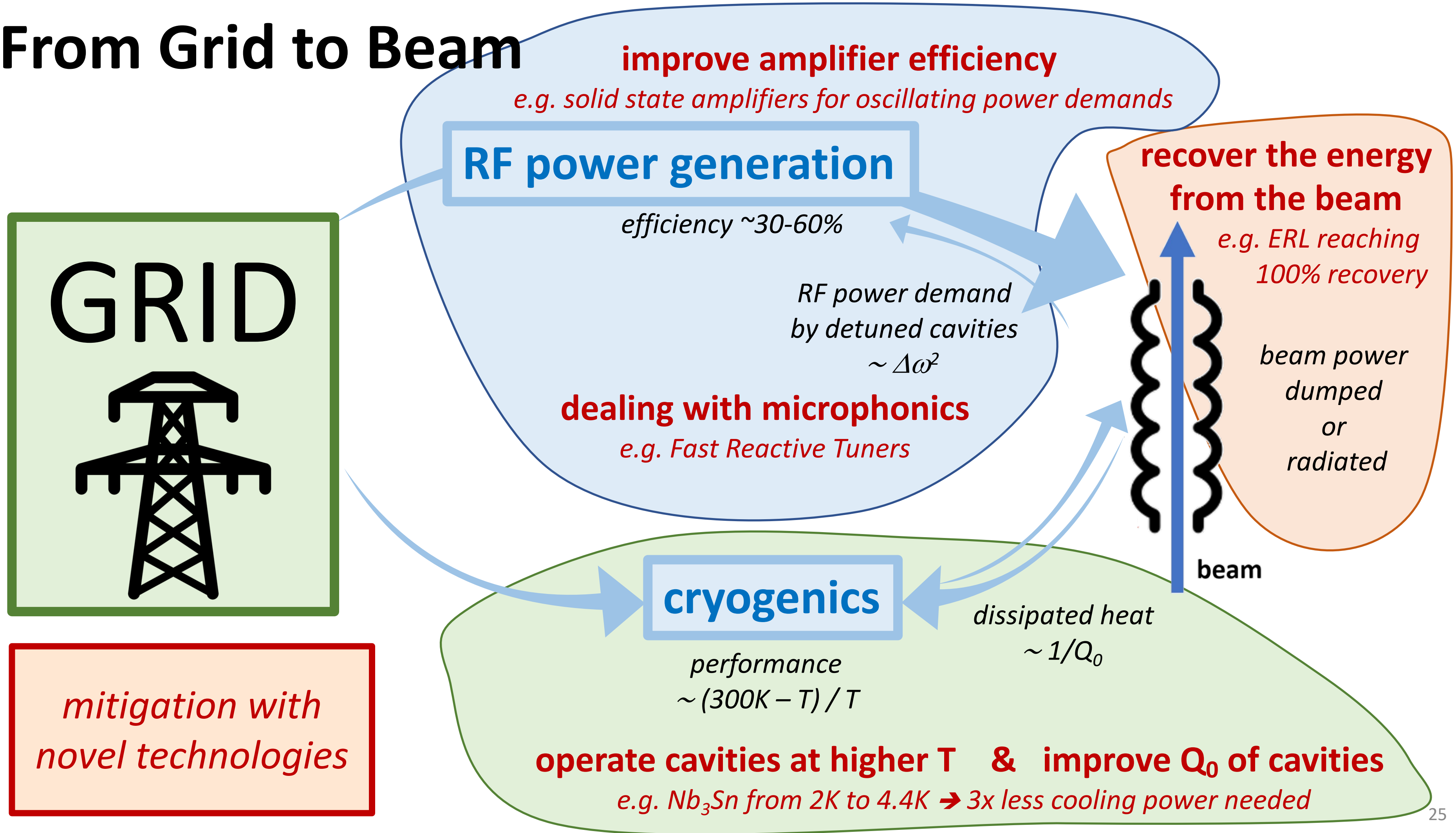

# “Innovate for Sustainable Accelerating Systems” (iSAS) – *overall budget*

| BUDGET iSAS - based on the presented scopes (excl. overhead) | | | |
|---|---|---|---|
| **WP** | **Subject** | **FINAL? kEUR** | |
| | **Energy Savings** | | |
| TA#1 | from the RF power (FRT) | 962 | nominal version (smaller number of tests) |
| | from the RF power (LLRF) | 466 | realistic version (no third institute) |
| TA#2 | from the cryogenics | 900 | nominal version (previous meeting) |
| TA#3 | from the beam | 1400 | guess: CM from ESS (-700k EUR), adapt this CM (+100kEUR)? |
| | **Intgration** | | **To be further developed & verified** |
| INT#1 | into new design of a sustainable CM | 150 | preview/guess |
| INT#2 | into accelerator-driven Research Infrastructures | 40 | preview/guess |
| INT#3 | into industrial applications | 50 | preview/guess |
| SOC | Societal aspects | 40 | preview/guess |
| CCM | Coordination & Collaboration & Management | 60 | preview/guess |
| **TOTAL** | | **4068** | |

# “Innovate for Sustainable Accelerating Systems” (iSAS)

**With now all scopes defined and reasonably within the earmarked Horizon Europe budget, an updated proposal for a concrete WP structure in the iSAS application**

***From Horizon Europe: “A work package (WP) is a major sub-division of the work plan of your project. As many WPs as needed but no more than what is manageable.”***

# “Innovate for Sustainable Accelerating Systems” (iSAS)

- **R&D Pathfinders for three Technology Areas (TA) for energy-saving**

  **TA#1: energy savings from the RF power** *(short-term and very wide applications)*

  *WP.1: optimal integration of Fast Reactive Tuners to deal with microphonics (400, 800 and 1300 MHz)*

  *WP.2: LLRF controls (incl. AI)*

  **TA#2: energy savings from the cryogenics** *(medium-term and wide applications)*

  *WP.3: high-temperature SRF cavities (thin films (e.g. $Nb_3Sn$) on Cu)*

  **TA#3: energy savings from the beam** *(long-term and specific applications)*

  *WP.4: Higher-Order Mode damping and couplers*

- **INT#1: integrate these technologies into the design of a sustainable LINAC cryomodule**
  - *WP.5: based on the ESS cryomodules, develop a parametric design for an optimally sustainable LINAC cryomodule, ready to be adapted and built for various applications in industry and in accelerator RIs*
- **INT#2: integrate these technologies into existing LINAC cryomodules at RIs**
  - *WP.6: engineering aspects to integrate and test energy-saving FRT and HOM technologies in existing structures at RIs, with a focus on ESS, HL-LHC, EU XFEL (i.e. addressing directly the scope of this Horizon Europe call)*
- **INT#3: integrate the technologies into the designs of new accelerator-driven RIs**
  - *WP.7: from proof-of-concept ideas to concrete, peer-reviewed and feasible designs, with a focus on current and future accelerator-driven RIs appearing in particle and nuclear physics strategies*
- **INT#4: integrate into turn-key solutions and revolutionising applications in industry**
  - *WP.8: prepare the co-developments with industrial partners such that when the new technologies and the new designed LINAC cryomodule are delivered they can be built by industry*

proposed update from previous meeting

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# “Innovate for Sustainable Accelerating Systems” (iSAS) – *cross coordination*

Technology Areas & Integration Work Packages

| | INT#1 Design | INT#2 Existing RIs | INT#3 New RIs | INT#4 Industry | |
|---|---|---|---|---|---|
| TA#1 LLRF & FRT | | | | | Axel Neumann (HZB) |
| TA#2 Thin Film SRF | | | | | Cristian Pira (INFN) |
| TA#3 HOM | | | | | Guillaume Olry (CNRS) |
| | NN (ESS) | NN (Uni Lancaster) NN (IJCLab) | NN (Uni Oxford) NN (DESY) | NN (INFN) | |

# “Innovate for Sustainable Accelerating Systems” (iSAS) – *concrete tasks*

TECHNOLOGY AREAS

**WP.1: Fast Reactive Tuners (lead HZB)**

Task 1.1: Coordination – HZB
Task 1.2: FRT for Transient Beam loading – CERN, LU, HZB
Task 1.3: FRT for microphonics – HZB, LU, CERN
Task 1.4: FRT in ERL mode – IJCLab, HZB, LU, ESS

**WP.2: LLRF controls, including AI (lead HZB)**

Task 2.1: Coordination – HZB, DESY
Task 2.2: Charactarize microphonics for LLRF controls – HZB, DESY
Task 2.3: LLRF controls based on mechanical tuners – HZB, DESY
Task 2.4: LLRF controls baed on FE FRT – HZB, DESY
Task 2.5: Integrate controls with AI – HZB, DESY

**WP.3: Thin Films for High-Temperature SRF cavities (lead INFN)**

Task 3.1: Coordination – INFN
Task 3.2: Develop and validate a new SRF cavity @ 4.2K – STFC, INFN, HZB, CEA
Task 3.3: RF Tunability – HZB, STFC, INFN, CEA
Task 3.4: Flux Trapping – STFC, HZB, STFC, CEA
Task 3.5: Adaptive Layer – CEA, HZB, STFC, INFN

**WP.4: HOM Damping and fundamental power couplers (lead IJCLab)**

Task 4.1: Coordination – IJCLab
Task 4.2: Design and prototype
Task 4.3: Testing

# “Innovate for Sustainable Accelerating Systems” (iSAS) – *concrete tasks*

INTEGRATION

**WP.5: Integrate into the design of a sustainable LINAC cryomodule (lead ESS)**
Task 5.1: Coordination – ESS
Task 5.2: …

**WP.6: Integrate into existing LINAC cryomodules at RIs (lead IJCLab & Uni Lancaster)**
Task 6.1: Coordination – IJCLab, Uni Lancaster
Task 6.2: Retrofitting into exisiting cryomodules HL-LHC oriented – Uni Lancaster, CERN
Task 6.3: Adapt the existing ESS cryomodule – IJCLab, …
Task 6.4: Fabrication and validation of components – IJCLab, …
Task 6.5: Assembly and test of adapted cryomodules – IJCLab, …

**WP.7: Integrate into the designs of new accelerator-driven RIs (lead DESY & Uni Oxford)**
Task 7.1: Coordination – DESY, Uni Oxford
Task 7.2: From proof-of-concept ideas to concrete, peer-reviewed and feasible designs – DESY, Uni Oxford

**WP.8: Integrate into industrial applications (lead INFN)**
Task 8.1: Coordination – INFN
Task 8.2: Dissemination of technological developments to industry – INFN, …

# “Innovate for Sustainable Accelerating Systems” (iSAS) – *concrete tasks*

**WP.9: Societal aspects (lead IJCLab)**
Task 9.1: Coordination – IJCLab
Task 9.2: Training and Early Career – …
Task 9.3: Outreach and Dissemination – …
Task 9.4: Diversity and Equity – …
Task 9.5: Open Science – …

**WP.10: Coordination & Management (lead IJCLab)**
Task 10.1: Project Coordination and Management Office – IJCLab
Task 10.2: Scientific Coordination – Uni Brussels, INFN, HZB, IJCLab
Task 10.3: Internal communication and Collaboration – IJCLab, STFC
Task 10.4: Relations with other projects in the accelerator landscape – IJCLab, Uni Brussels, INFN, HZB, STFC, CERN

# "Innovate for Sustainable Accelerating Systems" – *industry*

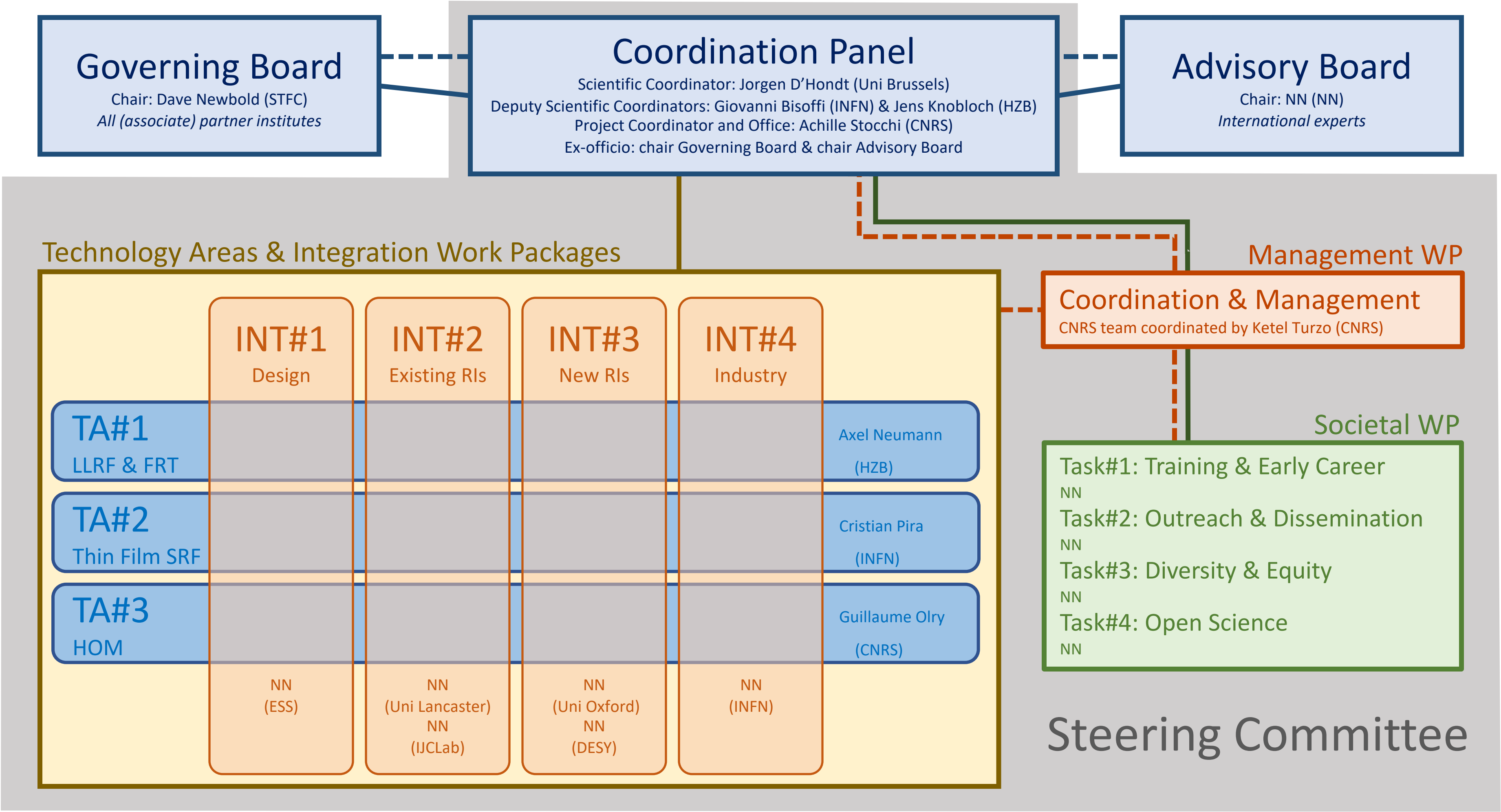
## Towards co-developing with industry in each of the 4 Technology WPs:

- For the WP1-2-3-4 conveners (Jens, Axel, Cristian, Guillaume)
- Collect from each participating research institute a portfolio of potential industrial partners in the scope of the iSAS application, i.e. industrial partners they can engage at this stage
- Conveners should identify the most impactful industry relations from among this list, i.e. the most impactful connections per technology WP
- This will allow for each of the four technology WPs to write down a concrete illustration of the opportunities and benefits for co-developing in the application, i.e. in the respective WP sections of the application document

## The industry integration WP:

- Write down a structure to inform the industry during the 4 years of the project about our novelties and a plan to get them onboard for the construction of each technology component and eventually the full new CM
- By the end of the iSAS project we will deliver new validated energy-saving technologies and the Horizon Europe application has to include a plan to make sure the industry is ready to built them at that time
- How we plan to reach co-developing has to be elaborated in the iSAS application
- Include an action plan to deploy the new developments at wider scale and ensure their sustainability

Strawman proposal v3 (30 Jan 2023)



# “Innovate for Sustainable Accelerating Systems” – *practical aspects*

## Preparing the application together:

- Digital repositories are ready (@HZB) → SharePoint
- Access being prepared for the WP conveners (they can further coordinate with the respective WP teams)
- Breakdown of the 50-page document ready (Part-B of Horizon Europe application)
- Guidance provided in the SharePoint

## Regular ZOOM meetings with the writing team:

- Dates: see previous slides
- CERN indico directory with links to meetings (incl ZOOM link): https://indico.cern.ch/category/16371/

## Reading committee (WP convener text → coordinators & experts → reading committee):

- Being developed by the Coordination Panel: e.g. ask members of the TIARA and iFAST preparation team, ask some additional EU experts at our institutions
- Develop a schedule for the readers (Jorgen)

## Registration of participants (Ketel Turzo and her team at IJCLab):

- Soon all research and industry participants listed by the conveners will be contacted with guidance to register their institution/company and to provide relevant information about the institute/company
- Registration will be done in the Horizon Europe online systems

# "Innovate for Sustainable Accelerating Systems" – ***Part-B writing***

Max 50 pages

| | | page count |
|---|---|---|
| INTRO | List of participants | 1 |
| | Table of content + abstract | 1 |
| Sect 1 | EXCELLENCE | |
| Sect 1 | CONTEXT ACC in Society + Societal aspects | 1 |
| Sect 1.1 | Main strategic goals | 1 |
| | TA#1 scope | 1 |
| | TA#2 scope | 1 |
| | TA#3 scope | 1 |
| | INT scope | 1 |
| | iSAS in landscape | 0,5 |
| Sect 1.2 | Concept to collaborate | 0,5 |
| | Overall methodology/strategy | 1 |
| | TA#1 meth | 1,3 |
| | TA#2 meth | 1,3 |
| | TA#3 meth | 1,3 |
| | INT meth | 1,3 |
| | SOCIETAL WP | 1 |
| | DATA MANAGEMENT (incl IP, ESCAPE?) | 1 |

# "Innovate for Sustainable Accelerating Systems" – *Part-B writing*

| | | |
|---|---|---|
| Sect 2 | IMPACT | |
| Sect 2.1 | Overall view on impact | 1 |
| | Impact TA#1 | 0,5 |
| | Impact TA#2 | 0,5 |
| | Impact TA#3 | 0,5 |
| | Impact INT#1 | 0,5 |
| | Impact INT#2 | 0,5 |
| | Impact INT#3 | 0,5 |
| | Impact INT#4 | 0,5 |
| Sect 2.2 | Overall view to max impact | 1 |
| | Training | 0,5 |
| | Dissemination & Exploitation | 1 |
| | Diversity/Gender | 0,5 |
| | Open Science | 0,5 |
| Summary | Tables | 2 |

# “Innovate for Sustainable Accelerating Systems” – *Part-B writing*

| Sect 3 | QUALITY AND EFFICIENCY OF THE IMPLEMENTATION | |
|---|---|---|
| Sect 3.1 | Overall structure WPs | 1 |
| | WP1 implementation - FRT | 1 |
| | WP2 implementation - LLRF | 1 |
| | WP3 implementation - high-temp SRF | 1 |
| | WP4 implementation - HOM | 1 |
| | WP5 implementation - INT#1 | 1 |
| | WP6 implementation - INT#2 | 1 |
| | WP7 implementation - INT#3 | 1 |
| | WP8 implementation - INT#4 | 1 |
| | WP9 implementation - societal aspects | 1 |
| | WP10 implementation - Coordination & Management | 0,5 |
| | Timing sheet | 1 |
| | Table deliverables | 1 |
| | Table milestones | 1 |
| | Tables risks | 1 |
| | Table staff effort | 1 |
| | Table subcontracting | 1 |
| | Table purchase | 1 |
| | Table other costs | 1 |
| | Table in-kind | 1 |
| Sect 3.2 | Consortium description | 1 |
| | Industrial involvement | 1 |
| | Access & Collaboration (EURO-LABS) | 0,5 |
| | Management & Organisation | 1 |
| | | |
| | TOTAL PAGE NUMBERS | 50,2 |

# MILESTONES

| | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|---|
| January | | | | | 13 | 14 | 15 |
| | 16 AGREE ON WP CONVENERS | 17 *COORD: "INTRO" READY & WTEAM: EXPLORE* | 18 | 19 | 20 | 21 | 22 |
| | 23 | 24 | 25 *COORD: GUIDANCE READY FOR WPs* | 26 *WPCON: DRAFT BRIEF SCOPE READY (EACH WP)* | 27 *WTEAM: INITIAL LIST OF PARTNERS READY* | 28 | 29 |
| February | 30 WTEAM: AGREE ON WP SCOPE, START WRITING | 31 | 1 | 2 | 3 | 4 | 5 |
| | 6 | 7 | 8 | 9 | 10 *PARTNERS TO DELIVER THEIR ADMIN TEMPLATE* | 11 | 12 |
| | 13 WPCON & COORD: DELIVER "v0" WP & GENERAL DRAFT | 14 WTEAM: "v0" READING | 15 | 16 | 17 WTEAM: FEEDBACK "v0" READY | 18 | 19 |
| | 20 WTEAM: ADAPT SECTIONS | 21 *COORD: TAIRA PRESENTATION* | 22 | 23 WPCON & COORD: DELIVER "v1" ALL SECTIONS | 24 WTEAM & READCOM: "v1" READING | 25 | 26 |
| March | 27 | 28 WTEAM: ALL "v1" COMMENTS RECEIVED | 1 WTEAM: ADAPT SECTIONS | 2 WPCON & COORD: DELIVER "v2" ALL SECTIONS | 3 WTEAM & READCOM: "v2" READING | 4 | 5 |
| | 6 WTEAM: ALL "v2" COMMENTS RECEIVED | 7 WTEAM: DELIVER "FINAL" VERSION & SUBMIT DRAFT | 8 COORD: FINAL READING & ALL PARTNERS TO SIGN-OFF | 9 SUBMIT | | | |

WRITING
READING
CLOSING

v0 draft (15 days)
v1 draft (4 days)
v2 draft (2 days)
final version (1 day)

# AGENDA

All meetings will be added to the indico directory

| | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|---|
| January | | | | | 13 | 14 | 15 |
| | 16 WTEAM 14:30 CET: organisational aspects | 17 | 18 | 19 | 20 | 21 | 22 |
| | 23 WTEAM 14:30 CET: first WP scope ideas presentation (1 slide) | 24 | 25 | 26 *WPCON brief (1p) draft scope to WTEAM (email)* | 27 WTEAM 14:30 CET: discuss scope WPs | 28 | 29 |
| February | 30 WTEAM 14:30 CET: agree on WP scope | 31 | 1 | 2 | 3 | 4 | 5 |
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 *WPCON & COORD "v0" sections to WTEAM (email)* |
| | 13 WTEAM 14:30 CET: presentation "v0" sections | 14 | 15 | 16 | 17 *WTEAM "v0" comments received and communicated (email)* | 18 | 19 |
| | 20 WTEAM 14:30 CET: discussion comments & budget | 21 | 22 | 23 *WPCON & COORD "v1" sections to WTEAM (email)* | 24 WTEAM 14:30 CET: discussion "v1" full document | 25 | 26 |
| March | 27 | 28 *WTEAM "v1" comments received and communicated (email)* | 1 | 2 WTEAM 14:30 CET: discussion open issues | 3 *COORD "v2" full document to WTEAM (email)* | 4 | 5 |
| | 6 WTEAM 14:30 CET: "v2" comment received and | 7 *COORD "final" full document to WTEAM (email)* | 8 WTEAM 14:30 CET: final discussion and sign-off by partners | 9 **SUBMIT** | | | |

# A.O.B.