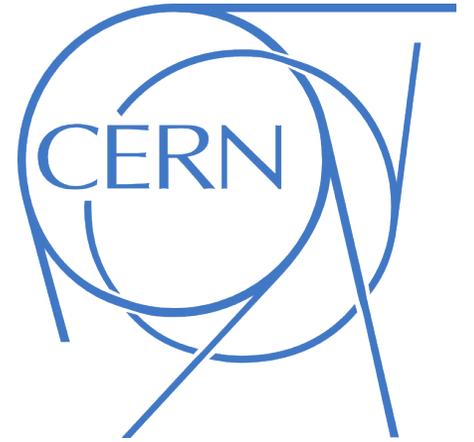




AGÊNCIA NACIONAL
DE INOVAÇÃO



PORTUGAL E A ESTRATÉGIA EUROPEIA PARA A FÍSICA DE PARTÍCULAS

DESAFIOS E OPORTUNIDADES PARA A INDÚSTRIA PORTUGUESA

Lisboa
2/07/2020

José Antão

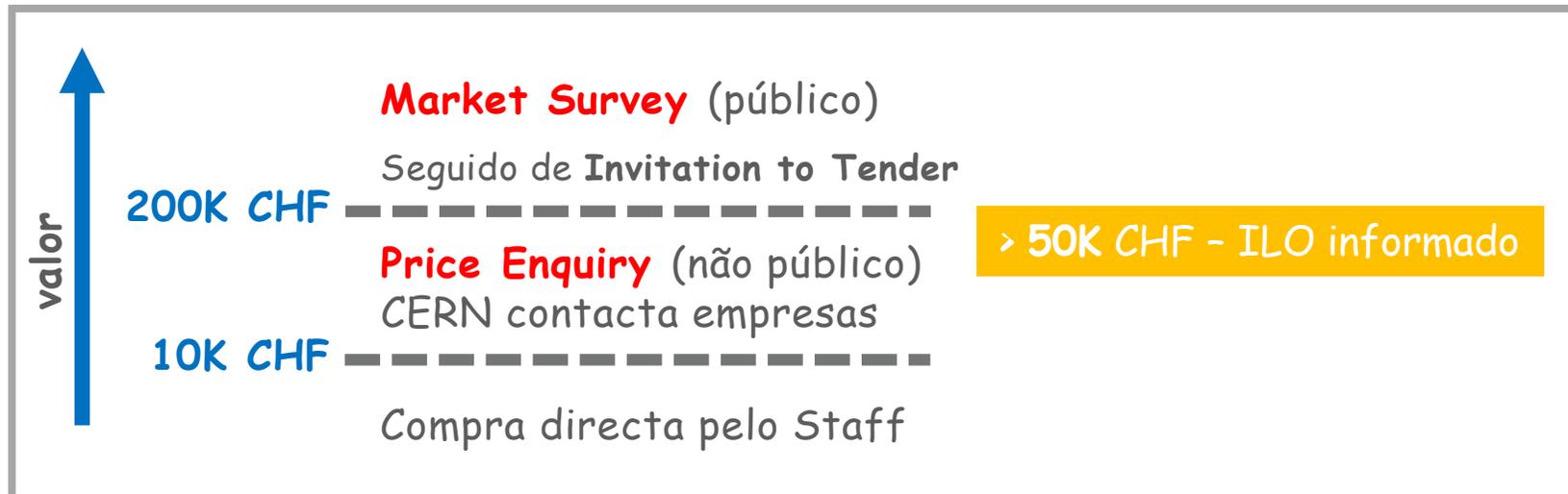
Industrial Liaison Officer @CERN, ITER, ESRF, SKA

jose.anta@ani.pt



Em linhas (muito) gerais

- Países membros pagam ao CERN uma quota anual;
- ~50% usado para comprar bens e serviços nos países membros
- Retorno industrial monitorizado para cada país





[Public] Supplier Database

ISO	Name	Service Provider	Reseller	Manufacturer	URL	CERN Supplier
	A SILVA MATOS, METALOMECANICA			✓		X
	ACTIVE SPACE TECHNOLOGIES	✓		✓		X
	ALTRANPORTUGAL SA	✓	✓	✓		X
	ANA LUISA MATIAS	✓				X
	ANNA KALCHEVA	✓				✓
	ANTIMO BARROS			✓		X
	ARPIAL METALURGICA LIGEIRA			✓		✓
	ARQUILED SA	✓		✓		X
	ARSOPI SA			✓		X
	BARRAQUEIRO TRANSPORTES, SA	✓				✓
	CEIIA CENTRO PARA A EXCELENCIA E INOVACAO NA INDUSTRIA AUTOM	✓				X
	CELOPLAS : PLASTICOS PARA A INDUSTRIA			✓		X
	COBA CONSULTORES DE ENGENHARIA E AMBIENTE SA	✓				X
	CRITICAL SOFTWARE	✓				X
	CUBOS E POLIGONOS, UNIPESSOAL, LDA	✓		✓		✓
	DIAS DE SOUSA INSTRUMENTACAO ANALITICA E CIENTIFICA	✓	✓			X
	EDISOFT SA	✓		✓		X
	EFACEC ENERGIA MAQUINAS E EQUIPAMENTOS ELECTRICOS SA			✓		✓



CERN e-Procurement

Doing business with CERN

Home Help **Register**

e-Mail Address :

Password :

Login

Forgotten Details

Register

NOTE: Please be aware that failure to provide correct login information three times will result in your account being locked

As one of our suppliers, we need to make sure you receive our email notifications. To ensure our emails reach your inbox please add our email procurement@cern.ch to your safe senders and check your spam filter settings. - Thank you

COVID-19 INFORMATION REGARDING GOODS RECEPTION AND INVOICE PAYMENT

The CERN Goods Reception Service will ensure the reception of goods, however with reduced resources. Any **special transport and delivery is subject to prior notice per email** to : Logistics.Service@cern.ch. If the contract foresees **acceptance tests** at CERN, **the delivery may be postponed**, therefore please contact forthwith the CERN contract manager concerned.

The CERN Accounts Payable Service will continue to work remotely. Please send your **invoices and questions by email** to : accounts.payable@cern.ch.

Welcome to CERN's Supplier Portal

Through this portal you can

- Register your firm into CERN's supplier database by entering firm's details
- Update your firm's profile by modifying existing information or adding new one
- Send and receive correspondence related to orders and invoices

How do I get started?

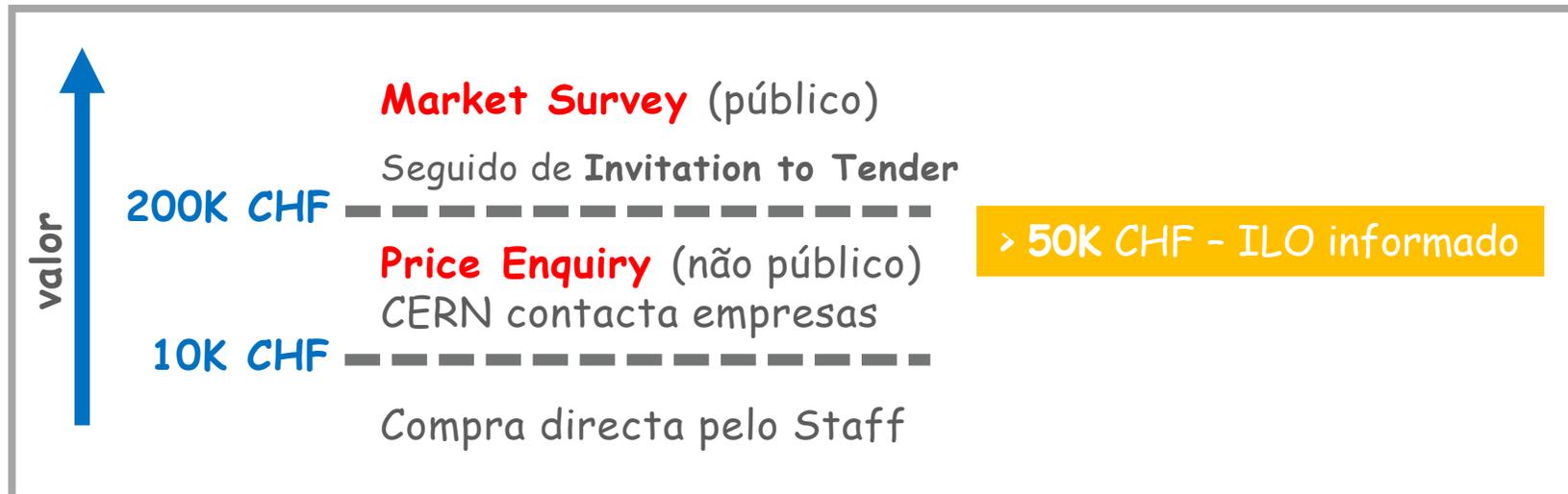
- If you are already registered in CERN's supplier database, you can gain full access to CERN's supplier portal by entering your e-mail address and password and selecting Login.
- If you wish to be registered in CERN's supplier database, you should select the Register option and fill in the necessary information.
- Once you have been successfully registered in CERN's supplier database, you will receive a confirmation e-mail.
- Then, you can gain full access to CERN's supplier portal by entering email address and password and selecting Login.

<https://procurement.cern.ch/aspx/Home>



Em linhas (muito) gerais

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- Retorno industrial monitorizado para cada país



Forthcoming market surveys and calls for tenders

Advance information on forthcoming market surveys and calls for tenders expected to exceed 200,000 Swiss francs.

In the line entitled Cost Range, a very rough indication of the cost range of the product is given in the form of letters **A, B, C, D**.

A represents items estimated at less than 750 kCHF, **B** represents items between 750 kCHF and 5 MCHF, **C** represents items between 5 MCHF and 10 MCHF and **D** represents items above 10 MCHF.

Firms may reply to the Market Survey published in the table below up to two weeks before the corresponding Invitation to Tender is sent out. Therefore, in case the deadline for replies indicated in the Market Survey cover letter is over, please send your reply to the Market Survey at the earliest possible date.

The countries of origin of supplies and services shall be [CERN Member States](#), except if provided otherwise in the table below.

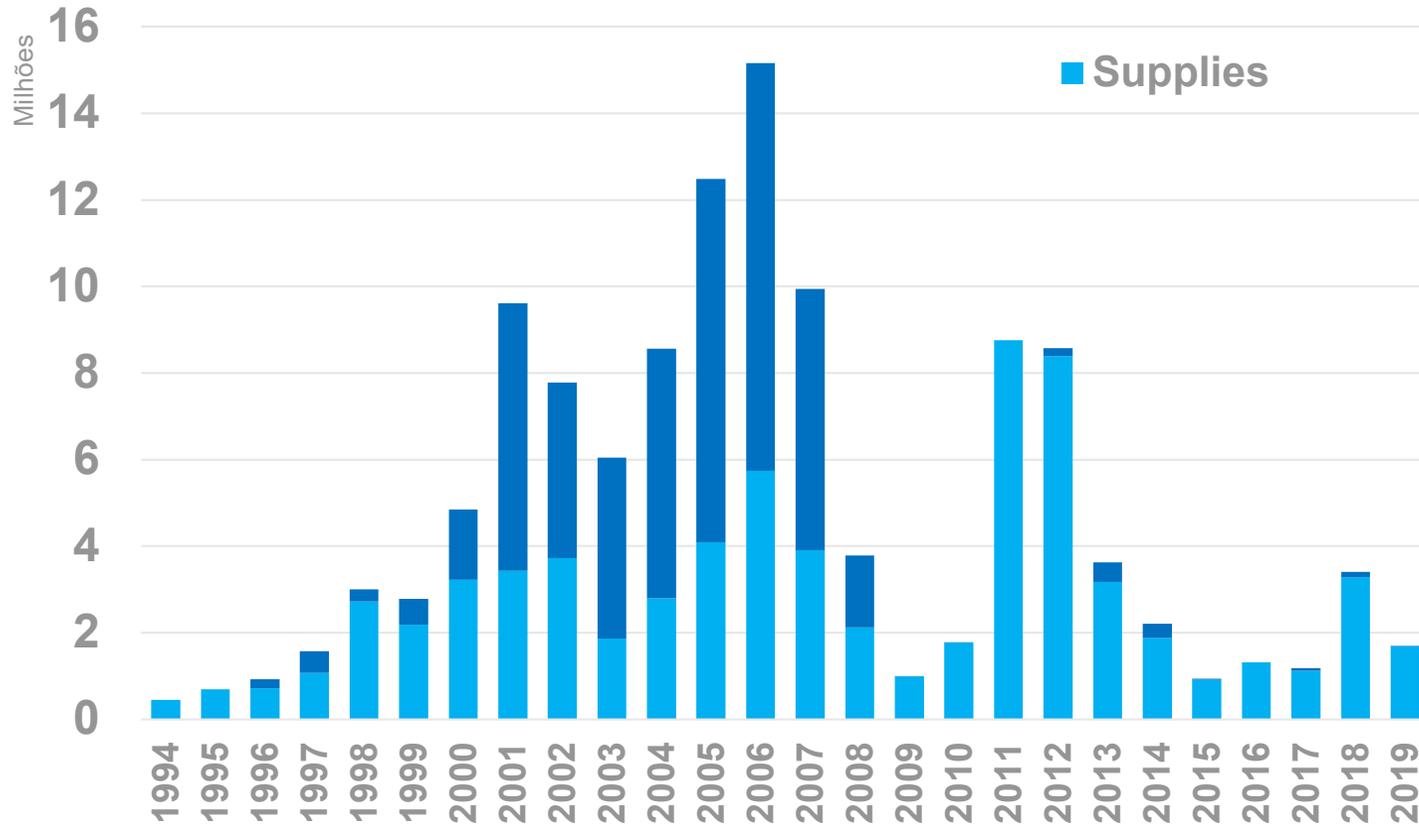
References marked with "New" have been posted during the last 8 weeks.

Search Menu		Links Menu	
Type of Contract:	All <input type="text"/>	Market Survey dispatched:	All <input type="text"/>
Reference:	<input type="text"/>	Call for Tenders scheduled for dispatch:	All <input type="text"/> All <input type="text"/>
Activity Code:	<input type="text"/>	Description and/or Specific Condition:	<input type="text"/>
Requirement:	<input type="text"/>	Commercial contact:	All <input type="text"/>
Cost Range:	All <input type="text"/>	Publication Date:	From <input type="text"/> To <input type="text"/> dd-mm-yyyy

Publication Date	Type of Contract	Reference	Requirement (Activity Code)	Description/Specific Condition	Cost Range	Market Survey scheduled for dispatch	Contacts and Interest in being contacted / Market Survey Documents	Invitation to Tender scheduled to dispatch
30-06-2020	Supply	New MS-4631/TE/HL-LHC	Supply and installation of helium refrigerator systems for the high luminosity project (06020102)	CERN intends to place a contract for the design, manufacture, installation ... Interested firms shall have experience in the design, manufacturing, installation and ... <input type="button" value="Read More"/>	D	Third quarter 2020	To express an interest please send an e-mail to procurement.service@cern.ch Technically: E. Monneret Commercially: I. Lobmaier	First quarter 2021
23-06-2020	Services	New MS-4629/EN	Service contract for the supply and installation of piping and its accessories on the CERN site. (01030301, 13020700)	CERN intends to place a service contract for piping minor works ... Interested firms shall have competence and experience in piping activities in ... <input type="button" value="Read More"/>	C	Third quarter 2020	To express an interest please send an e-mail to procurement.service@cern.ch Technically: M. Amarilla Garcia Commercially: S. Sonnerat	Fourth quarter 2020



Retorno industrial variável ao longo dos anos



LEP Operação

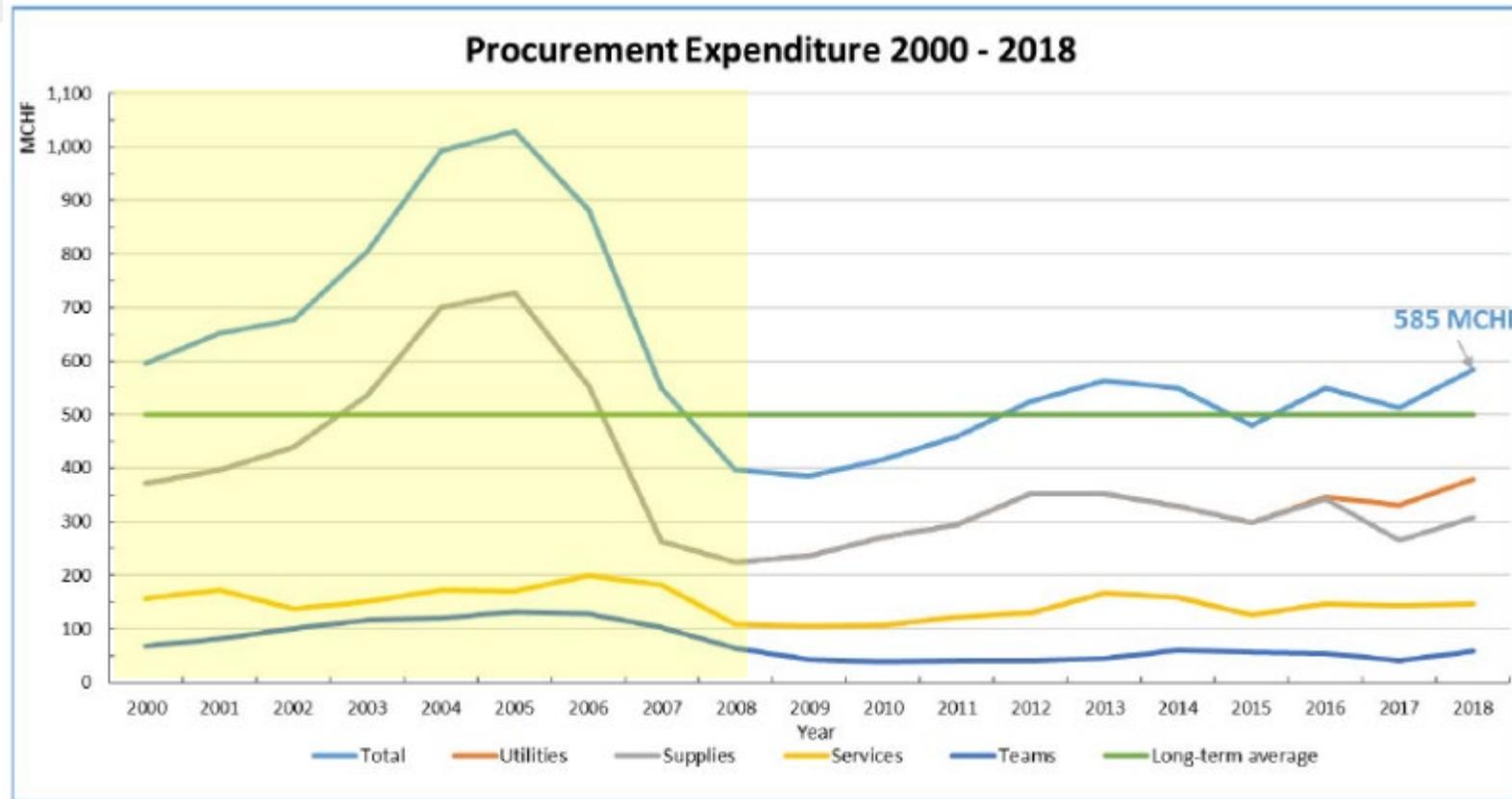
LHC Construção

HL-LHC

LS1

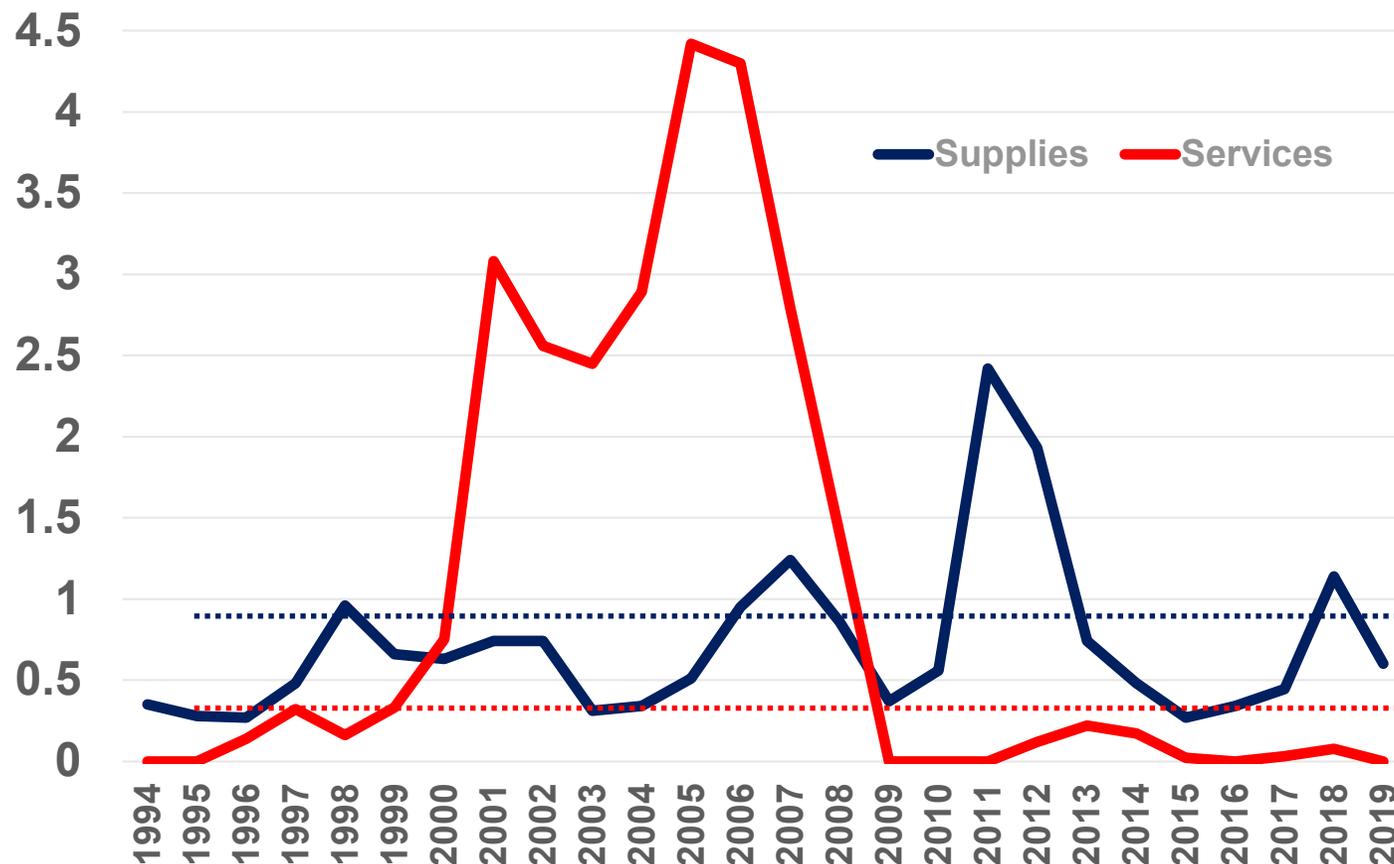


CERN gasta anualmente ~500M CHF



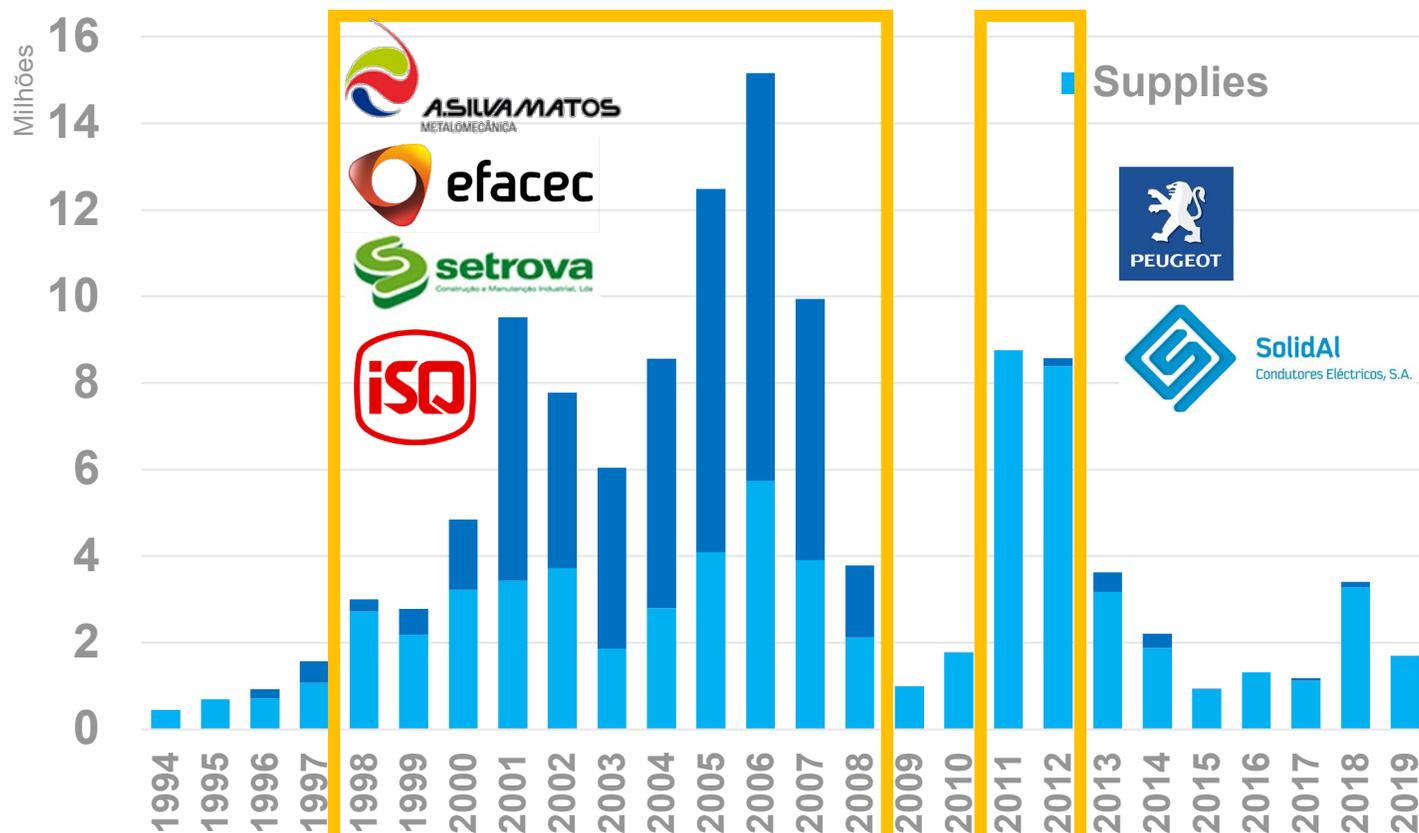


Excelente desempenho industrial durante construção do LHC





Poucos grandes contratos têm efeito importante



LEP Operação

LHC Construção

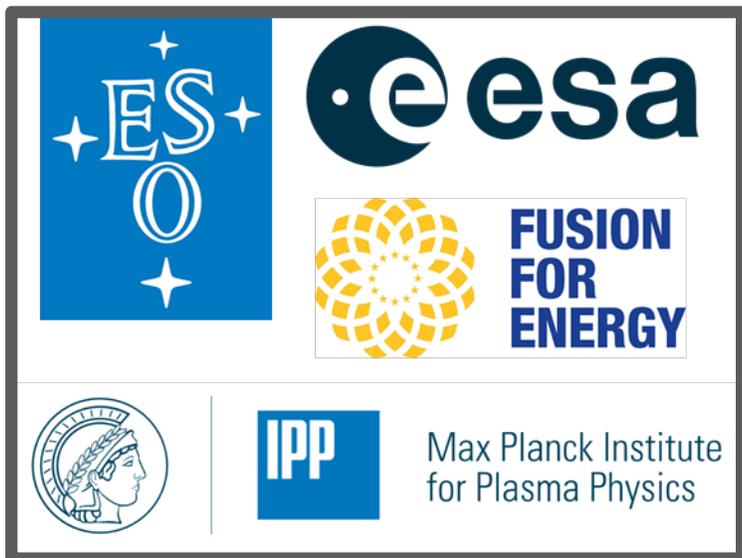
HL-LHC

LS1



CERN é selo de qualidade para as empresas

- O CERN é uma organização central e habilitadora no mercado "Big Science".
- É também uma ferramenta de marketing para os seus fornecedores (selo "CERN Supplier").





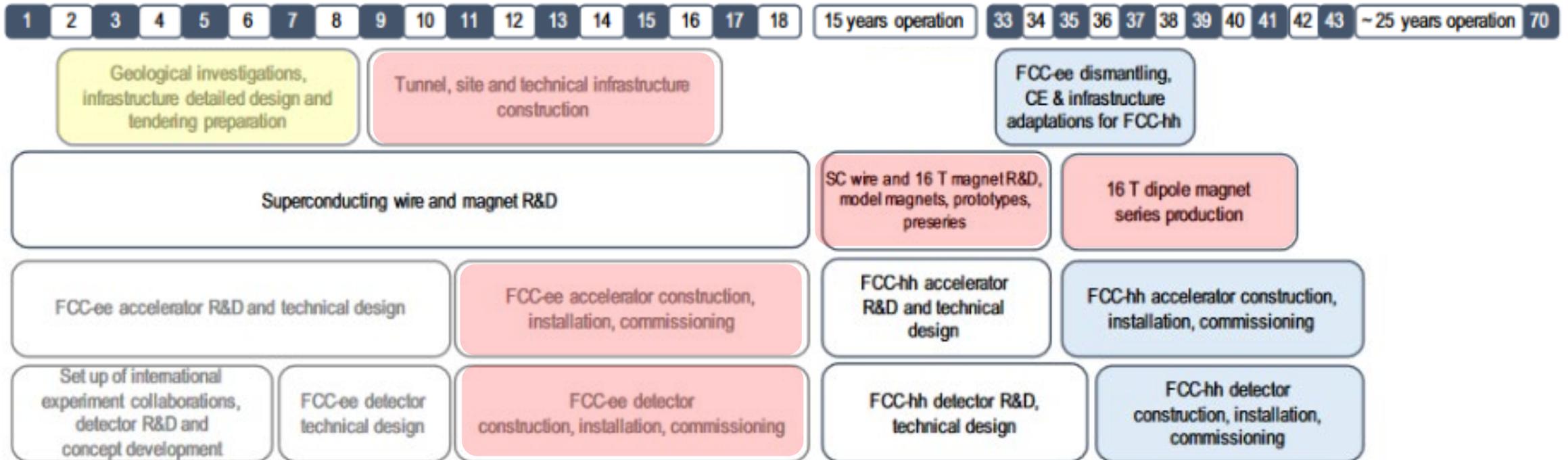
Exploração do programa HL-LHC

Estudo da exequibilidade do programa FCC

Outros (PBC, colaborações, etc)

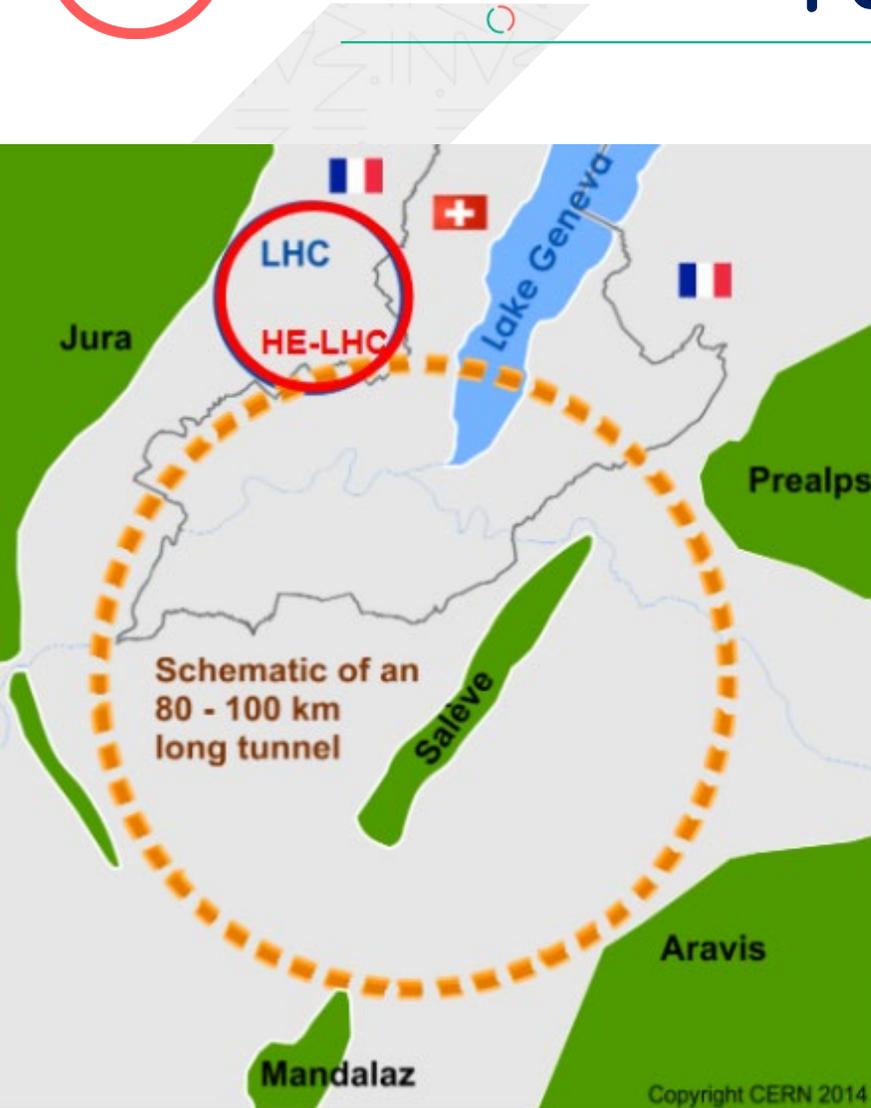


... a 70 anos



Nota: Market Survey para investigações geológicas deve ser publicado este ano

FCC: 1 túnel, 2 máquinas

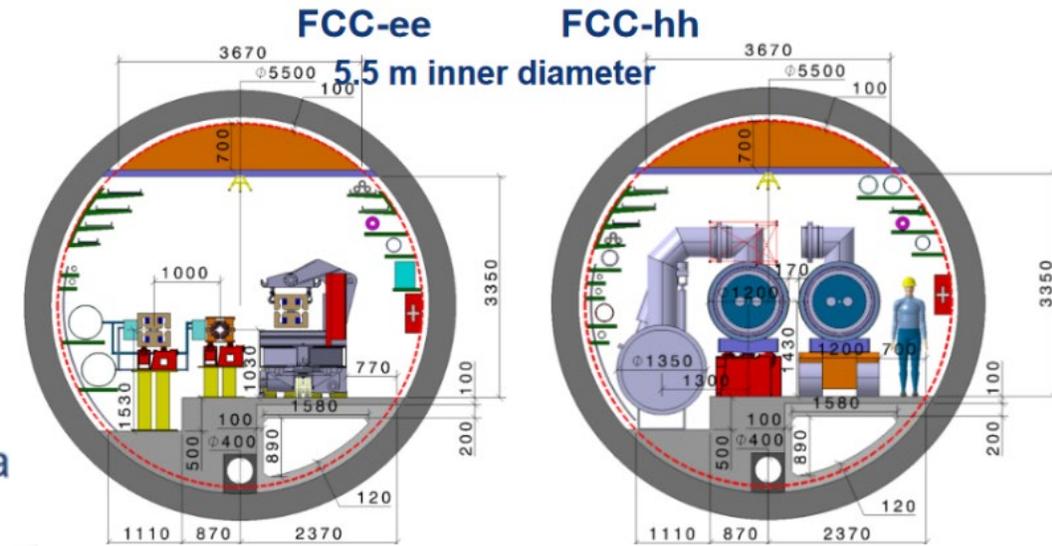


International FCC collaboration with CERN as host lab to study:

- ~100 km tunnel infrastructure in Geneva area, linked to CERN
- e^+e^- collider (*FCC-ee*), as potential first step
- pp -collider (*FCC-hh*) → long-term goal, defining infrastructure requirements

~16 T ⇒ 100 TeV pp in 100 km

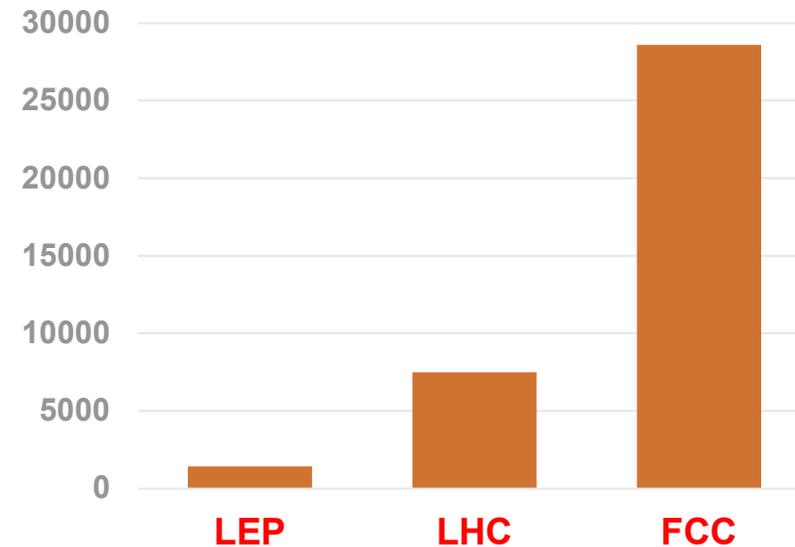
- HE-LHC with *FCC-hh* technology





FCC com custo total de 28,600 MCHF (construção)

Domain	Cost in MCHF
Stage 1 - Civil Engineering	5,400
Stage 1 - Technical Infrastructure	2,200
Stage 1 - FCC-ee Machine and Injector Complex	4,000
Stage 2 - Civil Engineering complement	600
Stage 2 - Technical Infrastructure adaptation	2,800
Stage 2 - FCC-hh Machine and Injector complex	13,600
TOTAL construction cost for integral FCC project	28,600





... a não ser que o Elon Musk permita poupar

MIT Technology Review  @techreview · 21 de jan de 2019

 CERN wants to build a particle collider that's four tim...
CERN wants to go super-sized. The particle physics lab near Geneva in Switzerland has just unveiled its plans...
technologyreview.com

131 1,3 mil 7,7 mil

Elon Musk  @elonmusk · 21 de jan de 2019

Director of **CERN** asked me about Boring Co building the new LHC tunnel when we were at the @royalsociety. Would probably save several billion Euros.

588 1,6 mil 20,5 mil

Elon Musk says he could build new particle accelerator tunnel for cheap

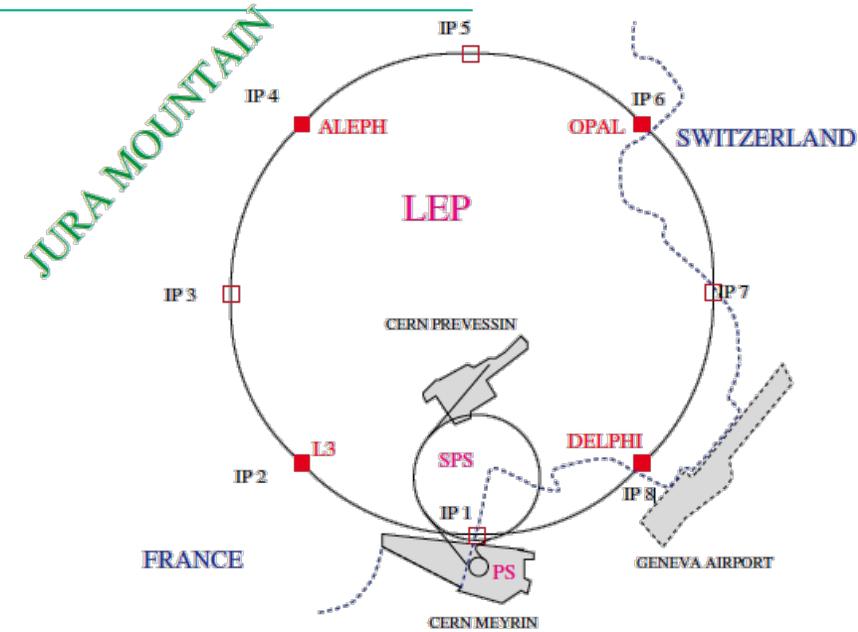
Need a new particle accelerator tunnel? Musk might be your guy.

 Jackson Ryan  Jan. 21, 2019 4:04 p.m. PT



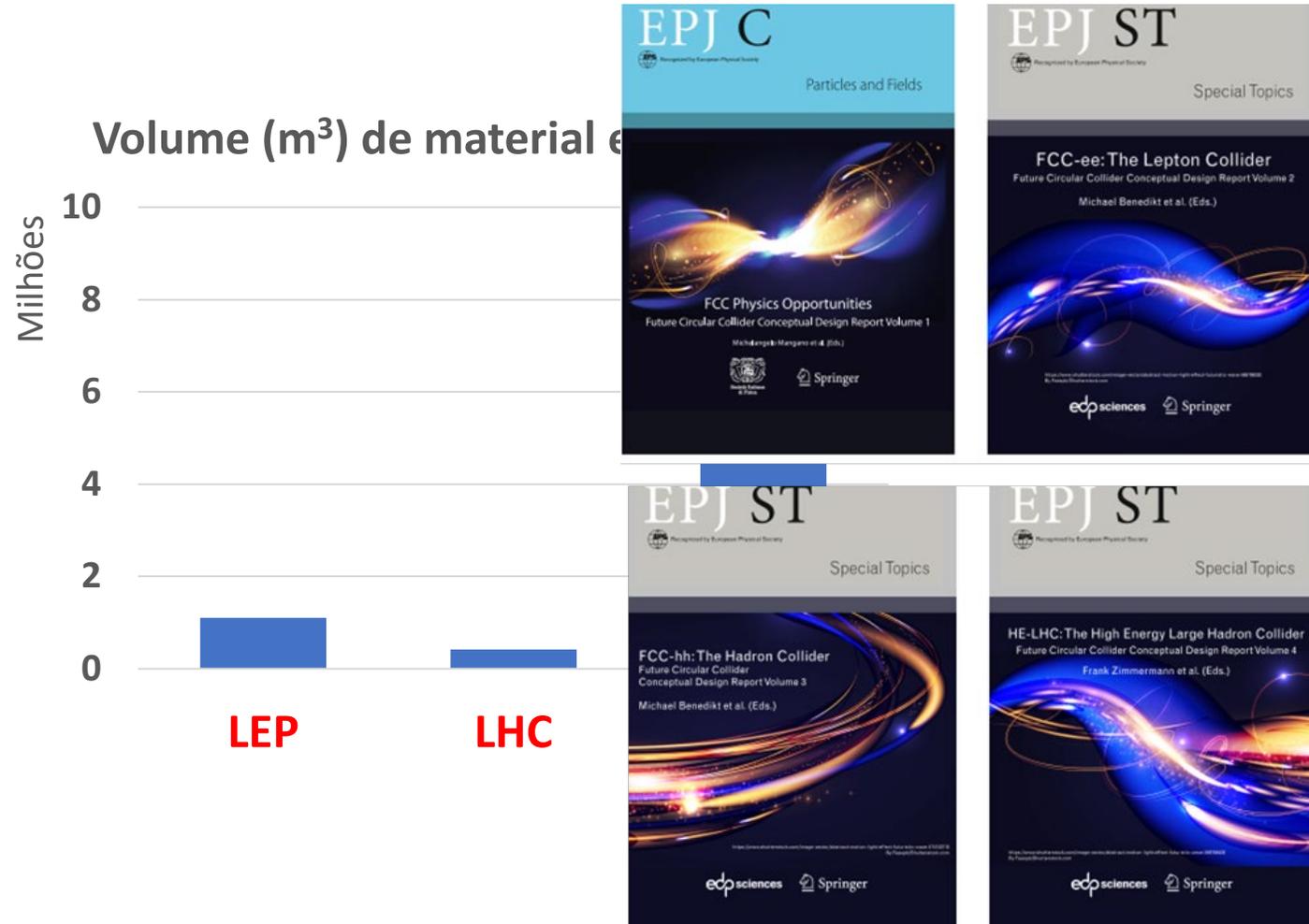


Portugal não chegou a tempo do túnel do LEP





Volume 10X superior de material escavado no FCC





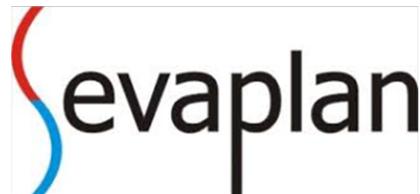
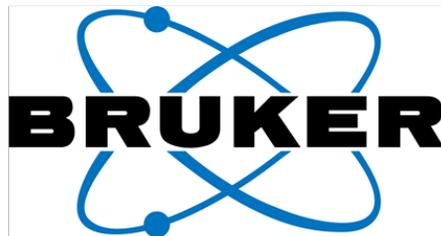
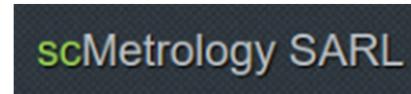
Alguns dos principais desafios do FCC

- **A 16 Tesla high-field accelerator magnet and related superconductor research**
- **An efficient 400 MW radiofrequency acceleration system and the associated power conversion systems**
- **A highly efficient large-scale cryogenics infrastructure and the accompanying refrigeration systems.**
- **Energy-efficient powering technologies (power conversion and transmission)**
- **Cost-efficient tunneling and re-use of the excavation material meeting the objectives of circular economy**

Empresas que possam ter soluções para algum destes problemas (ou outros) do CERN **devem** propô-las



Contributo da indústria desde o Conceptual Design Report

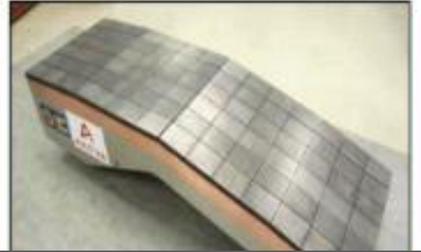




Mas as necessidades tecnológicas são permanentes



Civil



ote

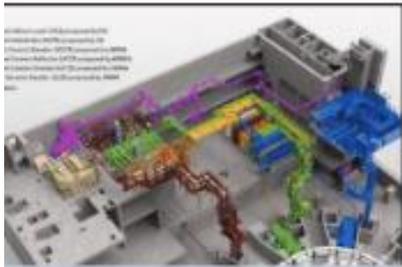
Serviços de engenharia, inspecções, logística (etc), metalomecânica, estruturas metálicas e compósitos, tanques de pressão, cablagens, componentes electrónicos, construção civil (subterrânea e de superfície), sistemas de ventilação, transformadores e outra aparelhagem eléctrica, materiais resistentes à radiação, ...



Cryogen



nt



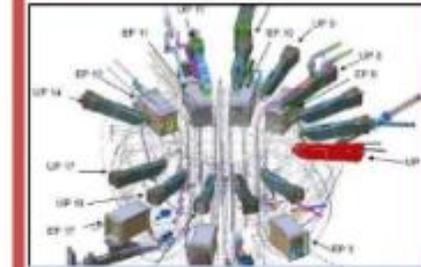
Tritium Technology



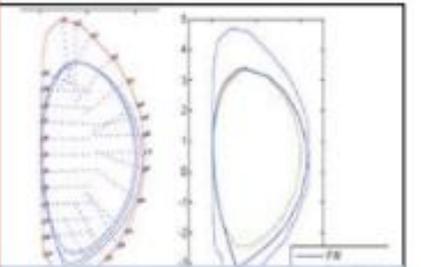
Large Mechanical Structures



Control and Data Systems



Diagnostics and Sensors



Plasma Engineering



Desafios para a indústria portuguesa

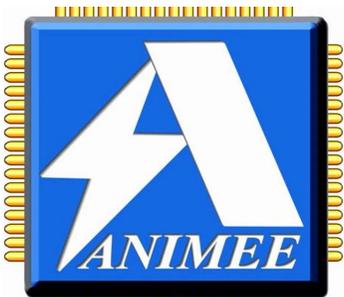
- Poucas empresas com “mentalidade de fronteira tecnológica”
 - Poucas empresas com relação comercial histórica ininterrupta com o CERN
 - Excelente engenharia, mas reativamente poucas tecnologias
 - Muitas das grandes empresas com orientação estratégica para outros continents
-
- Qual será o modelo de implementação do programa FCC?

Estes desafios são relativos: o CERN compra de tudo.

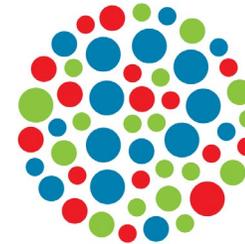


Rede informal de apoio às relações industriais com o CERN

- O CERN compra de tudo: desde ímanes supercondutores a árvores de jardim
- Eu não conheço todas as empresas relevantes para cada Market Survey ou Price Enquiry.
- Falem-me da vossa empresa e da sua ambição.
- Inscrevam-se na base de dados de fornecedores.
- Agradecimentos:



**METAL
PORTUGAL**[®]
by AIMMAP



aicep Portugal Global



Diálogo interagências para mercado Big Science

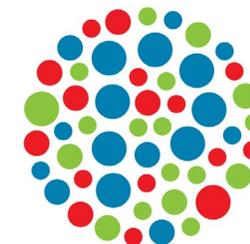


Big Science PT



FCT

Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR



aicep Portugal Global

Big Science Business Forum 2021



www.bsbf2021.org

#BSBF2021 #BigScienceBusinessForum



BIG SCIENCE BUSINESS FORUM

GRANADA (SPAIN), 28 SEPT - 1 OCT 2021



Em suma

- O desempenho histórico da indústria portuguesa no CERN oscilou entre o excelente e o mediocre.
- O Programa FCC traz oportunidades de **negócio numa maior escala, nos próximos 40 anos**
- Oportunidades mais imediatas **na engenharia civil**
- Oportunidades para **relações mais estruturadas** em relações de longo prazo (ad hoc)
- O CERN não é um mercado exótico: **é o epicentro do grande mercado de Big Science.**
- Registem-se, apareçam, contactem.

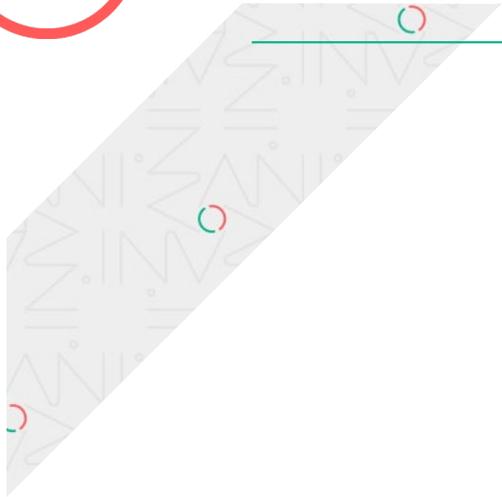


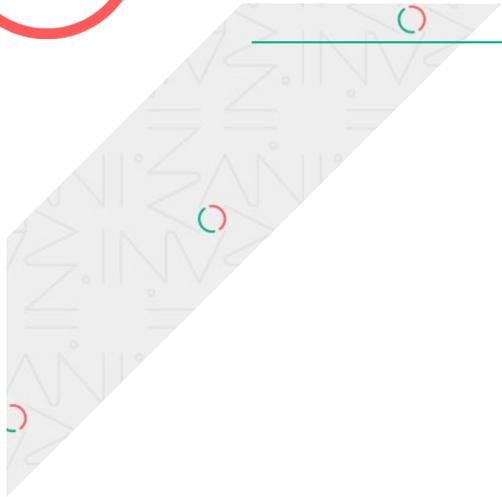
Portugal @CERN – 3-4 Setembro, 2019



17 empresas; Reuniões com 21 grupos do CERN (BE, EN, TE, SMB).

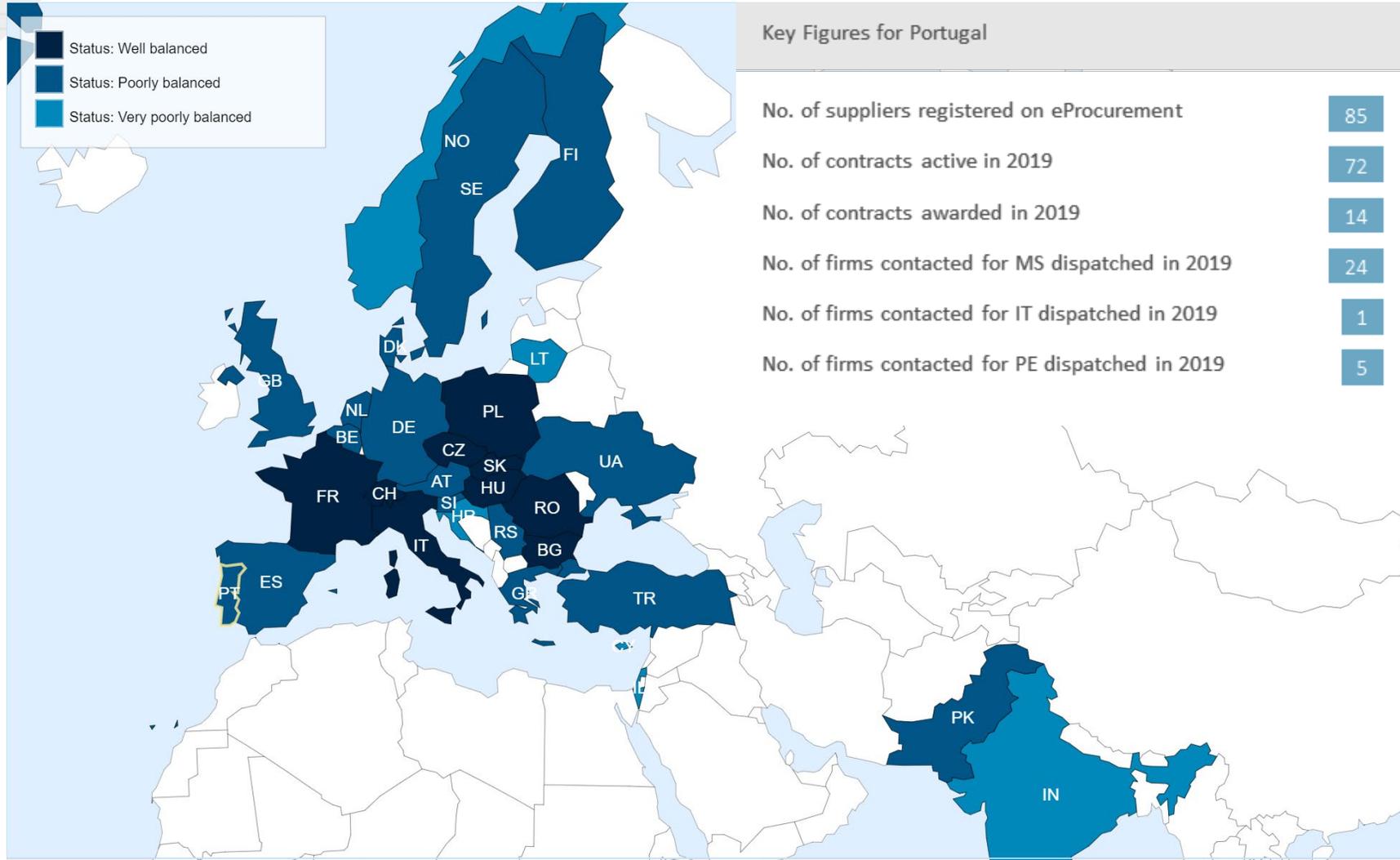
PERIN - doubling the Portuguese Presence in European Programs







Dados de procurement 2019/Portugal



European Advanced Superconductivity Innovation and Training Network

➤ **selected for funding by EC in May 2017, started 1 October 2017**

- SC wires at low temperatures for magnets (Nb_3Sn , MgB_2 , HTS)
- Superconducting thin films for RF and beam screen (Nb_3Sn , TI)
- Electrohydraulic forming for RF structures
- Optimisation cryogenic infrastructure systems
- Magnet cooling architectures

**Horizon 2020 program
Funding for 15 Early Stage
Researchers over 3 years &
training**

13 Beneficiaries



12 Partners





H2020 DS FCC Innovation Study (FCC-IS)

Goal: Carry out the technical design study for a 100 km long luminosity frontier circular collider infrastructure at CERN that will extend Europe's leadership in the domain of fundamental physics research until the end of the 21st century.

The study focuses on the high priority topics to prepare the ground for a construction project by 2026:

1. **optimisation of the particle collider design**, which leads to the invariants of the infrastructure project,
2. planning and necessary investigations for a **sustainable civil engineering construction project** including the requirements of a circular economy,
3. **implementation and public participation processes in France and Switzerland** (CERN host states) including transnational topics such as environmental impact assessment, management of excavation materials and access to shared resources (electricity, water, communication, transport),
4. **definition and implementation of a project exploitation plan** considering the need to **create a committed user community** that exploits the RI from the beginning onwards and to **engage every member of the society**,
5. **Socio-economic** impact assessment with a plan to **design the facility for impact creation**, including the regional impacts and potential synergies for all participating stakeholders in Europe.