



Optional: Event Title

FF4EuroHPC Enabling SMEs to benefit from HPC

FF4EuroHPC Call-2

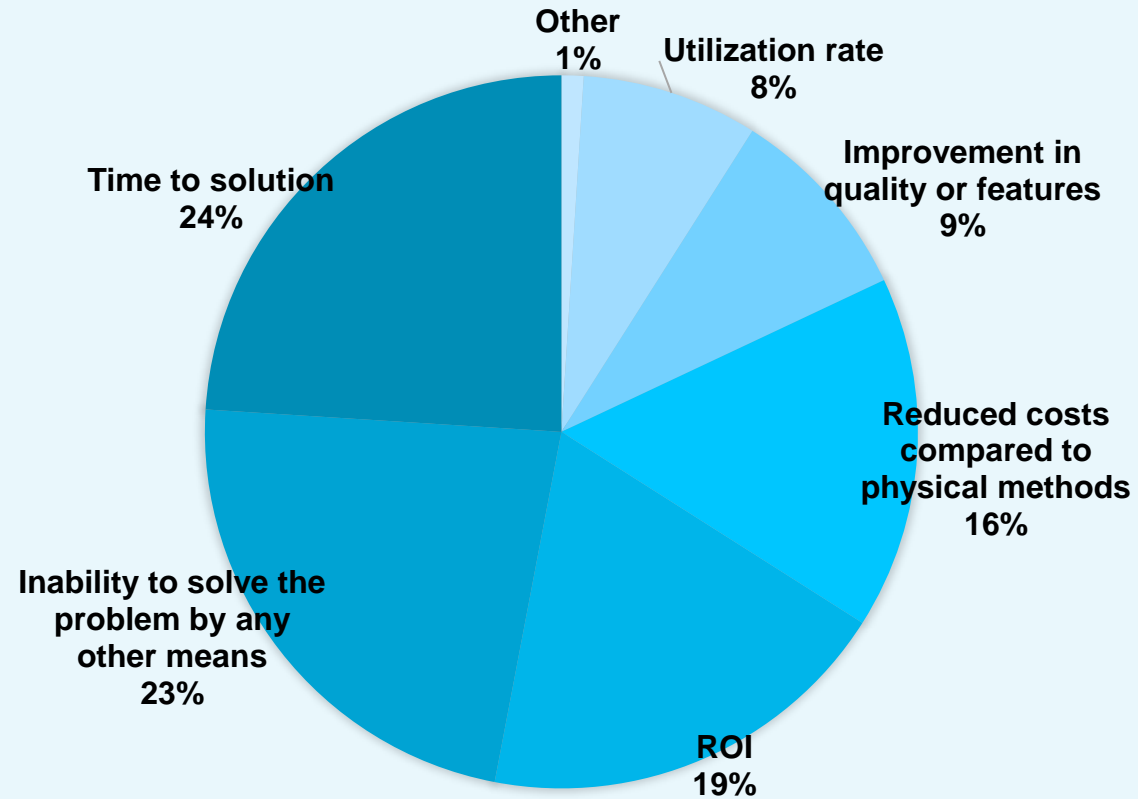
Presenter Name, Organisation Name

Why use HPC in business?

- High Performance Computing (HPC), High Performance Data Analytics (HPDA), Internet-of-Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML): **Indispensable tools for INDUSTRY 4.0**
- The current digital revolution is driven by data and intelligence and builds on those tools
- The increasingly complex, connected and digitized world creates a flood of data – HPC and the new technologies allow us to derive meaning and knowledge from the data → better & faster products, models or processes in virtually all applications
- Advanced HPC services can enable European companies to focus on quality and innovation – and thus be able to prosper in the global marketplace
- Many industrialized economies (both developed and developing) have identified HPC and HPDA/AI as a key tool for innovation – in the U.S. the phrase “to out compute is to out compete” has been used to make the case to the Government

Why use HPC in business?

BENEFITS OF HPC (SOURCE: COUNCIL OF COMPETITIVENESS)



Political context

- All major economies world-wide are investing in large supercomputers on the road to Exascale
- EuroHPC is a major commitment by the European Union
- Business Case is for **Science and Industry**
- European citizens expect their taxes to be spent wisely for the good of everyone
- We must ensure our Universities **and** our Companies can access and benefit from investment in supercomputing



The Fortissimo Approach

- Central theme: the successful execution of „experiments“ with SMEs, delivering **real business impact** through use of HPC
- The bulk of project funding is used for these experiments and the highest quality, innovative SME-oriented experiments are acquired through the execution of **open calls for proposals**
- Two prior projects (Fortissimo and Fortissimo-2) executed 92 experiments generating 79 impressive, business-oriented success stories



Success Story: Improved Flange Tightening

Experiment Partners:
Texas Controls
AIMEN
CESGA

- SME Industrial End-user
- Technology provider
- HPC Centre / experts

- Texas Controls - a Spanish SME offering tightening and sealing solutions to large industrial facilities in the industrial, power generation and oil & gas sectors
- HPC Simulation based design of flange tightening operations leads to:
 - 33% time-saving
 - Reduced manpower costs & reduced equipment "down time"
 - End-user savings of 180 K€ per tightening
 - Estimated annual savings of 5.4 M€ for Texas customers



Ergolines Success Story

- SME based in Italy
- Speciality steels technology
- Simulation of slag carry-over from ladle to tundish
 - New monitoring system developed
 - Better overall steel quality
 - Reduced re-melting
- Reduced steel loss by 6,000 tonnes per year
- Savings between 420,000 € - 600,000 € per year

Ergolines received the IDC HPC Innovation Award 2016 for their demonstration of economical benefit of using HPC during their Fortissimo experiment.

Experiment Partners:

Ergolines

Arctur

- SME Industrial End-user
- HPC Centre / Expert



HPC-based Urban Planning – IES Success Story

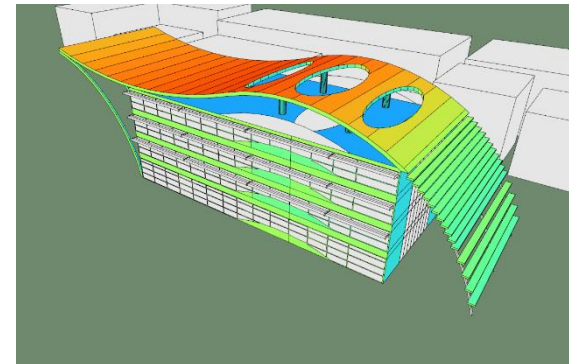
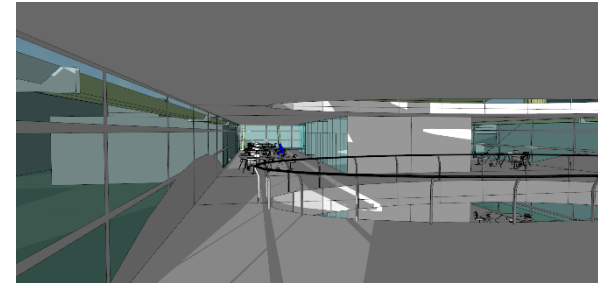
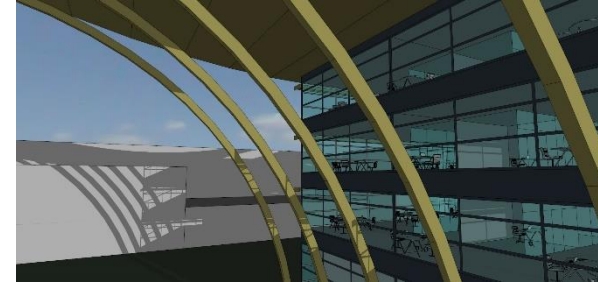
- IES is a Scottish SME (with offices world-wide)
- HPC-Cloud approach enables pay-as-you go customer options reducing large model simulations from days/weeks to hours/days
- 50% cost reduction compared to use of in-house infrastructure

Experiment Partners:

IES

U. Edinburgh (epcc)

- SME - Industrial consulting and ISV
- HPC Centre / experts



Sports-car aerodynamics - Koenigsegg

Experiment Partners:

Koenigsegg

ICON

NTUA

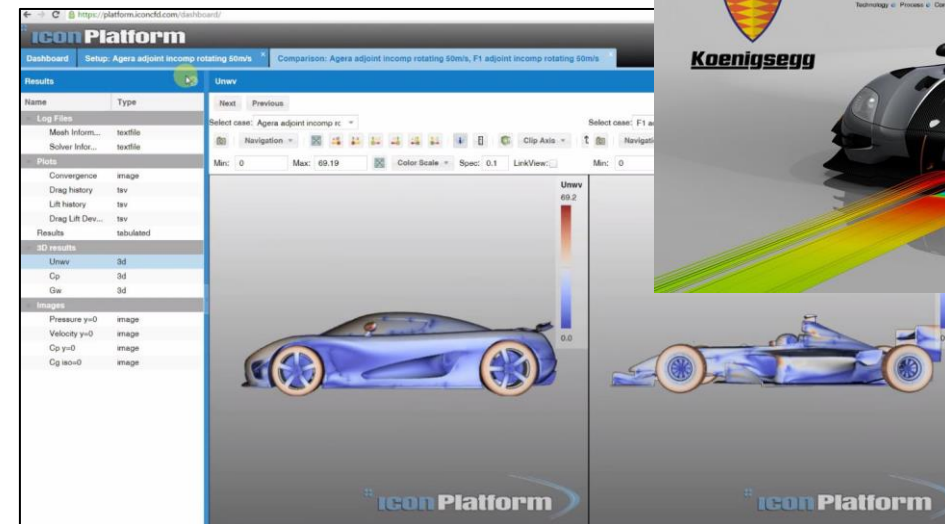
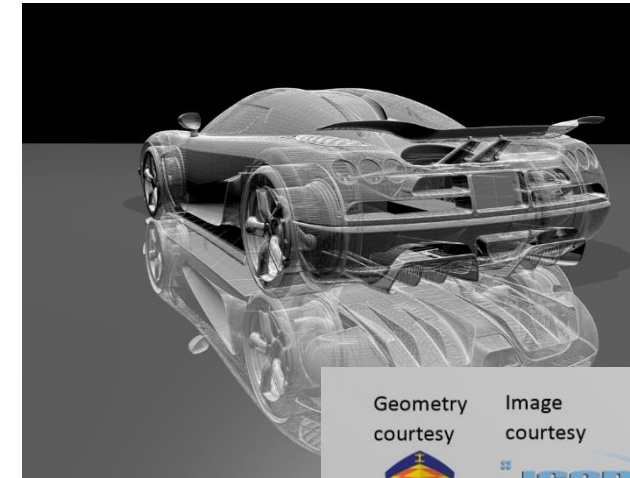
CINECA

- SME Industrial End-user
- ISV
- HPC Expert
- HPC Centre

- The SME Koenigsegg designs & manufactures high-performance sports-cars
- Aerodynamics development for the Koenigsegg One:1 - HPC-based CFD:
 - 250km/h → 250% higher down-force
 - 440 km/h → 50% higher down-force

Benefits of Cloud-based HPC

- Reduce design costs by 30%
- Reduce wind tunnel testing by 50%
- Reduce prototyping costs by 60%
- Reduce time-to-market by 30%



Lessons Learned



- The best experiments
 - Properly planned their work from the start
 - Picked an achievable project – not too small, not too large
 - Made sure they had access to all of the software required or understood how it would be developed
 - Put together a clear business case – where the business benefit over the subsequent 3-5 years greatly exceeded the funding requested
 - Planned how to go from the initial experiment to production use from the outset

Lessons Learned



- The best HPC centres
 - Worked closely with their Experiment Partners to develop the proposal
 - Carefully understood the effort required and how they would staff the project
 - Worked with the Experiment Partners to support them as they developed their business model
 - Were pragmatic if more access to HPC or HPDA resources were required than initially envisaged
 - Were responsive to requests from the Project Management Team

The FF4EuroHPC Project

- **FF4HPC: HPC Innovation for European SMEs**
- Funded under the H2020-JTI-EuroHPC-2019-2 Call
- Commenced 1.9.2020; 36 months duration
- Coordinator:



- Other Partners:



Stimulating the Innovation Potential of SMEs

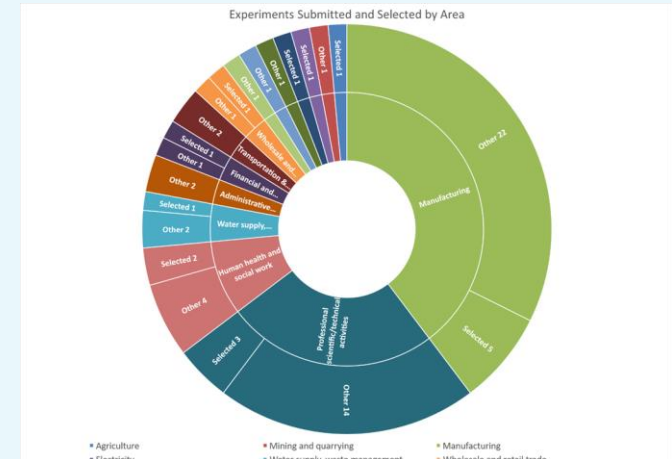
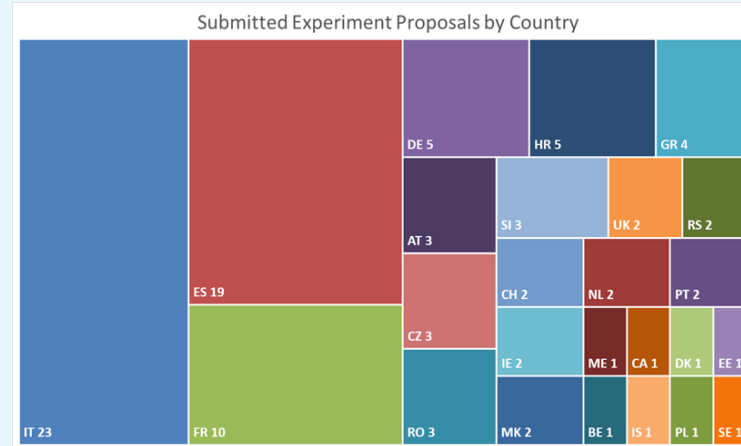
- Increase the [innovation potential of industry](#), and in particular of small and medium sized enterprises (SMEs), through the use of advanced HPC infrastructures, applications and services.
- Facilitate [access to HPC-based infrastructures and services](#) for a wide range of users of new and emerging data and compute-intensive applications and services.
- [Foster wider innovation](#), for example by exchanging and promoting best practice use cases or application experiences.
- Provide an effective mechanism for [inclusion of innovative, agile SMEs lowering the barriers](#) for small actors to enter the market and exploit new business opportunities.

The FF4EuroHPC Methodology

- Support the EuroHPC initiative to promote industrial uptake of HPC technology and increase the innovation potential of European industry
→ focus: small and medium sized enterprises (SMEs)
- Extend and continue the Fortissimo Approach:
Portfolio of business-oriented application “experiments” that are driven by SME end-users needs – [selected through two open calls for proposals](#)
- Furthermore...
 - Collaboration with the national HPC Competence Centres (plus EuroHPC projects CASTIEL & EuroCC)
 - Support the participating SMEs in establishment of HPC-related innovation

Response to FF4EuroHPC Call-1

- 68 Proposals were received involving 202 organisations and participants from 25 European countries
- Wide range of application areas



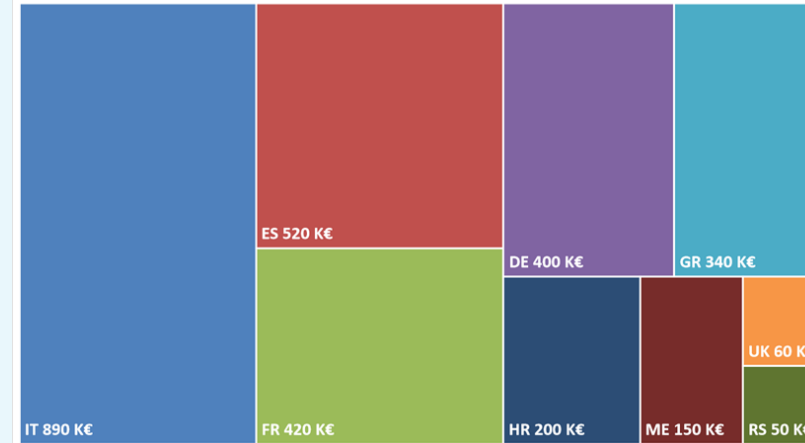
Video Analytics
 Quantum Computing
 Molecular Dynamics
 Combinatorial Optimization
 Weather Prediction Robot Simulation
 Finite Elements **CFD**
 Monte Carlo
 Combustion **ML**
 NLP Risk Management
 Ocean Simulation
 Wave Propagation
 Structure Analysis
 3D Rendering
 Plasma Dynamics
 Coupled Simulations

Experiments Selected in FF4EuroHPC Call-1

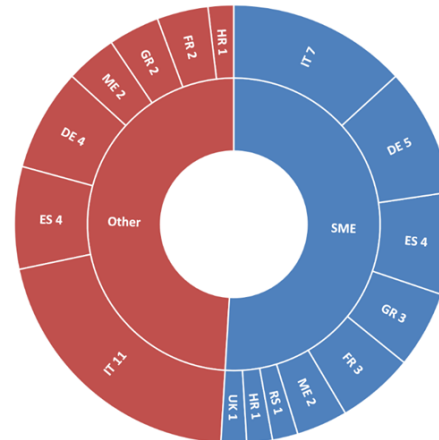


- 16 proposals selected for funding, with a funding budget just in excess of € 3M
 - Involving 53 organisations, 27 of which being SMEs
- Strong SME participation and range of themes addressed

Funding for Selected Experiments per Country



SME and non-SME Partners by Country



Weather Prediction
NLP
Risk Management
ML
CFD
3D Rendering
Video Analytics
Molecular Dynamics
Ocean Simulation
Monte Carlo
Coupled Simulations

Elevate your Business to the Next Level with the help of HPC – FF4EuroHPC CALL-2



Call for proposals targets highest quality experiments involving innovative, agile SMEs and with work plans built around innovation targets arising from the use of advanced HPC services



Are There Differences Between Call-1 and Call-2?



YES.

The key changes affect the selection process and have been introduced to:

- (i) give a higher priority to experiments addressing the business benefits of manufacturing SMEs;
- (ii) achieve a broad geographical distribution of participants.

Call-2 Objectives



- Experiments should address business challenges from European SMEs from varied application domains
 - Preference being given to engineering and manufacturing, or sectors able to demonstrate fast economic growth or particular economic impact for Europe.
 - The highest priority is given to proposals directly addressing the business challenges of manufacturing SMEs
 - Research-focused business models are not within the scope of the Call
- Priority will be given to consortia centred on SMEs that are new to the use of advanced HPC services

Expectations for Experiments – 1/2

- Involve all necessary parties
 - required for the effective and efficient execution of the investigation and impact demonstration to address SME business challenges through the use of HPC
- Define the resources they need and budget for them
 - FF4EuroHPC will not be in a position to provide computing resources.
- Define the data protection and data/information access issues that impact its proposed work plan and ensure that the operation of the experiment adheres to those requirements



Expectations for Experiments – 2/2

- Generate publishable success stories based on solution of the SME's real-world problems that clearly identify the business benefits realised or obtained.
- Align, where appropriate, with regional priorities, such as industrial specialisation areas.
- Be complementary to those already included in the past Fortissimo and Fortissimo 2 projects and to those selected in FF4EuroHPC Call-1

Evaluation



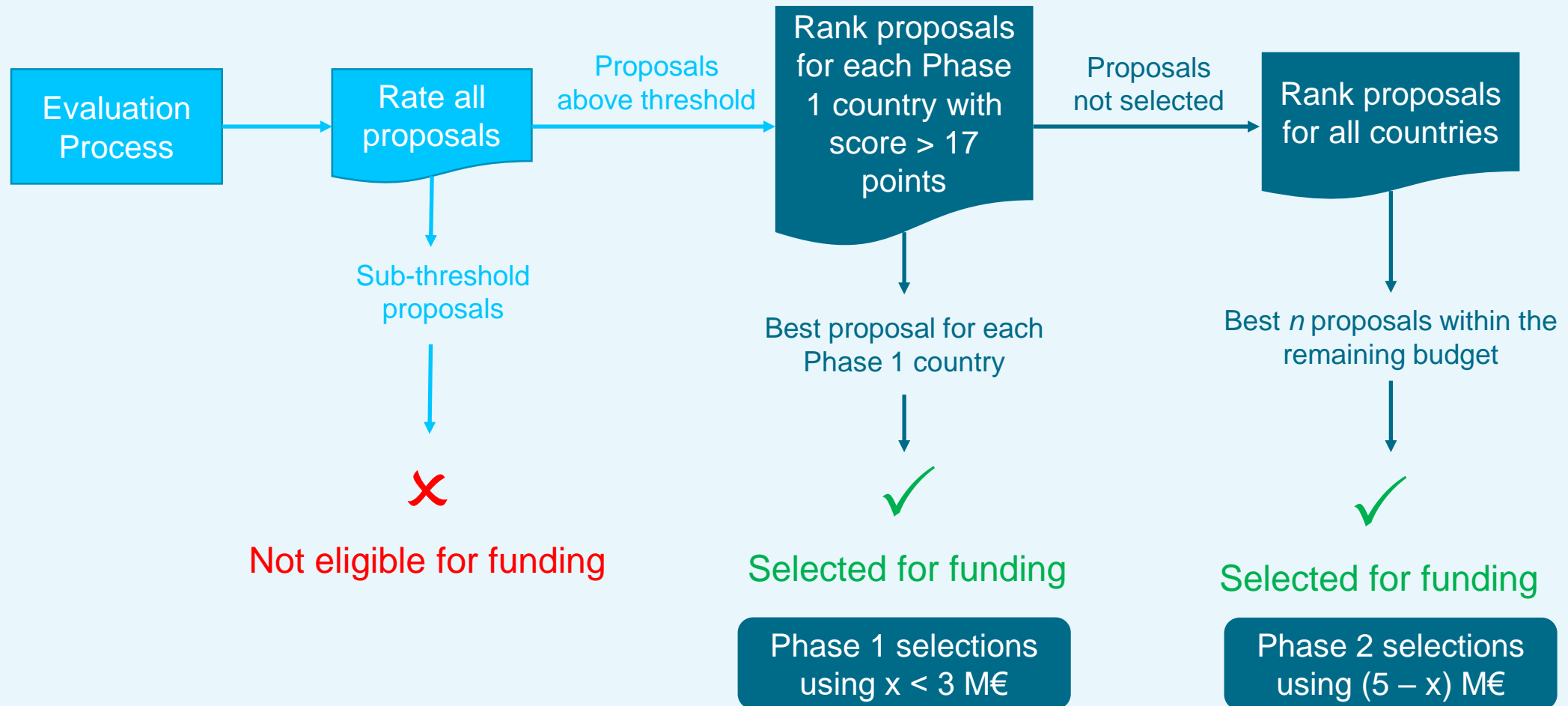
- The criteria for evaluation will comprise
 1. Impact including industrial relevance and exploitation plans
 2. Soundness of concept, innovation and quality of the work plan
 3. Quality of the consortium as a whole and of the individual proposers
 4. Effective and justified deployment of resources
- Criteria 1 to 4 will carry a score ranging from 0 to 5.
- Criterion 1 will have a weight of 2x, Criteria 2 to 4 a weight of 1x
- Maximum score is 25 points
- A threshold score of 3 will apply to the first three criteria
- Prioritisation of experiments involving manufacturing SMEs
 - The maximum score on Criterion 1 that will be assigned to a proposal not directly addressing the business challenges of manufacturing SMEs will be 4.0 points.

Selection of Experiments for Funding – 1/2



- Two-phase process - specific intent to increase the geographic distribution of FF4EuroHPC experiments
- FF4EuroHPC Call-1 selected proposals involving organisations from the following 9 countries: Croatia, France, Germany, Greece, Italy, Montenegro, Serbia, Spain, and the United Kingdom.
- Phase 1:
 - A selection of experiments with a cumulative funding of **up to € 3 M**
 - Selection from will be made from those proposals **with a score exceeding 17 points** and taking, for each country **not in the aforementioned list**, the highest ranked proposal involving an organisation from that country (if any).
- Phase 2 will use the ranking of all remaining proposals irrespective of country affiliations to select the remaining experiments for funding with the budget not used in the first phase

Selection of Experiments for Funding – 2/2



Funding of Experiments

- FF4EuroHPC will make use of the [Financial Support for Third Parties](#) method to enable the inclusion of new experiment partners.
 - Funding of Third Parties to follow the same principles as used for FF4EuroHPC beneficiaries, which receives European Commission funding within the R&D&I programme of the EuroHPC Joint Undertaking. In particular, Third Parties will receive 100% funding of eligible costs arising.
- The funding for an individual experiment may not exceed 200 K€ (covering all participants).
- The maximum funding that can be allocated to any Third Party, across all FF4EuroHPC experiments in which that Third Party is involved, is 150 K€.
- The participation of certain FF4EuroHPC beneficiaries in experiments is eligible, but the costs for their activities in experiments are not included within the requested funding for experiments.
- [Note: Proposals to FF4EuroHPC Call-2 that do not adhere to the abovementioned funding restrictions will be rejected without further evaluation](#)

Key Call Details

- Submission Deadline: *29th September 2021, 17:00 Brussels local time*
- Funding for Call-2: The indicative total funding [budget is 5 M€](#)
Expected duration of experiments:
maximum 15 months with expected commencement 1st March 2022
- Maximum funding request per proposal:
[EUR 200,000 €](#) (covering all participants)
- Proposal submission: in electronic form
- Language: English
- Submission site:

<https://www.ff4eurohpc.eu/calls/submission>



Proposal Submission



- Proposals must be submitted in English & must comprise 2 parts: Part A (administrative information), Part B (body of the proposal).
 - Part A: cover page and a set of tables to provide administrative data – no additional info to be included!
 - Part B: Cover page + max. 10 pages
- Proposals not adhering to the page limit & content guidelines will be rejected!
- Detailed instructions for proposal submission, together with information about the evaluation criteria to be applied, are provided online at:
<https://www.ff4eurohpc.eu/calls/submission>
- Submission will be exclusively in electronic form and all submissions must be made by 17:00 Brussels local time, 27th January, 2021.

FF4EuroHPC CALL-2 Documentation



- Documents:
 - Announcement and Proposer's Guide
 - Proposal Exemplar as Word documents (Part A & Part B “exemplars”)
- Online info (sub-pages):
 - Proposer-Evaluator check-list (“check-list”)
 - Frequently Asked Questions (“FAQ”)

Available at: www.ff4eurohpc.eu/open-call

Have More Questions?

- Online FAQ: www.ff4eurohpc.eu/en/open-calls/faq/



Need more information or would like to get inspired?

Success stories:

<https://www.ff4eurohpc.eu/en/success-stories/>

Booklet:

<https://www.ff4eurohpc.eu/en/multimedia/booklet/>

Success Stories Videos:

<https://www.youtube.com/channel/UCwLI9IPVN-0IQ5KDqKVc2ig>

Informative brochures:

<https://www.ff4eurohpc.eu/en/multimedia/brochures/>

Get inspired website (for SMEs):

<https://www.ff4eurohpc.eu/en/open-calls/get-inspired/>



Still have questions?

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Thank you



This project has received funding from the European High-Performance Computing Joint Undertaking Joint Undertaking (JU) under grant agreement No 951745. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Germany, Italy, Slovenia, France, Spain.