European-wide field trials for residential fuel cell micro-CHP

20th February
WP 3 Seminar (M7)

Alessandro Graizzaro, Envipark

Agenda

1. Target groups identified during Hyprofessionals project
2. Funding Analysis in different EU countries for training actions on Fuel Cells
3. Pilot Training actions during Hyprofessionals project in different countries
4. Proposed actions for developing training actions in the future
5. Training courses contents developed in past projects within Leonardo Agency Framework
6. Ene.Field manufacturers collected experience on technicians training

discussion/inputs from manufacturer/utilities and a discussion on how to proceed with this work task

1. Target groups identified during Hyprofessionals project

RESULTS

- Identification of stakeholders categories using a webform connected to the website

Demand

- SMEs
  - Manufacturing
  - Service / Engineering
  - Commerce
- GEs
  - Manufacturing
  - Service / Engineering

Offer

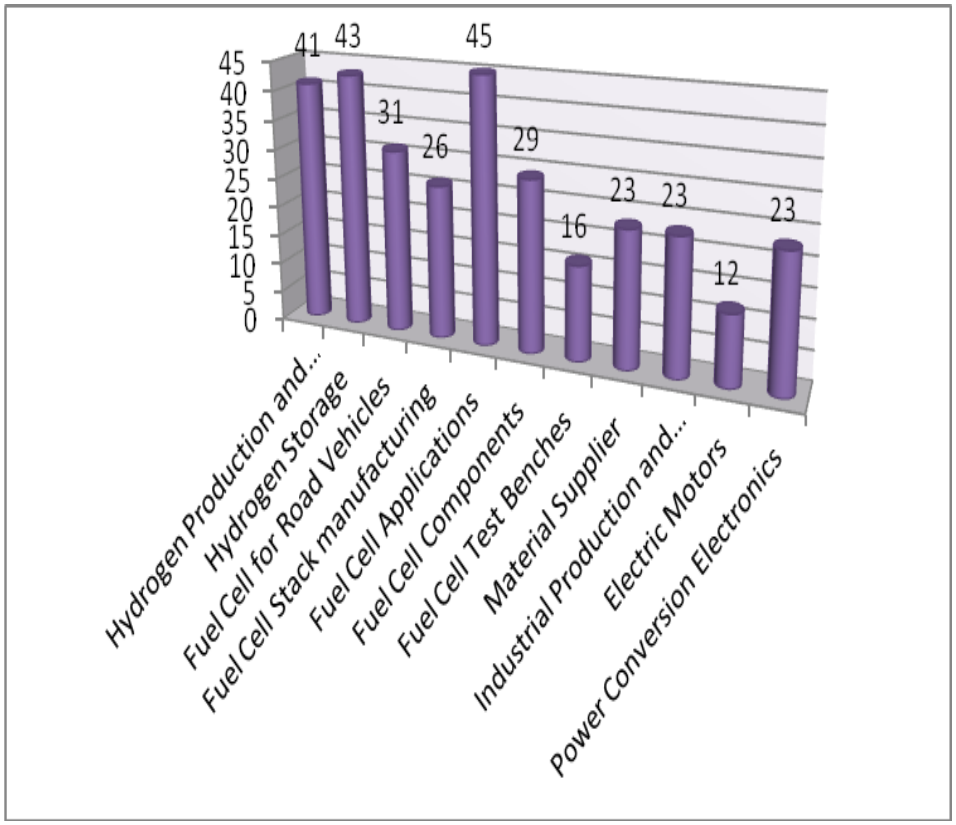
- Research Centres
  - Public
  - Private
- Training Centres
  - Public
  - Private

Industry Partecipants

Number of stakeholder: 72
Involved countries: 9

Denmark	1
France	9
Germany	18
Italy	15
Nederland	2
Spain	15
Turkey	3
Austria	1
United Kingdom	4

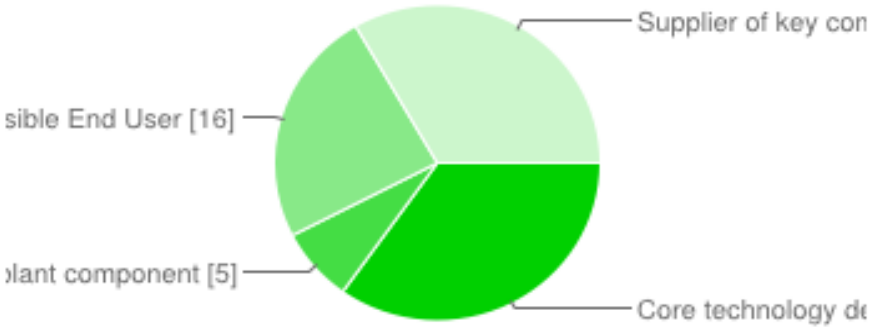
Sector of interest



Hydrogen Production and distribution	**41**	56%
Hydrogen Storage	**43**	59%
Fuel Cell for Road Vehicles	**31**	42%
Fuel Cell Stack manufacturing	**26**	36%
Fuel Cell Applications	**45**	62%
Fuel Cell Components	**29**	40%
Fuel Cell Test Benches	**16**	22%
Material Supplier	**23**	32%
Industrial Production and Automation technologies	**23**	32%
Electric Motors	**12**	16%
Power Conversion Electronics	**23**	32%

Sector of interest

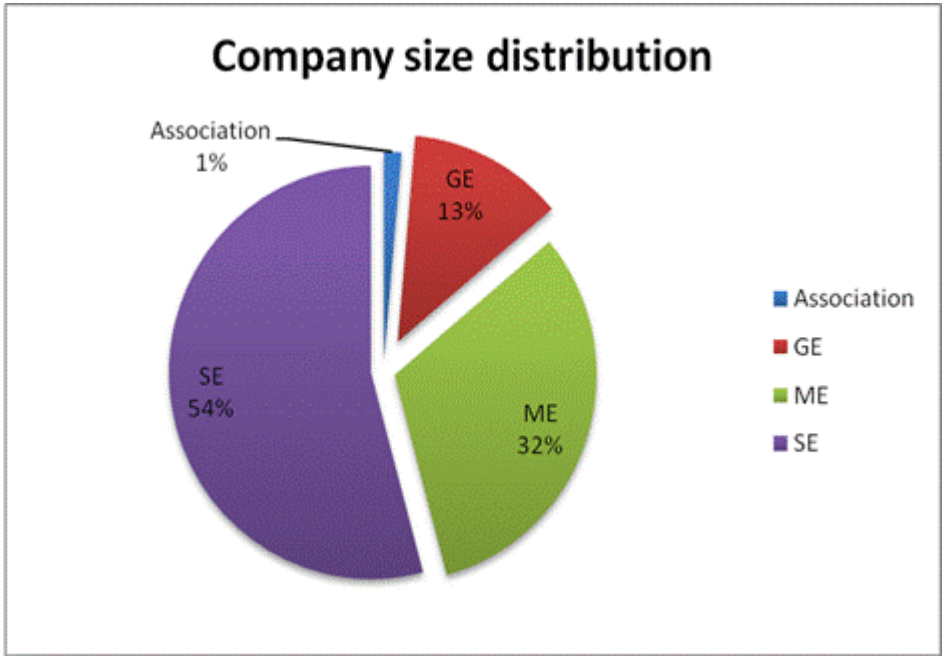
Role or possible role in the H-FC chain



Core technology developer	**23**	32%
Supplier of balance of plant component	**5**	7%
End User / Possible End User	**16**	22%
Supplier of key component	**22**	30%

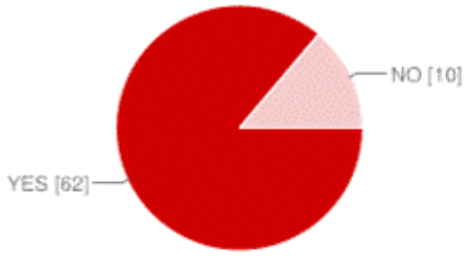
Industry stakeholders

Company Size distribution		
	Already in H2 Business	Total
Association	NO	1
AS total		**1**
GE	NO	5
	YES	4
GE Total		**9**
ME	NO	10
	YES	13
ME Total		**23**
SE	NO	19
	YES	20
SE Total		**39**
Total		**72**



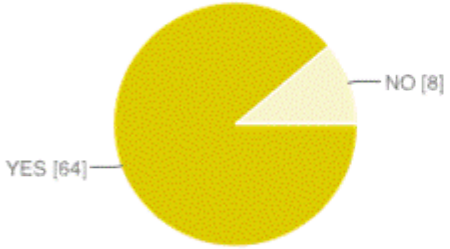
Assessment of the level of perception on Hydrogen and Fuel cells

Does your company have or had in the past hydrogen / fuel cell related activities?



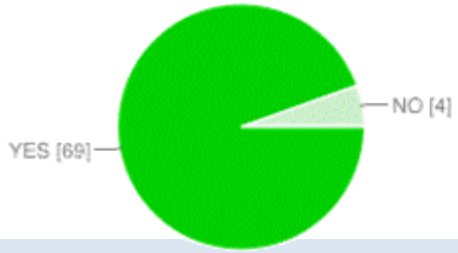
YES	**62**	85%
NO	**10**	14%

Does your company have ongoing projects in this topic?



YES	**64**	88%
NO	**8**	11%

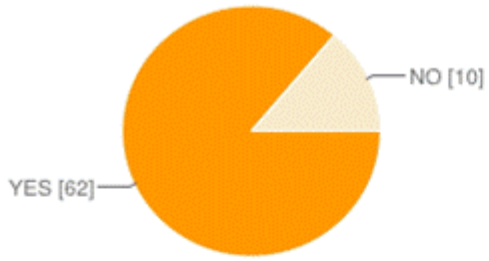
Do your company trust hydrogen and fuel cell will be a market opportunity in the future?



YES	**69**	95%
NO	**4**	5%

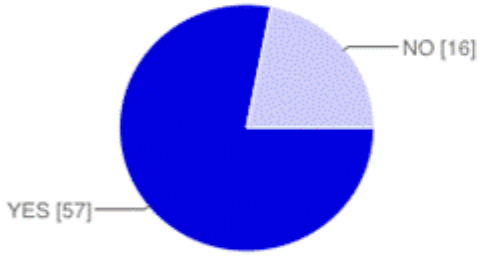
Assessment of the level of perception on Hydrogen and Fuel cells

Does your company have any collaboration with other companies in the field of H-FC?



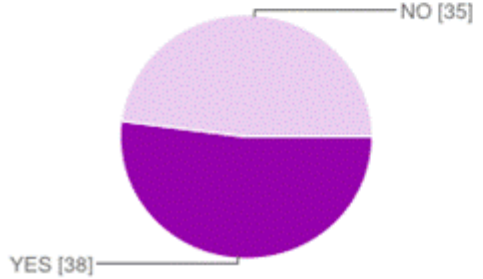
YES	**62**	85%
NO	**10**	14%

Does your company have any collaboration with University or Research Centers in the field of H-FC?



YES	**57**	78%
NO	**16**	22%

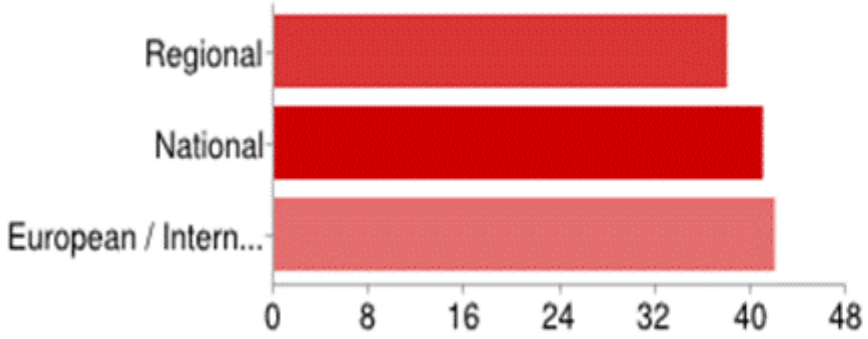
Does your company already sell some products in the H-FC field?



YES	**38**	52%
NO	**35**	48%

Level of cooperation

If your company have some kind of collaboration in this field is it:

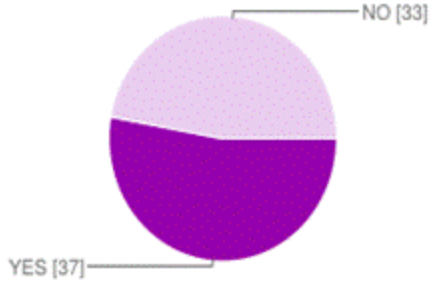


Regional	**38**	58%
National	**41**	62%
European / International	**42**	64%

People may select more than one checkbox, so percentages may add up to more than 100%.

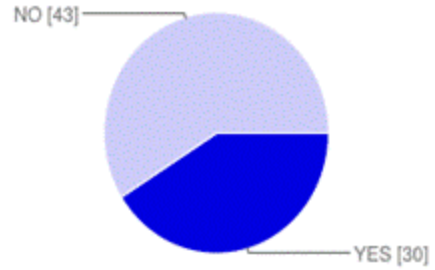
Specific need of training actions

Does the company have any cooperation with educational / training centres?



YES	37	51%
NO	33	45%

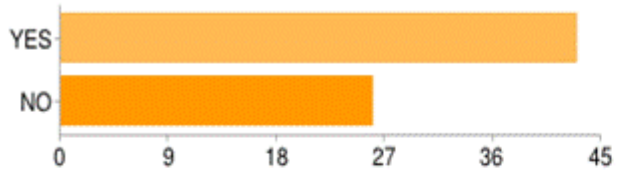
Is it easy to find qualified workers ?



YES	30	41%
NO	43	59%

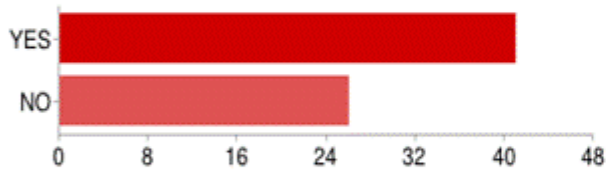
Does the company need to train technicians for H-FC related activities?

Does the company need to train technicians for H-FC related activities? - Internal Training



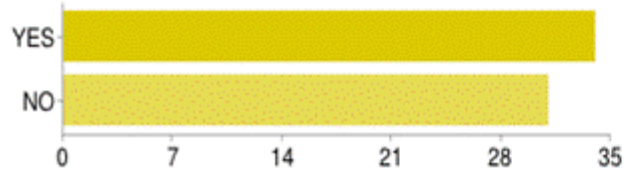
YES	43	59%
NO	26	36%

Does the company need to train technicians for H-FC related activities? - Short Professional Training



YES	41	56%
NO	26	36%

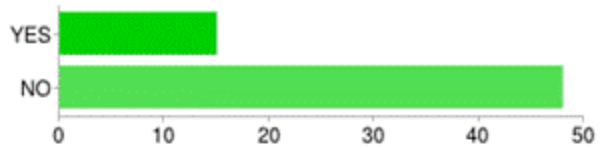
Does the company need to train technicians for H-FC related activities? - Short Theorical courses



YES	34	47%
NO	31	42%

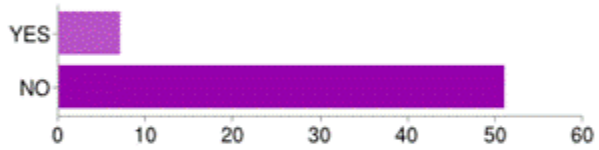
Specific need of training actions

Does the company need to train technicians for H-FC related activities? - Long formation at University



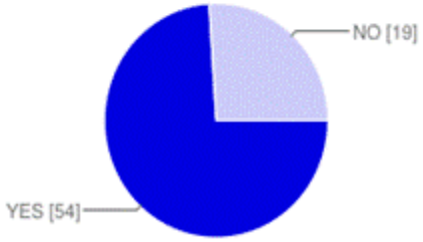
YES	**15**	21%
NO	**48**	66%

Does the company need to train technicians for H-FC related activities? - Long formation at training centers



YES	**7**	10%
NO	**51**	70%

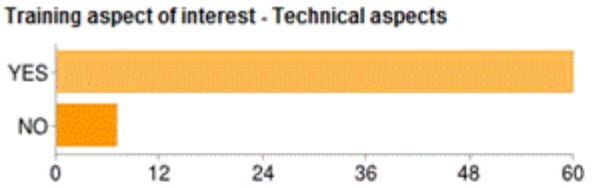
Does the company need to train workers for H2-FC related activities?



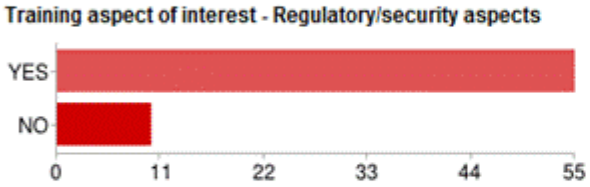
YES	**54**	74%
NO	**19**	26%

Specific need of training actions

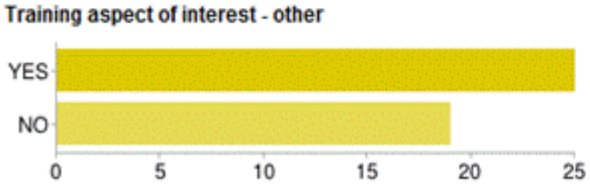
Training aspect of interest:



YES	**60**	82%
NO	**7**	10%



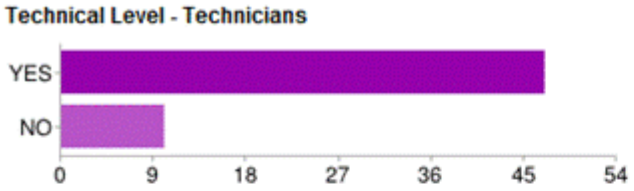
YES	**55**	75%
NO	**10**	14%



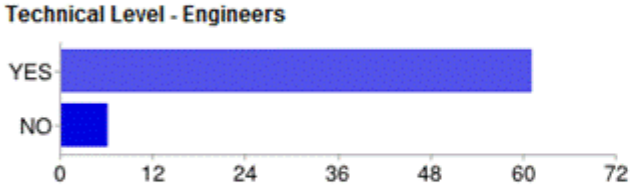
YES	**25**	34%
NO	**19**	26%

Specific need of training actions

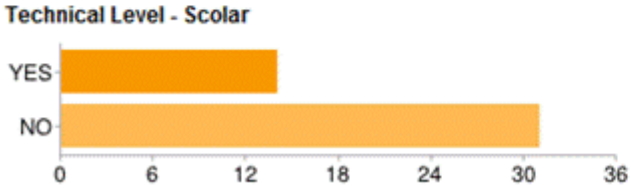
Technical Level of the training person:



YES	**47**	64%
NO	**10**	14%



YES	**61**	84%
NO	**6**	8%



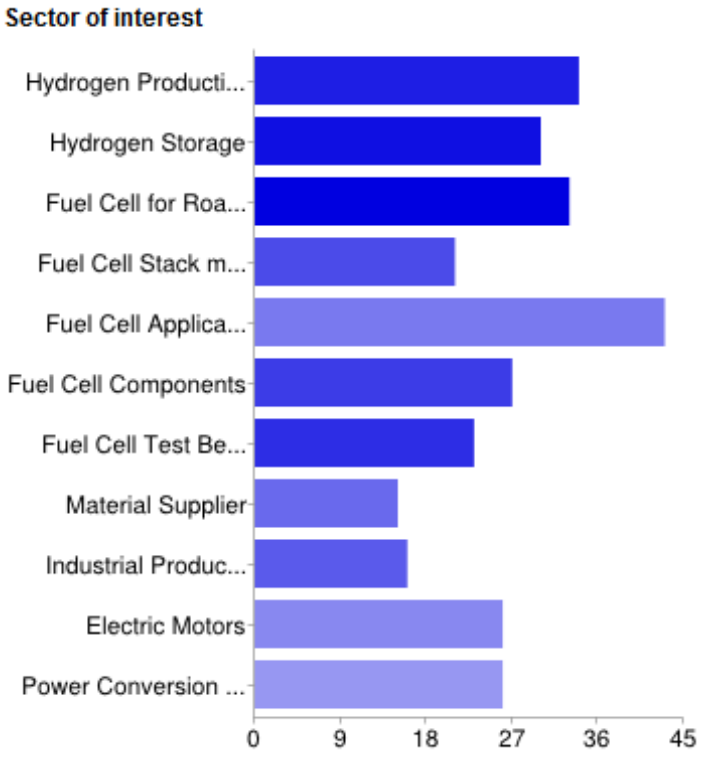
YES	**14**	19%
NO	**31**	42%

Educational Partecipants

Number of stakeholder: 57
Involved countries: 12

Austria	1
Belgium	2
France	6
Germany	15
Italy	11
Spain	14
Bulgaria	1
Denmark	1
Romania	1
UK	2
Turkey	2

Sector of interest



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Hydrogen Storage	**30**	48%
Fuel Cell for Road Vehicles	**33**	53%
Fuel Cell Stack manufacturing	**21**	34%
Fuel Cell Applications	**43**	69%
Fuel Cell Components	**27**	44%
Fuel Cell Test Benches	**23**	37%
Material Supplier	**15**	24%
Industrial Production and Automation technologies	**16**	26%
Electric Motors	**26**	42%
Power Conversion Electronics	**26**	42%

People may select more than one checkbox, so percentages may add up to more than 100%.

- Identification of stakeholders
  - –Production, Storage and Applications are the main fields of interest
  - – the sector “Fuel Cell Applications” include Early Markets such as forklift and UPS as first movers
  - – Hydrogen Production and Storage are somehow related to the renewable energy market which is growing significantly: this overlap is by sure a strong driving force for the development of the sector.

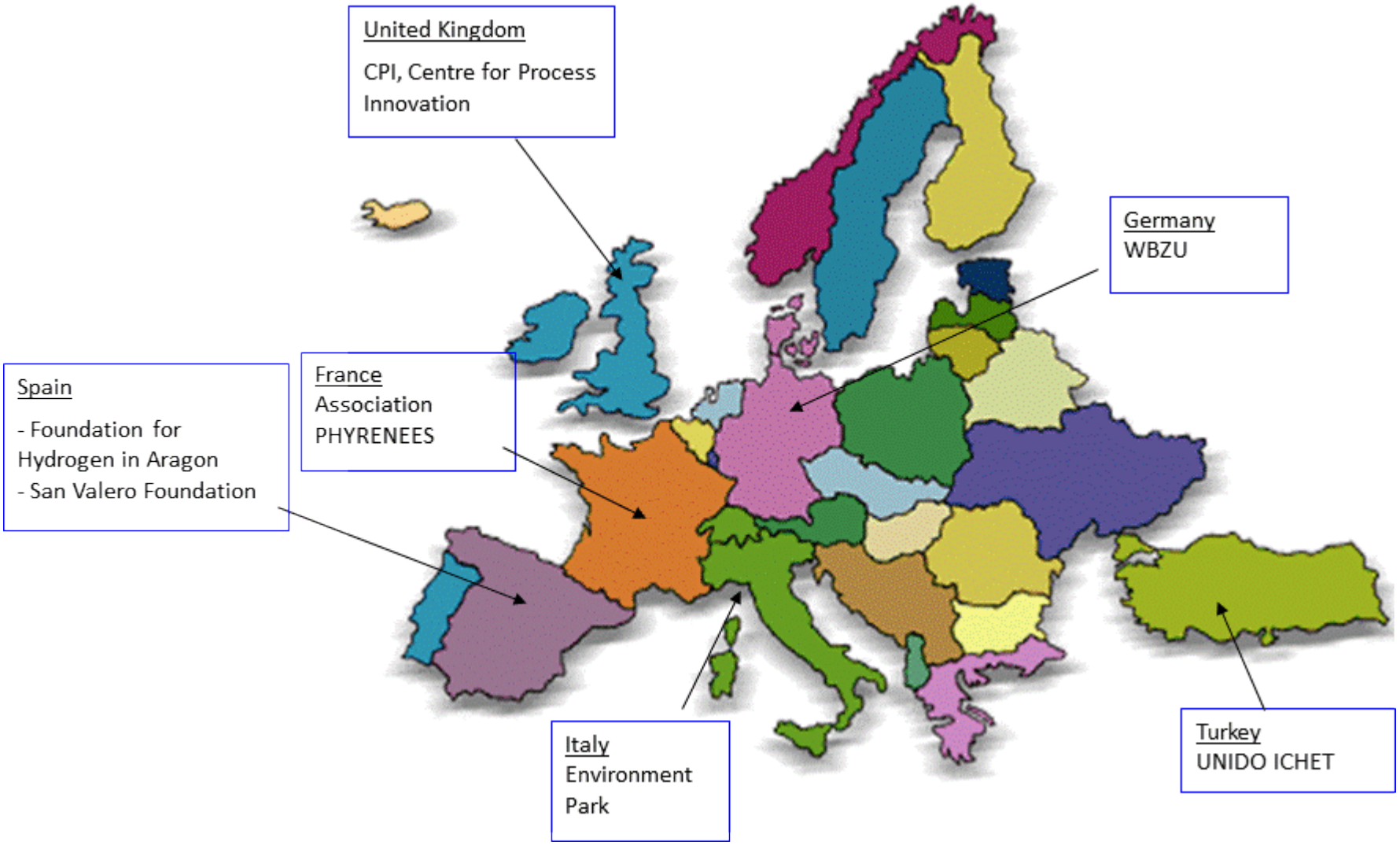
  Training actions should take into account this relationship between fuel cells and renewable energy.

- Educational gap and needs
  - Most of the companies interested in H2/FC field are SMEs
  - Need of short period technical training to be done internally when possibile or externally when necessary
  - Cooperation between companies and training centers should be improved
  - Training actions should be addressed to satisfy the need of early market applications in the fuel cell field

2. Funding Analysis in different EU countries for training actions on Fuel Cells

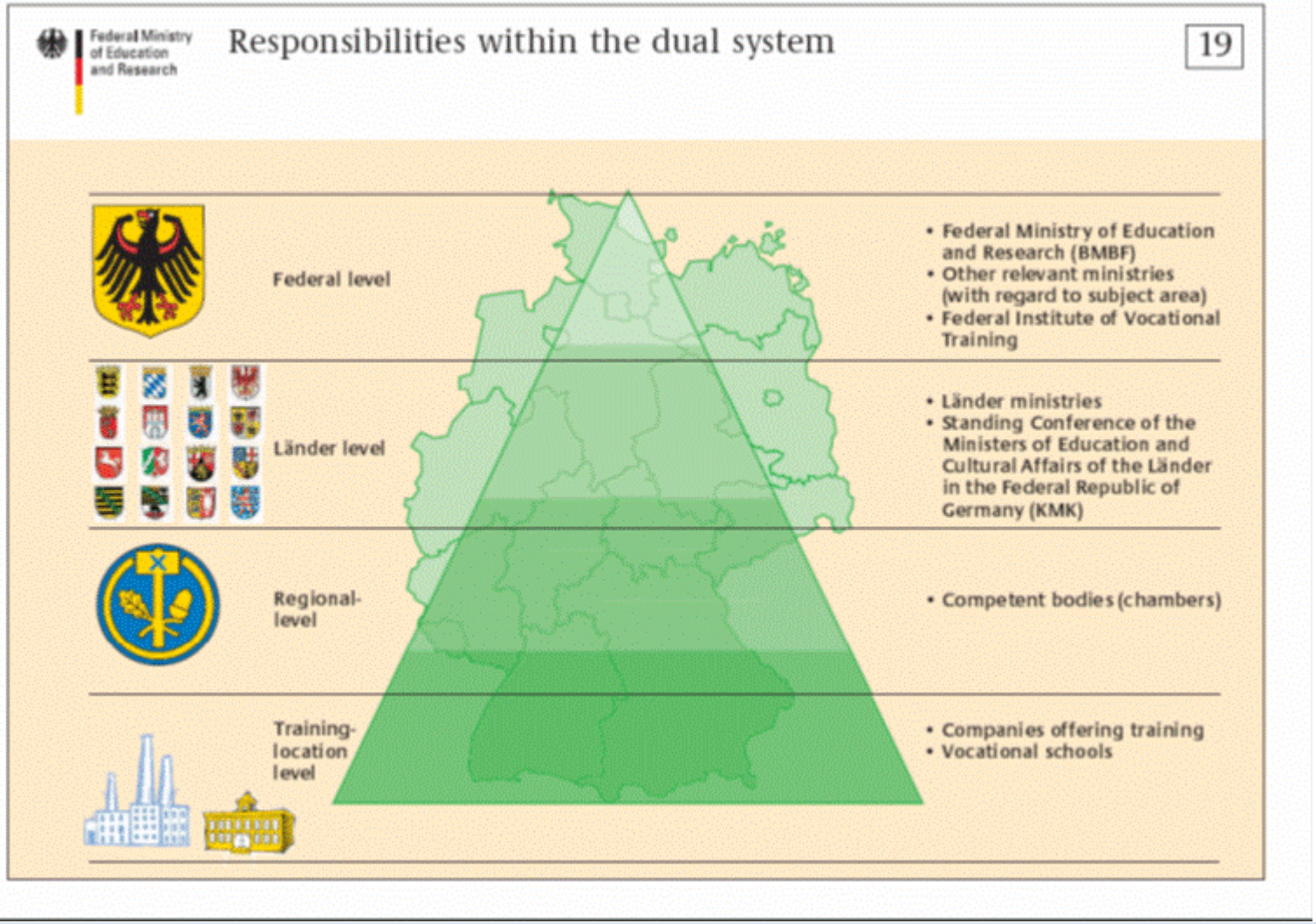
RESULTS

Countries considered in the analysis of funding programs



Germany financial support

The responsibilities in the German dual VET-System



Funds and programs for vocational education and training (VET)

Funding by the Federation

On the federal Level 34 VET-program (out of 195) are mapped in the analysis [BMBF 2011, 64-66]. Most of them are not specific for a certain technology. The opportunities to submit proposals concerning fuel cells and Hydrogen have to be discussed with the providers of funds.

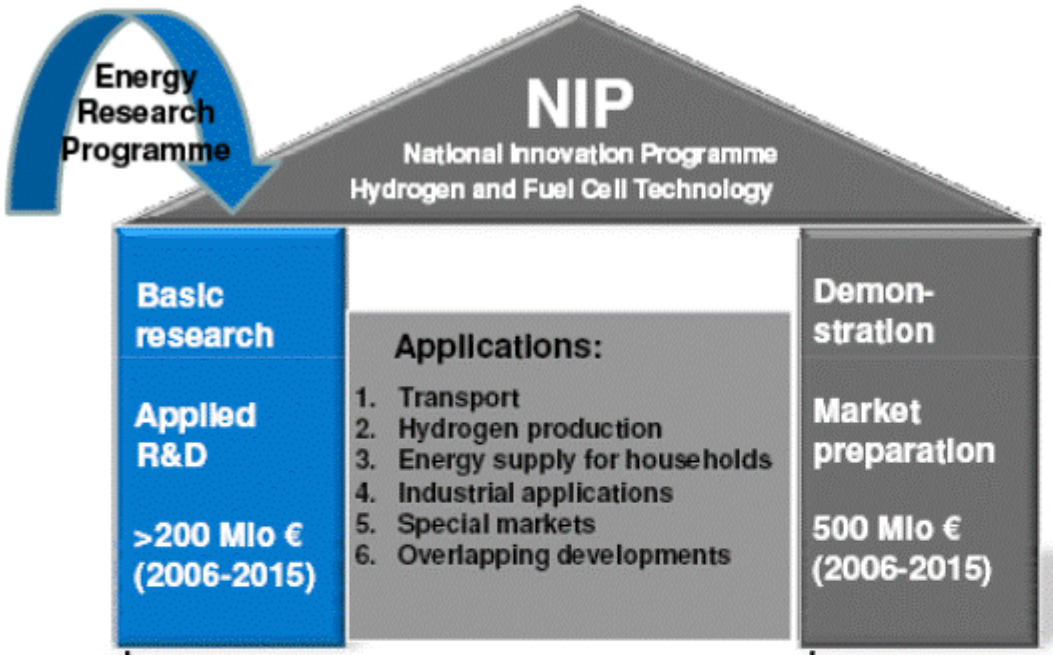
Funding by the German 'Länder'

Because of the important role of the 'Bundesländer' (usually simply called 'Land') in the German federation every Land has its own funding mechanism. The mentioned analysis by BMBF identified in 152 programmes in the 16 Länder of Germany

Funding by the National Innovation Programme for Hydrogen and Fuel Cell Technology" (NIP)

The German Federal Government supports the further development and introduction of fuel cell and Hydrogen technologies through targeted funding under the "National Innovation Programme for Hydrogen and Fuel Cell Technology" (NIP) drawn up jointly by the Federal Ministries of Transport, Building and Urban Affairs (BMVBS), Economics and Technology (BMWi), Education and Research (BMBF) and Environment, Nature Conservation and Nuclear Safety (BMU).

Funding by the National Innovation Programme for Hydrogen and FC Technology (NIP)



Lighthouse projects:

- Clean energy partnership
  - Petrol stations, fleets
- Callux
  - Energy provider, CHP
- e4ships
  - Ships, ferries, yachts, harbours
- Leisure + tourism
  - Caravanning, camping
- Clean Power net
  - UPS, backup systems
- German Airport Alliance
  - Busses, luggage transport

BMWi

Contact for R&D projects:
Project Management Agency Juelich

BMVBS

NIP coordinator and contact for demonstration projects:
National Organisation Hydrogen and Fuel cells **NOW**

Funding programmes related to fuel cell technology

- Institutional funding
- **Energy research programme**
  - About 25 Mio € per year
- National innovation programme
  - 500 Mio € from 2006-2015 for demonstration part
- Energy and climate fund
  - Since 2011 (CO2-certificates and taxes on nuclear fuel elements)
- Special calls with deadlines
  - e.g. energy storage programme 200 Mio €
  - Power grid
  - Electro mobility
- Funding by 16 German states
- European funding programme
  - FCH Joint Undertaking ca. 460 Mio € from 2008-2013

Spain financial support

1. Financial support from the educational administration

2. Financial support from the science and technology administration

Centre for Industrial Technological Development (in Sp. CDTI)
http://www.cdti.es

R&D&I National Plan (National Plan for Scientific Research, Technological development ad innovation)
http://www.micinn.es

Spanish Foundation for Science and Technology (in Sp. FECYT)
http://www.fecyt.es

There are several ways to access support programmes for hydrogen and fuel cells teaching plans but there are not specific channels that favour particularly the transfer of knowledge of that technology.

Italy financial support

Global structure of funds for vocational training

Inter-Professional Funds
http://www.fondinterprofessionali.it/
These funds are directly allocated by the companies with the national institute for social security.
Company can choose different fund manager closer to the type of activity.

European Social Fund (ESF)
www.fondosocialeeuropeo.it
In Italy ESF are managed by the Regional Government through the quinquennial Regional Operative Plan (POR FESR 2007-2013), and each Region delegates the Provincial Government for the operative handling of the training courses

IFTS (Istruzione Formazione Tecnica Superiore)
IFTS funds are managed at National Level by Indire (public entity, www.indire.eu) and then allocated to the Regions. These funds are partly co-financed by the Ministry of Education. In some Regions these funds are assigned to the so called IFTS Poles organized by categories like energy, agriculture and so on.

UK financial support

Vocational Qualifications

✓The Business and Technology Education Council (BTEC) is the British body which awards vocational qualifications. BTEC qualifications are undertaken in vocational subjects ranging from Business studies to Engineering.

✓National Vocational Qualifications (NVQs) are work based awards in England, Wales and Northern Ireland that are achieved through assessment and training. In Scotland they are known as Scottish Vocational Qualification (SVQ). To achieve an NVQ, candidates must prove that they have the ability (competence) to carry out their job to the required standard.

✓The City and Guilds of London Institute (City & Guilds) is a leading United Kingdom vocational education organisation. Two million people every year start City & Guilds qualifications, which span all levels from basic skills to the highest standards of professional achievement

✓Apprenticeship is a system of training a new generation of practitioners of a particular skill. Apprenticeships are now experiencing something of a renaissance and there is currently much more interest in the development of apprenticeships in the UK, this may provide opportunities for Hydrogen and Fuel Cell technologies.

Current examples of vocational training organisations

www.cogent-ssc.com

Cogent is the UK's industry skills body for chemical, pharmaceutical, nuclear, petroleum, polymers and life sciences business, and they also have a key role in meeting the skills needs of emerging technologies.

Part of Cogent is the National Skills Academy (NSA) – (www.process.nsacademy.co.uk)

*The National Skills Academy for **the Process Industries** is an employer-led centre of excellence launched to address skills and training needs throughout the Chemical, Polymer, and Pharmaceutical Manufacturing sectors. The academy works alongside training providers and educational bodies to ensure that more people enter the industry equipped with the skills the industry needs.*

Cogent and the Academy for the Process Industries secured over £2m of support for training in the sector from the Government.

Funding

Apprenticeship funding is available from the National Apprenticeship Service (NAS). *For more about apprenticeship programmes in England, go to: www.apprenticeships.org.uk.*
For more about apprenticeship programmes in Wales, go to www.careerswales.com
For more about apprenticeships in Scotland, go to www.skillsdevelopmentscotland.co.uk

Skills Funding Agency – in partnership with the UK Government Department for Business, Innovation and Skills (BIS)
The Skills Funding Agency is a partner organisation of the Department for Business, Innovation and Skills (BIS) and it exists to fund and promote adult further education (FE) and skills training in England.

Scrivere ancora qualcosa!!!!!

France financial support

The system of education in France

✓ Main Education:

The public universities, technical schools, engineering schools are financed by the State.
Some masters, or professional courses are developed in cooperation with industry, and include a module on hydrogen for energy storage.

✓ In-service Training:

Regarding the in-service training, the financing can come from a number of different sources both public or private. A technician can be trained to the new technologies of hydrogen and fuel cells if his company asks him to follow an adequate training course or if he finds one by him-self.

✓ Research Centers:

The laboratories of Grenoble, Belfort, Nancy and Toulouse have developed specialised competences, and benefit from the support of the industrial field
→association AFHYPAC : the French association for hydrogen and fuel cells which supports and communicates on formation in hydrogen and fuel cell and proposes documentation on hydrogen and fuell cells on their website www.afh2.org

Turkey financial support

Most of the educational activities are sponsored by the Ministry of Education as proposals submitted to them. Hydrogen and fuel cell research in Turkey is mainly funded by Turkish Scientific and Technical Research Council (TUBITAK) on national and international level.

Name of the funding program:	**ALL EUROPEAN PROGRAMS** Scholorship Programs for Undergraduate, Graduate and Psot-doctoral Education
Name of the call:	All level of funding (Undergraduate, graduate, post-doctoral and research) under several different names as available in the link.
Start and End of the funding / duration:	Open though out the year.
www-Link to the program / contact information:	http://www.tubitak.gov.tr/sid/1022/pid/547/index.htm
Short descriptuion:	In addition to National funding activities, TUBITAK pprogrammes are divided into three general categories. ▪ *Bilateral Cooperation* ▪ *Cooperation with the Regional and International Organizations* ▪ *Cooperation with the European Union (EU)*
Comments:	Undergraduate, graduate and Posdoctoral educational activities are supported national and international level.

TUBITAK funding on hydrogen and fuel cell education can be obtained either on a national basis by interested parties submitting a proposal or as part of a European base initiative. There is no funding limit specified.