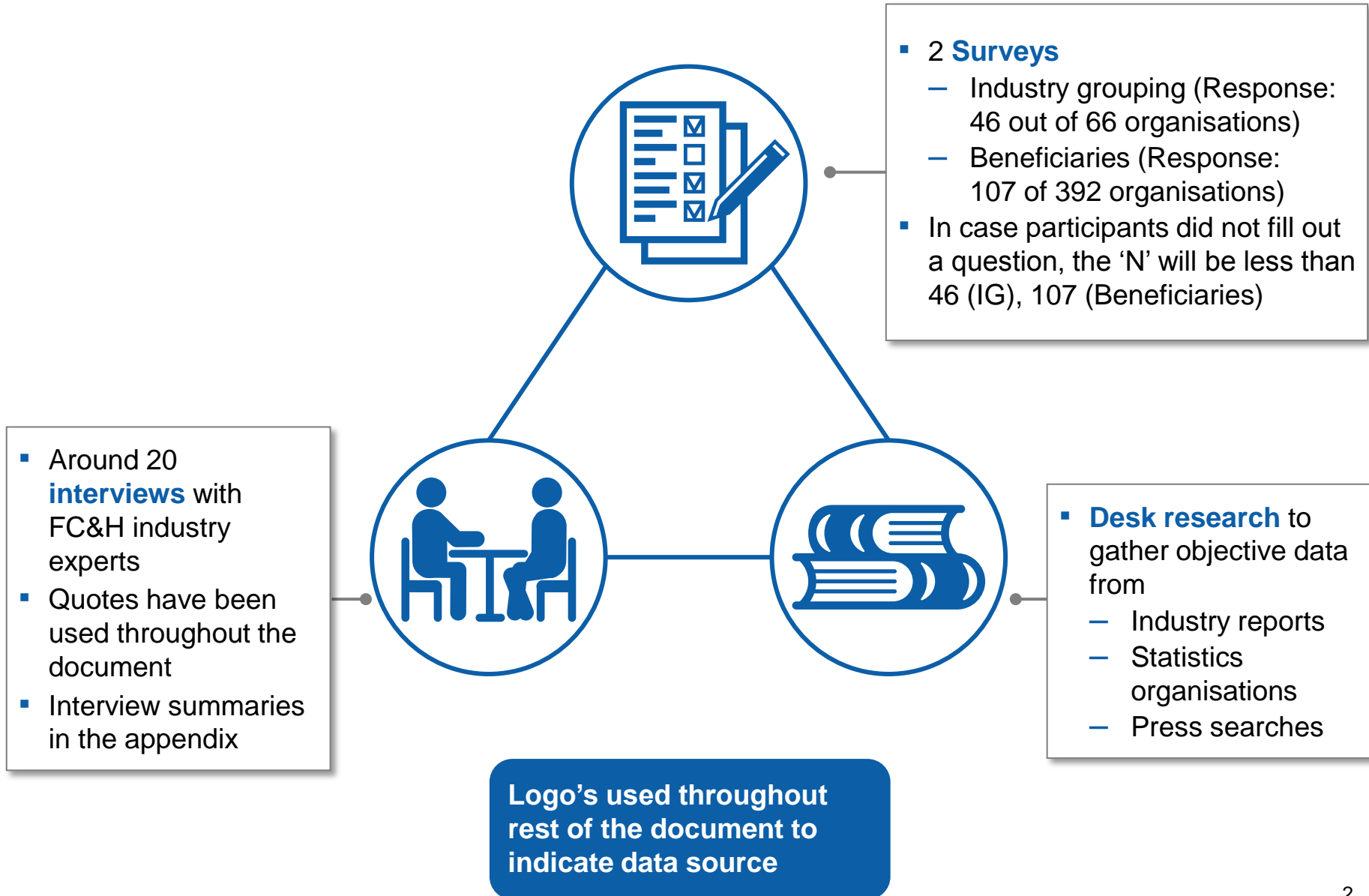


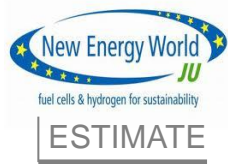
Study on the trends in terms of investments, jobs and turnover in the Fuel cells and Hydrogen sector

Final document
October 5th, 2012

Insights developed in this report are based on 3 sources of information



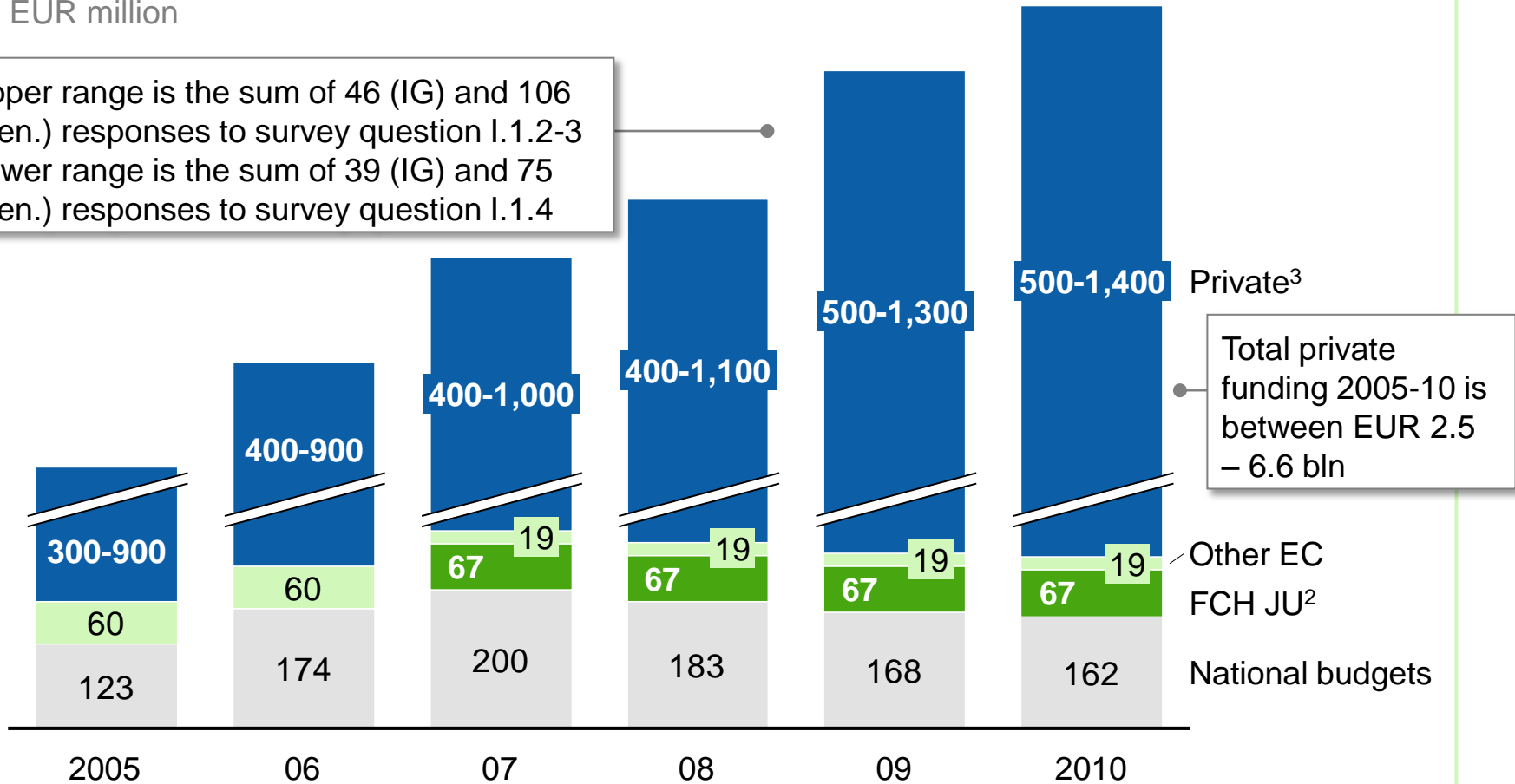
Private funding has been the largest contributor, and growing, while public funding has remained stable



Expenditure for FC&H in the EU¹

EUR million

- Upper range is the sum of 46 (IG) and 106 (Ben.) responses to survey question I.1.2-3
- Lower range is the sum of 39 (IG) and 75 (Ben.) responses to survey question I.1.4



¹ Public support numbers exclude deployment expenditure

² Funding divided uniformly over all years of FP7. In reality, the FCH JU was starting up in 2007 and 08 and funding in those years was lower

³ Note that the survey covered most, but not the entire, industry. Numbers rounded to 100's

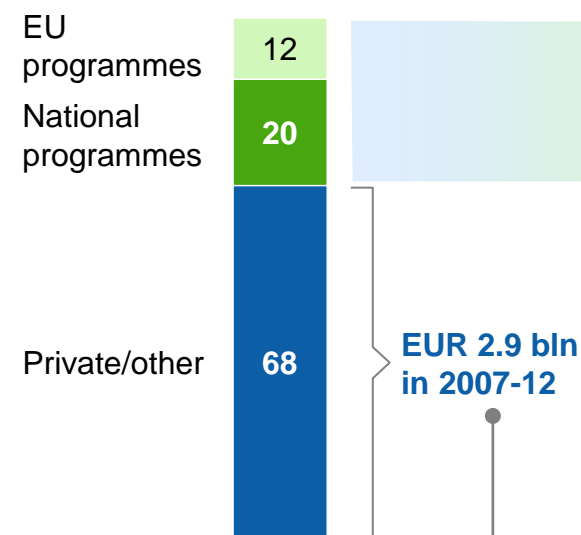


Alternative estimate puts the European private FC&H expenditure at EUR 2.9 bln between 2007-12

Origin of budget for R&D and market introduction/deployment expenditures in 2007-12

Percent, N = 46 (IG), N = 107 (Ben)

100% = EUR 4.3 bln



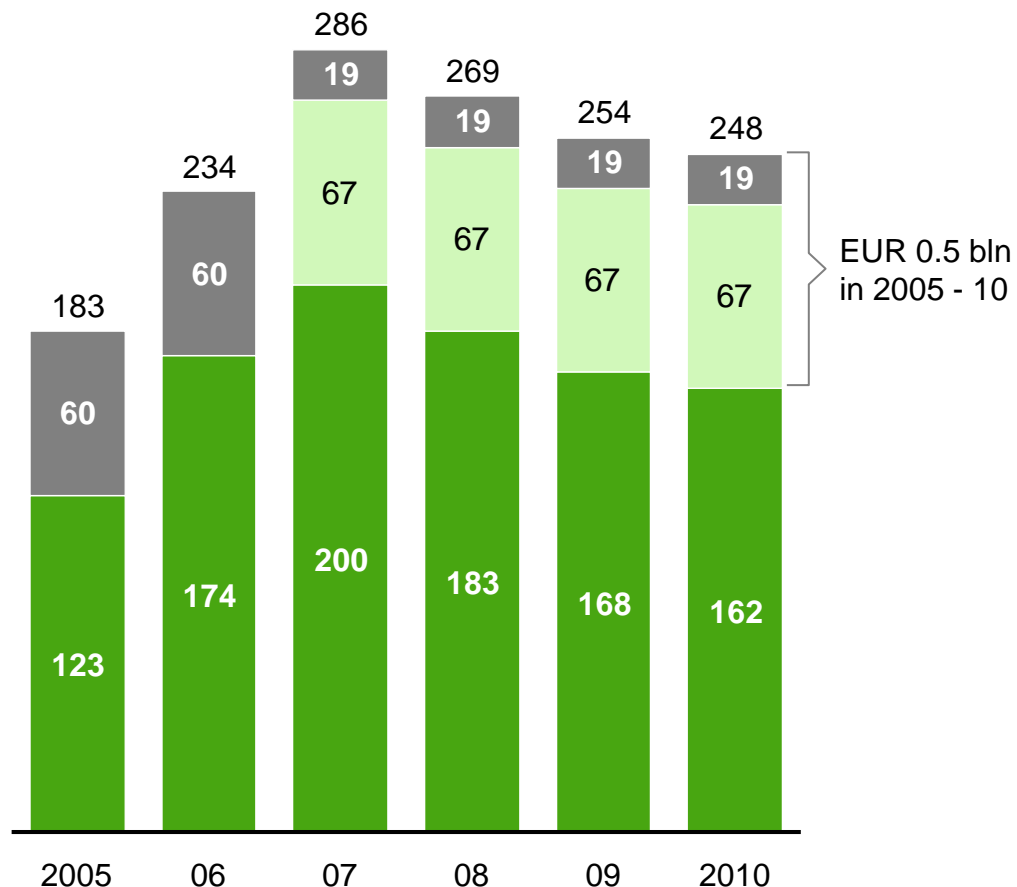
Alternative estimate of private expenditure:

- Total budget of EU programmes = $(67+19) \times 6 \text{ years} = \text{EUR } 516 \text{ mln}$
- Total expenditure = $516 / 12\% = \text{EUR } 4.3 \text{ bln}$
- Private expenditure = $4.3 \times 68\% = \text{EUR } 2.9 \text{ bln}$

Public support for FC&H in the EU¹

EUR million

Other EC FCH JU² National budgets



¹ Public support numbers exclude deployment expenditure

² Funding divided uniformly over all years of FP7. In reality, the FCH JU was starting up in 2007 and 08 and funding in those years was lower

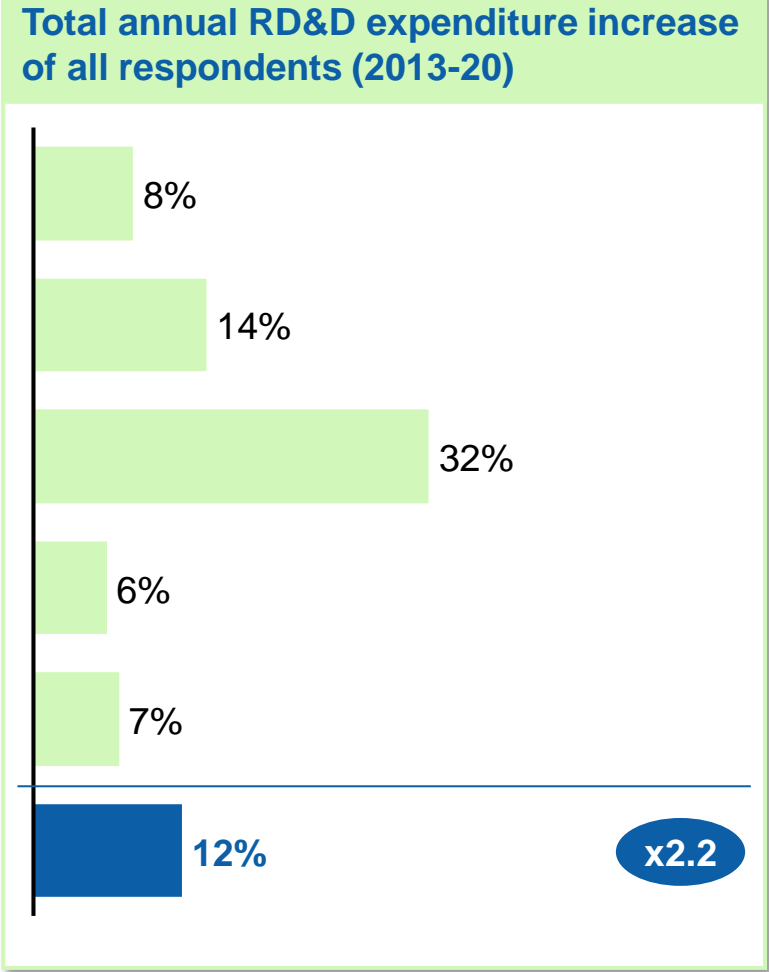
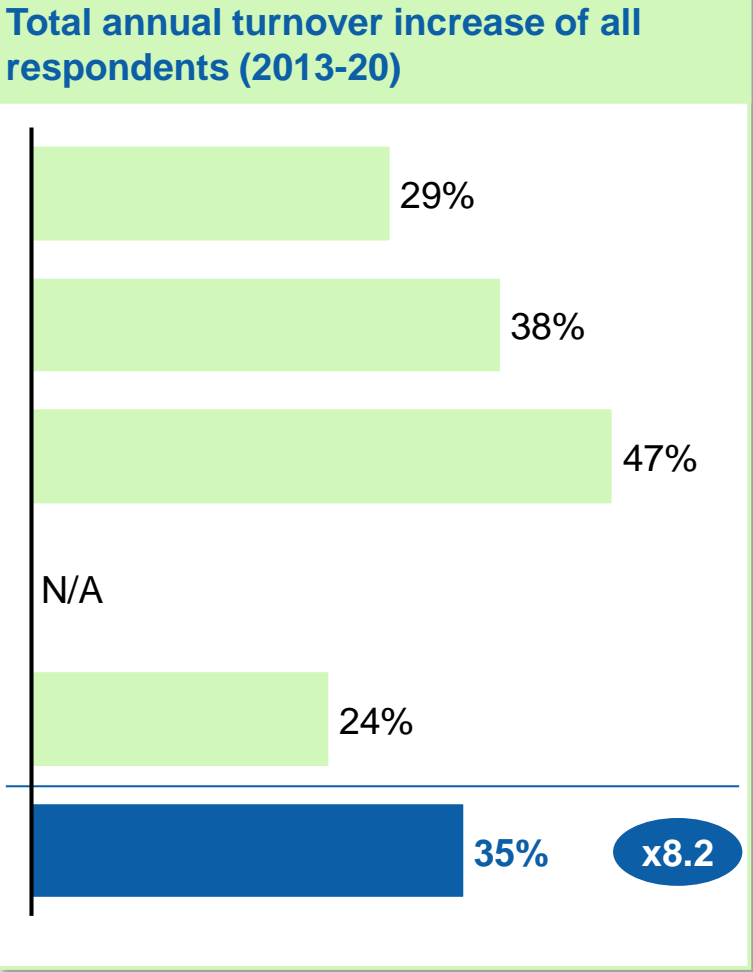
Respondents expect rapid growth in turnover and RD&D in all sectors

CAGR¹, N = 33 (IG), 30 (Beneficiaries)



xY.Y

Total increase in annual amount from 2013 to 2020



1 CAGR = Compound Annual Growth Rate

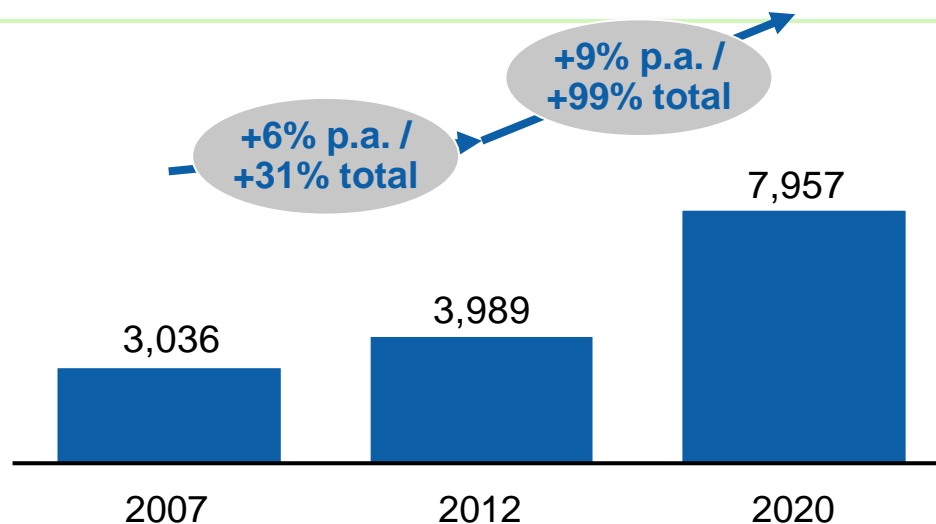
SOURCE: FCH JU survey

As a result, job creation is expected to increase to 9% per annum

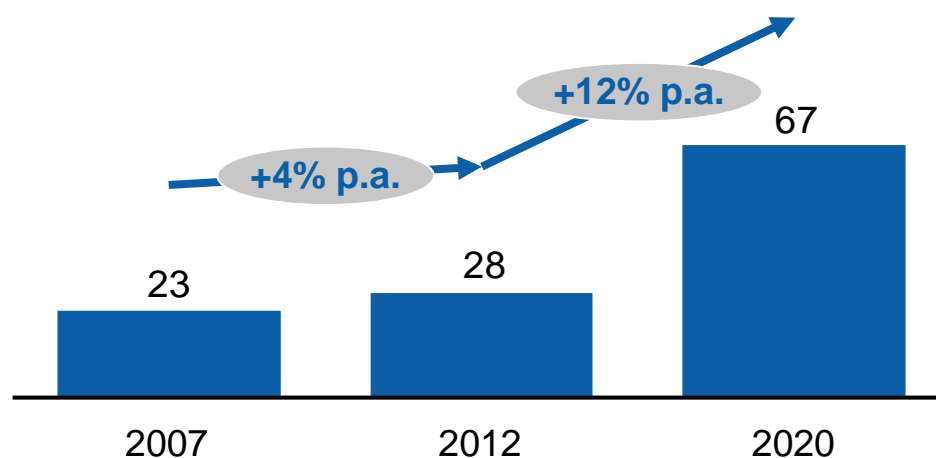
N = 46 (IG), 107 (Beneficiaries)



Growth of employment at respondents is expected to speed up till 2020
Number of FTE



Average number of people per respondent organization
Number of FTE



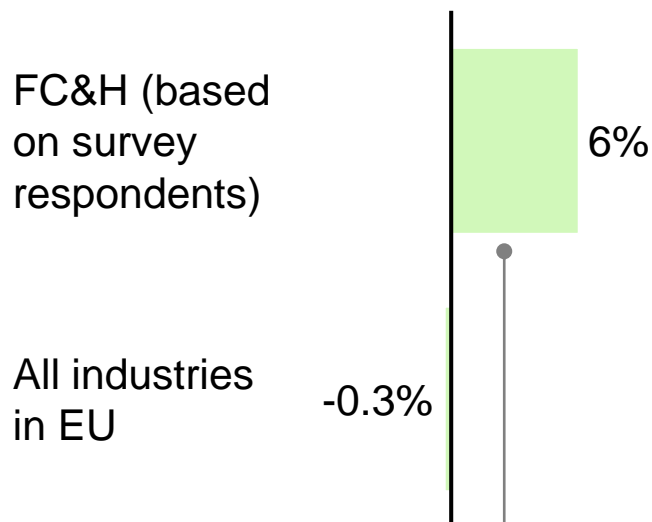
Employment and number of patents granted in the EU FC&H sector outpaced the average economy



Growth of employment in the EU

CAGR¹ 2007-2012

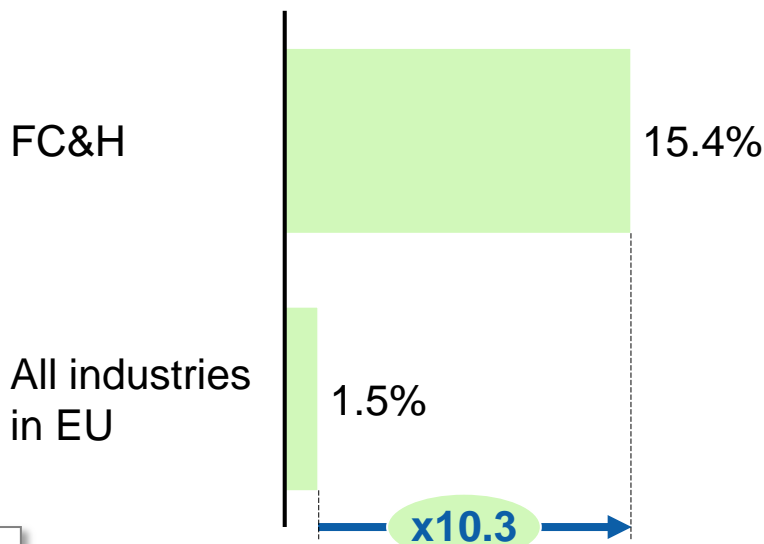
N = 106



Employment in the FC&H sector at survey respondents increased from 3036 FTE in 2007 to 3989 FTE in 2012²

Growth in patents granted in the EU to EU companies

CAGR¹ 2005-2010



¹ CAGR = Compound Annual Growth Rate

² These figures exclude associated employment at, e.g., suppliers, and substitution effects

Success for the European FC&H sector requires addressing and overcoming several critical challenges



Challenges facing the FC&H industry

- 1 **Commercialisation timeline** systematically falls behind estimates, leading to uncertainty for investors and customers
- 2 **Chicken and egg problem** – Large infrastructure investments necessary for FC&H transport sector to materialize, and vice versa
- 3 **Nascent, not yet commercial, industry** still requires support
- 4 **Competition of investment** flowing to US and Asia requires stable EU investments to ensure (future) jobs and deployment
- 5 **Low public awareness** and press for FC&H technology

4 Competition from other regions is strong, with Europe public funding behind the Americas

Governmental RD&D budgets for FC&H¹

EUR millions



“Installations of large stationary fuel cell power systems to date have mostly been in the USA and South Korea, and both these markets are experiencing rapid growth”
– Fuel cell today industry review 2012

“US lost momentum – and Korea/Japan are too closed; EU is progressing fast, it will be a pilot market; activities of FCH JU are showing results”
– Car manufacturer

“The US shale gas boom has reduced the focus on efficient use of fossil fuels. This might lead to a less attractive R&D and investment climate in the US – with potential spill-overs to the EU”
– EU government

“Germany is almost at Japan/Korea level; NOW with very important role; the rest of Europe, particularly Southern Europe, has almost zero momentum”
– EU Car Manufacturer

1 In 2010 EUR terms and exchange rates

2 US and Canada

3 Australia, Japan, Korea and New Zealand

Considering past achievements and improvement points, IG survey respondents favour a modernized JU going forward

■ Significantly negative ■ Neutral ■ Significantly positive

There are 4 things the FCH JU has done exceptionally well

Stability

"There is stability and long term commitment. Without the FCH JU, our board would have already exited the business"

One voice

"The FCH JU creates enormous leverage – it provides one strong united voice to policy makers and to stakeholders abroad" – O&G Company

Central focal point

"It is a vehicle to build coalitions – without the FCH JU, H₂M would not be there"

Strong support

"FCH JU delivers support that local nor private programs can give"

The FCH JU should also improve on a few things

Over-arching strategy

"FCH JU needs to think of a combination of programs with national programs" – Domestic heat & power manufacturer

First success

"The FCH JU will fail if H2M does not make it"

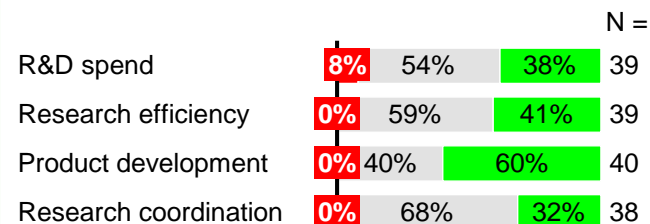
Execution speed

"The FCH JU funding application process is more complex and time consuming than EC programs such as FP7, and has a lower funding rate"

IG survey respondents expect a modernized JU to have a positive impact going forward

Survey question: How would a modernized JU impact the following items?

Number of survey responses, IG only



Characteristics of a modernized JU

- Multiannual budget commitment by the EU
- Implementing body: JU, Programme Office
- Support activities for innovation and early deployment as in Horizon 2020
- Multiannual strategic research agenda:
 - Defined by IG & RG
 - Decided jointly through the Governing Board
- Annual research priorities (topics)
 - Defined by IG & RG
 - Decided jointly through the Governing Board
- State Representatives Group with a greater possibility to contribute
- Implementing rules as in Horizon 2020, with simplified admin compared to current JU
- International cooperation: JU / Commission