



| The European Synchrotron



The evolving Role of Research Infrastructures at the core of the innovation ecosystem of Grenoble

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THE EUROPEAN SYNCHROTRON



22

partner countries



10 000

scientific visits per year



44

beamlines



4

Nobel Prizes



2000

publications per year



330 M€

over 2009-2022

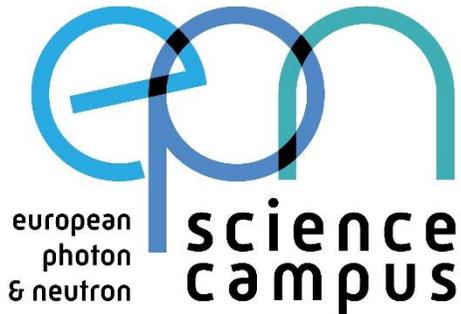
2009-2022: delivery of a new portfolio of beamlines

2015-2022: construction of a new generation of synchrotron, EBS

30 years of science

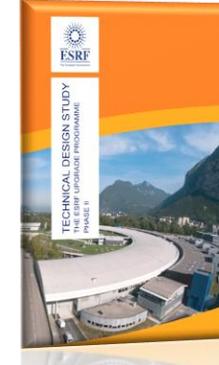
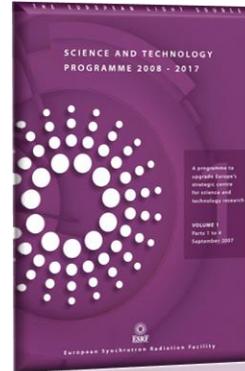


A UNIQUE SITE FOR RESEARCH AND INNOVATION



ESRF UPGRADE PROGRAMME: AN AMBITIOUS PROGRAMME TO PREPARE THE FUTURE

Purple Book
January
2008



Orange Book
January
2015

**ESRF UPGRADE PHASE I
180 M€ (2009-2015):
ESFRI ROADMAP 2006-2016
IN TIME – WITHIN BUDGET**

- 19 new beamlines, many specialised on *nano*-beam science
- Upgrade and renewal of facilities and support laboratories



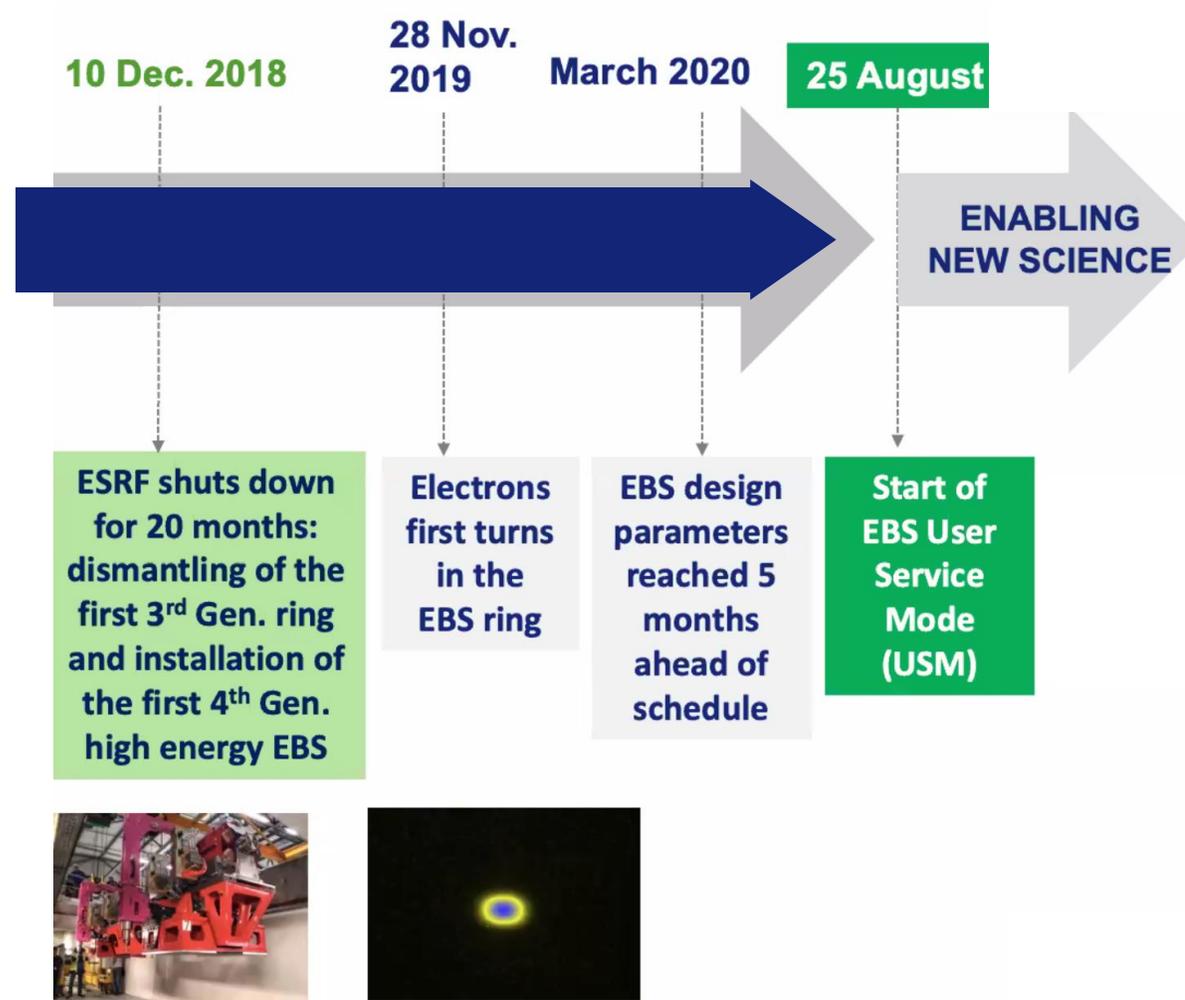
ESRF-EBS
EXTREMELY BRILLIANT SOURCE



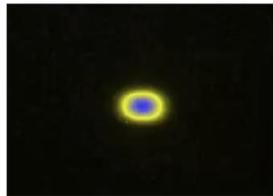
ESRF-EBS

**Extremely Brilliant Source
150 M€ (2015-2022):
ESFRI LANDMARK (2016)
HMBA lattice proposed by
P.Raimondi and co-workers
revolutionary design
for a new generation of synchrotron
source storage rings**

EBS LAUNCHED

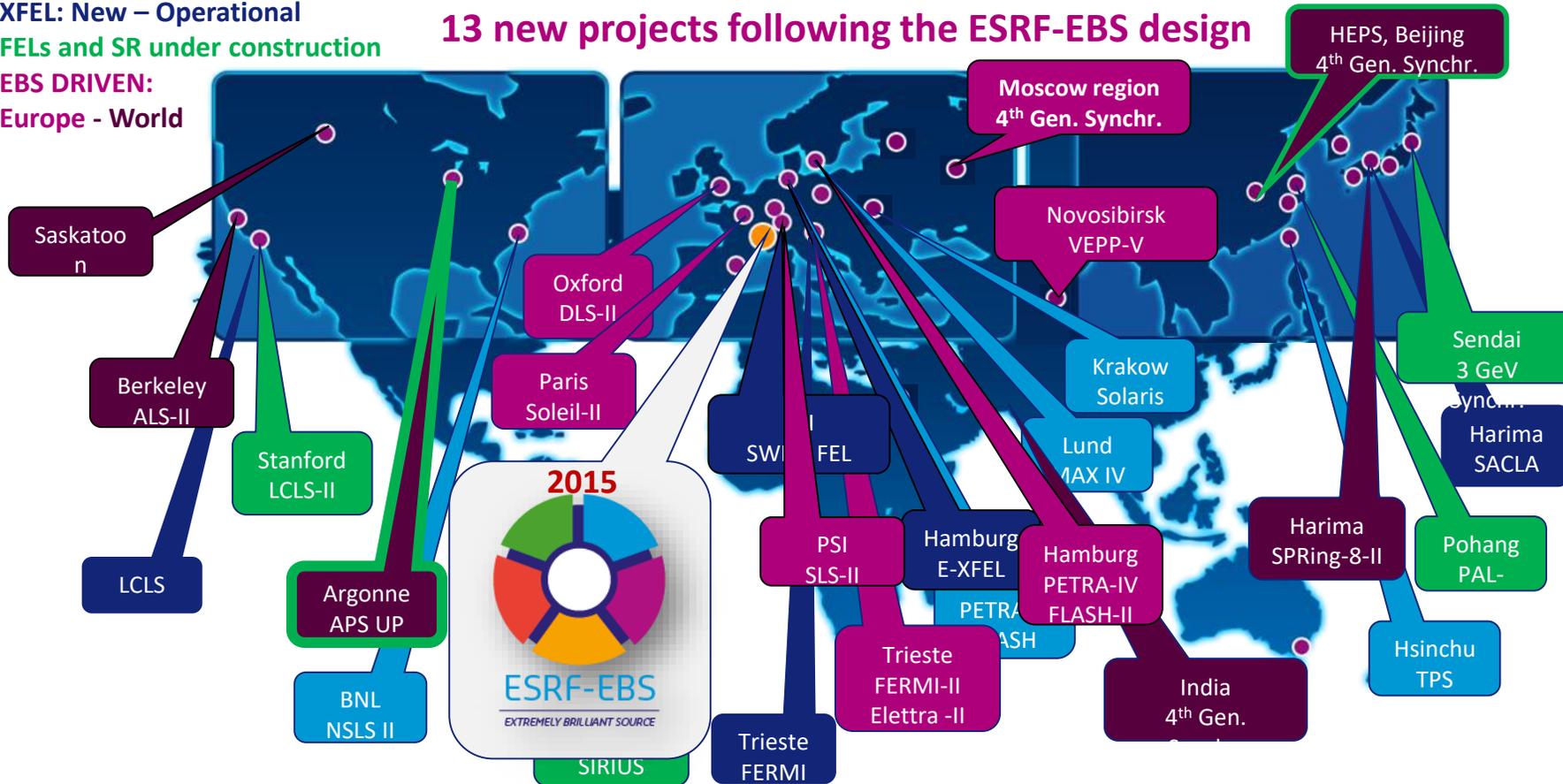


In time
Within budget
Even within COVID period



SR: New – Operational
 XFEL: New – Operational
 FELs and SR under construction
 EBS DRIVEN:
 Europe - World

Major new projects in X-ray science
 13 new projects following the ESRF-EBS design



A ground-breaking
research infrastructure
at the core of an
innovation ecosystem

- The role of RIs is evolving as originally stand-alone undertakings are **becoming more and more part of a connected ecosystem** forming a unique resource for advanced research and interdisciplinary analysis of complex scientific problems.
- **The Long-Term Sustainability of RIs**

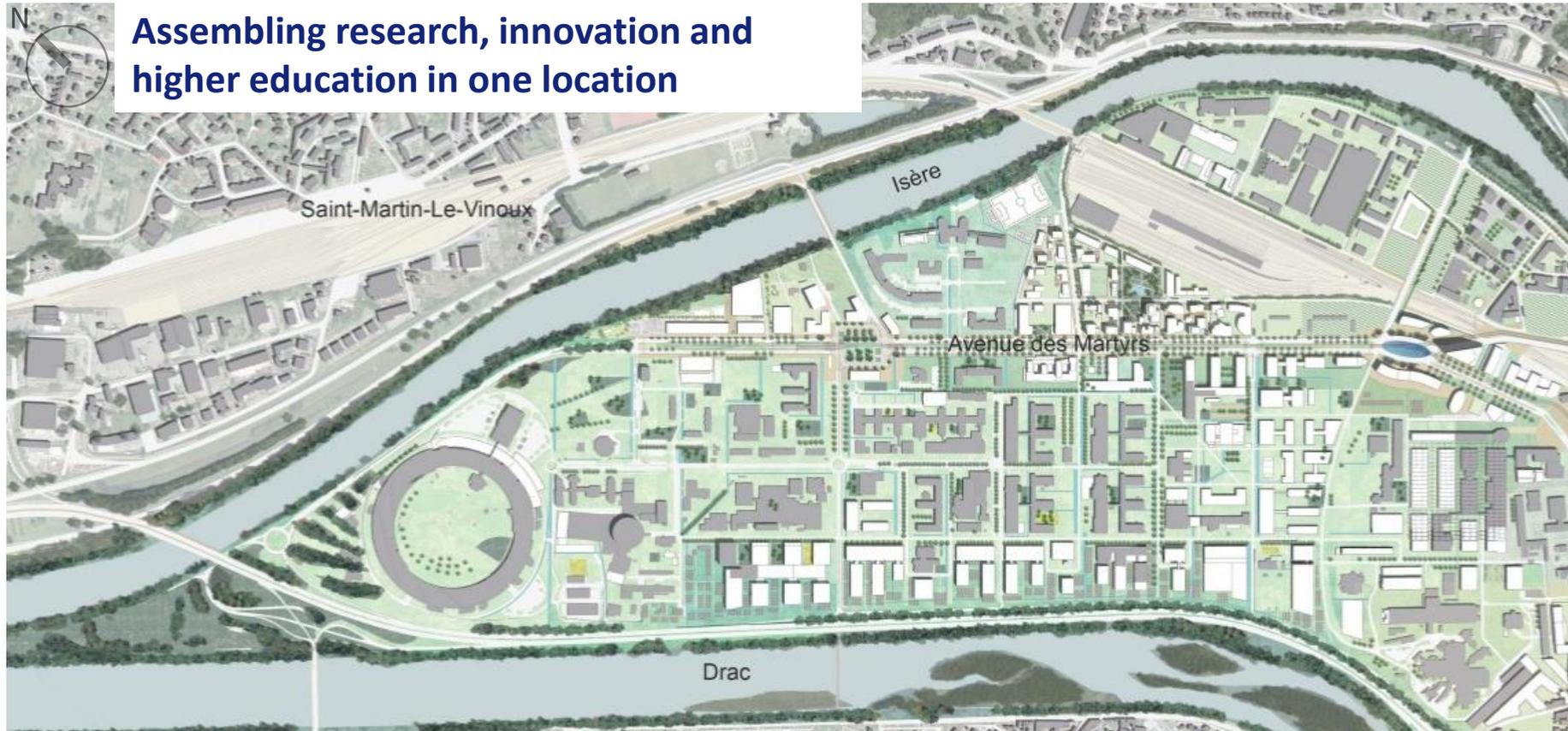
FULLY EXPLOIT THE POTENTIAL OF RIS AS INNOVATION HUBS.

RIs, as **enablers of high-quality research**, providers of advanced services and data as well as prescribers of leading-edge technologies, have an **innovation potential that needs to be fully exploited to ensure maximum return and therefore financial and societal long-term sustainability and acceptance**. There are, however, many **significant challenges** to fulfil this potential: imperfect communication, lack of awareness of the needs of economic actors and opportunities of RIs, entry barriers for access, as well as insufficient human resources at the interface between RIs and the commercial sector. Some of these challenges can be met by **creating a more efficient integrated and coordinated ecosystem for RIs and Industry in which every player in the socio-economic value chain is involved, including public authorities at local, regional, national and European level, as appropriate**.

At the heart of the global innovation campus GIANT

GIANT
INNOVATION CAMPUS

Assembling research, innovation and higher education in one location



EMBL



GIANT campus investment

 Total
GIANT Investment
2008-2015



Infrastructures R&D
and academic lab
600 M€



Scientific equipment,
technological platforms
600 M€



Infrastructures, Tramway, housing
and public equipment
600 M€

Public and private funding



Global Investment
1,8 B€

4,1 B€ /year
on the local economy



One third of the
Grenoble area Gross
Domestic Product

The peninsula in 2000



GIANT campus structure today



100x gain in the beam brilliance and coherence

- **Higher spatial resolution for all imaging techniques:**
 - Full field phase contrast
 - Mapping
 - Reciprocal space reconstructed (Coherent Diffraction Imaging)
- **Improved detection limit for chemical analysis**
- **High throughput characterization (statistical analysis)**
- **Real time characterization for operando and in-situ analysis**



GIANT domains of activity

GIANT's research is organized along three thematic lines:

- sustainable energy development
- advanced information and communication systems
- innovation in health and biology

Energy:

- The energy to innovate
- Energies for the future: production
- Energies for the future: storage
- Energies for the future: new nuclear technologies

Energy storage:

- Hydrogen technology
- Storage
- Energy management and efficiency
- Micro-energy sources and mobile energy
- Electrical and hybrid vehicles

Battery Innovation @ GIANT

BATTERY INNOVATION



Battery Innovation @ GIANT

This initiative is the result of a successful workshop held in 2017 and co-organised by the [Alternative Energies and Atomic Energy Commission \(CEA\)](#), the [European Synchrotron Research Facility \(ESRF\)](#) and the [Institut Laue Langevin \(ILL\)](#), which brought together **battery researchers** from primarily the Grenoble region with **synchrotron x-ray** and **neutron beamline** scientists to discuss recent exciting progress in battery research, parallel advances in characterization methods and possible coactions.

A clear outcome of this event was the wish stated by participants from all fields of expertise to create a **platform for exchange and information** in order to address questions which are most relevant to the problems inherent in this form of electricity storage, thus directly confronting a major technical challenge crucial to modern society.

By **opening up the dialogue** to a more general audience, notably in the academic and industrial domains, the organisers hope is to promote a cross-fertilisation of ideas and solutions for future battery R&D.

battery@giant-grenoble.org

Collaborative projects on battery



Verkor, a French industrial company, is set to amplify battery cell production in Europe, with the support of EIT InnoEnergy, Schneider Electric and the GROUPE IDEC. The new venture will accelerate the production capacity of low-carbon batteries in southern Europe to meet growing demand for electric vehicles and stationary storage. **Production in Verkor's first Gigafactory is scheduled to begin in 2023**, with a capacity of 16 GWh of battery cells which will increase to 50 GWh in line with market dynamics. **The facility will require an initial investment of €1.6bn** and will create more than **2,000 direct jobs** while supporting thousands more in its supply chain and ecosystem. **The search for 200+ hectares of land is already underway.**

...a last information

GIANT phase 2: 2015-2020

Open Innovation

GIANT
INNOVATION CAMPUS

Open Innovation Center on the GIANT campus:
A place dedicated to innovation
Based on GIANT technological platforms and competencies

→ Giving students, industry partners, startups, researchers, access to:
Open Labs, FabLabs, trainings in new methods...

Opening in 2020

The last slide from my presentation last year



Y-SPOT



Dream. Design. Do.

Deep tech inside

À Grenoble, au cœur d'un pôle scientifique de renommée internationale, 3 300 m² sont dédiés à l'innovation technologique, avec :

- des espaces modulables pour **accueillir des entreprises en résidence technologique**,
- un atelier de prototypage rapide pour tester un concept à l'épreuve du réel,
- un **showroom des innovations**, vitrine du savoir-faire du CEA et de ses partenaires,
- un lieu d'événements, de conférences et d'échanges pour valoriser de nouvelles façons de fabriquer l'innovation,
- une connexion directe avec **les équipements et les laboratoires R&D du CEA**.