

SUMMER SEMINARY SESIÓN TR@NSENER

Innovación y transición energética:
Principales conclusiones del estudio
“An overview of innovation in the energy sector
for the e-sudoe region”

José García-Quevedo
Investigador de la Cátedra de Sostenibilidad Energética de la UB



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R&D AND INNOVATION IN ENERGY IN SPAIN

- “From a peripheral phenomenon, innovation now is central to fundamental shifts in the power sector” (Eurelectric, 2013)
- “Accelerating clean energy innovation... innovation is a key area...” (European Commission, 2016)
- Spanish Strategy for Science, Technology and Innovation 2013-2020. “Secure, efficient and clean energy”



- R&D and innovation key issues to face the challenges of the energy sector (environment, efficiency, competitiveness)
- Knowledge about R&D and innovation of energy firms is still insufficient (incentives, innovation objectives, obstacles, effects public policies...)
- Lack of knowledge about R&D in energy in manufacturing firms (non-energy firms)



An overview of innovation in the energy sector for the SUDOE regions: The situation in Spain

- R&D in utilities in Spain: Main data and some determinants
- R&D in energy in non-energy sectors
- Some conclusions and public policy implications



R&D IN ENERGY FIRMS IN SPAIN

- Exploit available databases (Technological Innovation Panel, PITEC, Spanish version of CIS)
- Create new sets of data (merging different sources): R&D, environment, taxes, emissions
- Specific treatment of data (Spanish Institute of Statistics)



R&D IN ENERGY FIRMS IN SPAIN

TABLE 1. R&D AND INNOVATION IN ENERGY. 2016.

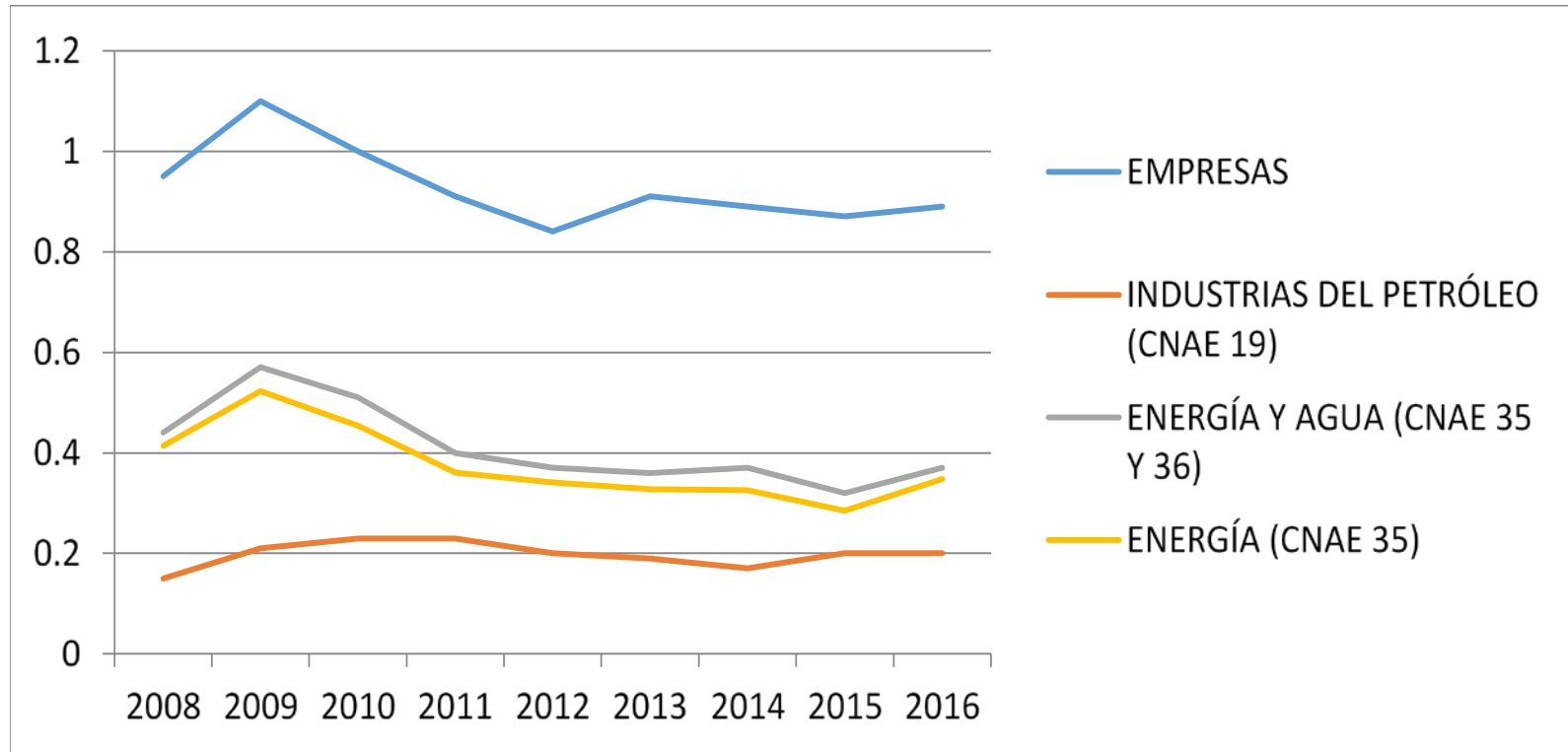
	Petroleum industries	Energy and water	Total firms
Firms that perform R&D	5	86	10,325
Internal expenditure on R&D (thousands of euros)	61,464	131,206	7,125,973
Employees in R&D (FTE)	414.4	1,237.1	90,129
Purchase of R&D services (thousands of euros)	20,348	85,627	1,852,538
Innovative firms	6	134	18,475
Percentage of innovative firms	71.43	21.55	12.75
Innovation intensity	0.20	0.37	0.89

Source: INE and own elaboration



R&D IN ENERGY FIRMS IN SPAIN

Figure 1. Innovation intensity (Innovation expenditure divided by the firm's sales. In %).

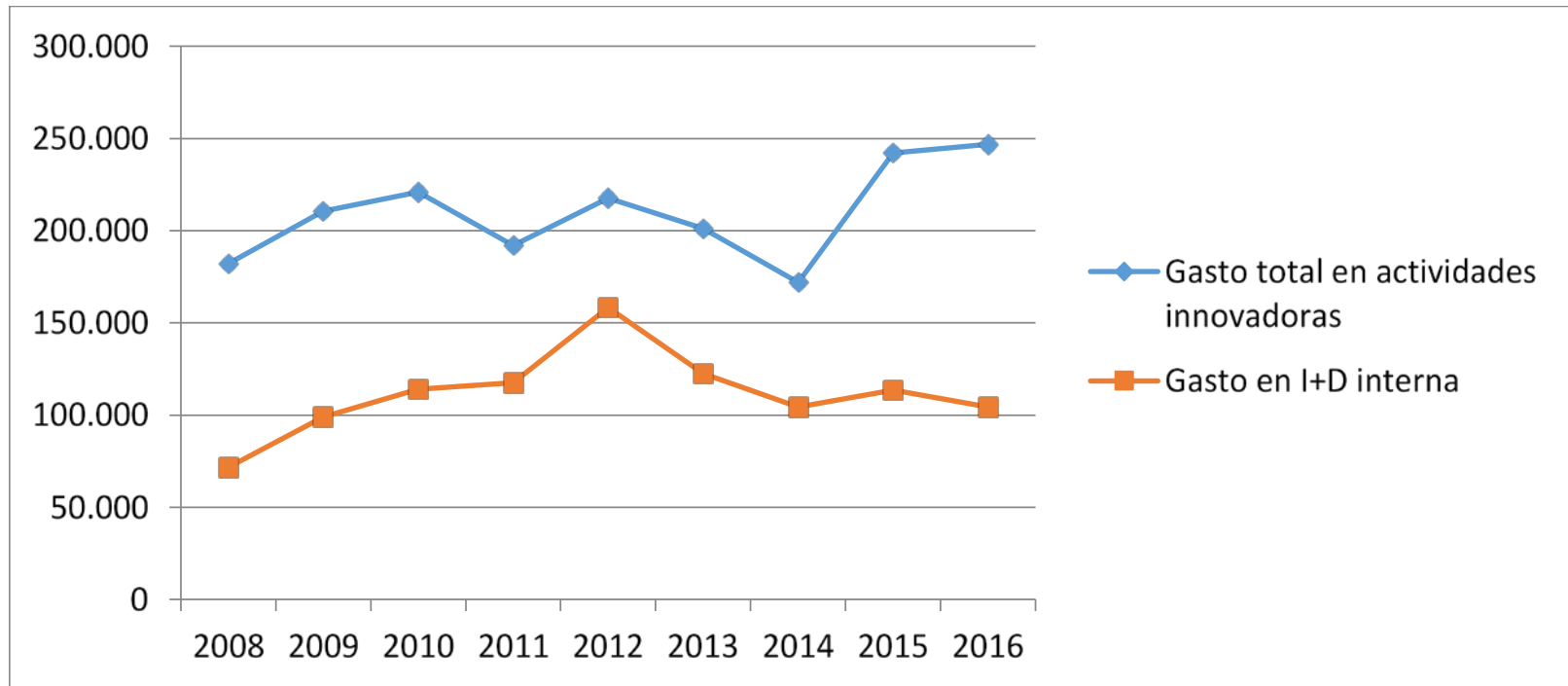


Source: INE and own elaboration



R&D IN ENERGY FIRMS IN SPAIN

Figure 2. Innovation and R&D expenditure. Electricity, gas, steam and air conditioning supply (NACE Rev. 2. 35). Thousands of euro

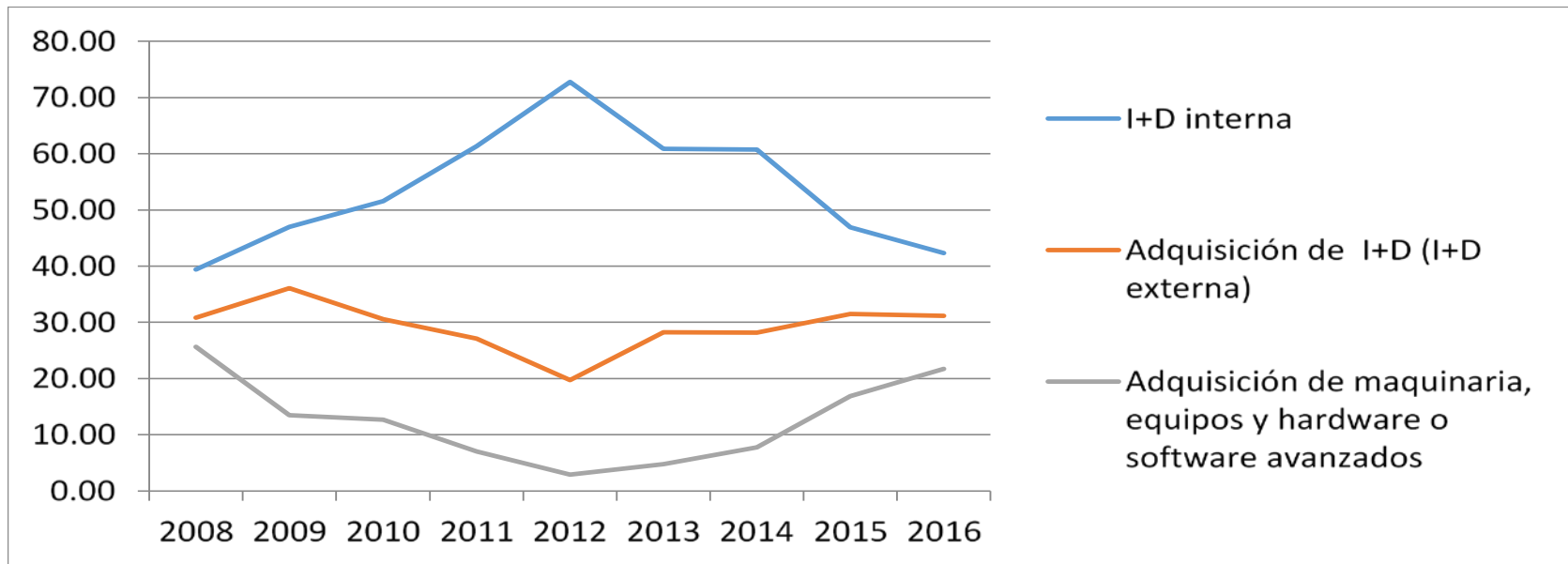


Source: INE and own elaboration



R&D IN ENERGY FIRMS IN SPAIN

Figure 3. Internal R&D, external R&D, acquisition of advanced machinery, equipment and software (As percentage over total innovation expenditure).



Source: INE and own elaboration



R&D IN ENERGY FIRMS IN SPAIN

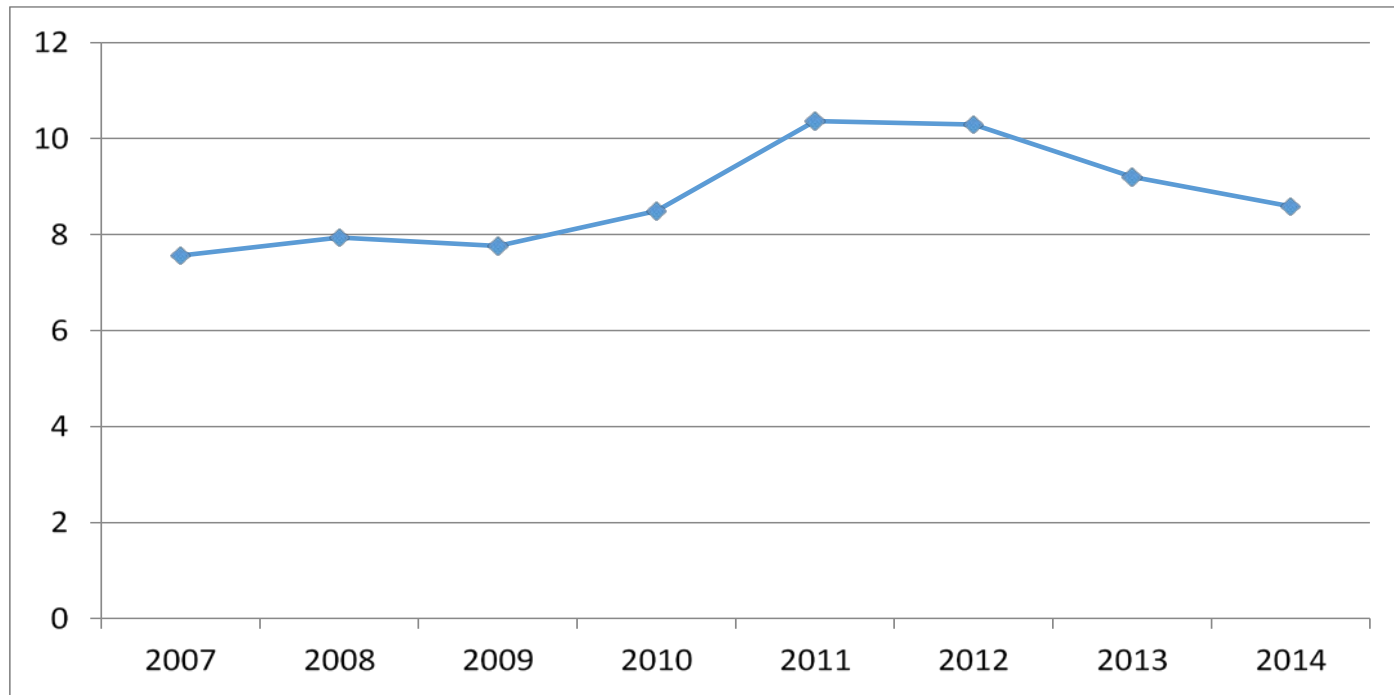
Drivers of R&D and innovation investment (Costa et al. 2019)

- Persistence of R&D and innovation investments
- Internal and external R&D related with environmental impact and regulation
- Acquisition of advanced machinery with process innovation (flexibility and capacity)
- Complementarity between internal R&D and acquiring R&D



ENERGY R&D IN NON-ENERGY FIRMS

Figure 4. R&D expenditure in energy (as percentage over business internal R&D)



Source: INE and own elaboration



ENERGY R&D IN NON-ENERGY FIRMS

- All manufacturing sectors part of their R&D into production, distribution and rational use of energy, SEO 5, OECD
- Main sectors: Electrical equipment (21.9%), Machinery and equipment (14.5%), Computer, electronic products (11.7%)
- Costa and Garcia-Quevedo (2019). Reasons to invest in manufacturing sectors:
 - Importance of the suppliers
 - No energy efficiency (acquisition of machinery)



CONCLUDING REMARKS AND PUBLIC POLICY

- Investment in R&D in energy is still small to face the challenges
- Different agents (private and public): utilities, suppliers, public policy....
- Technological advances could be favoured by collaboration (system of innovation, open innovation)
- Reinforce public intervention to increase innovation (market failures, disruptive innovations, long periods of research, collaborative R&D)



REFERENCES

- Costa-Campi, M.T., Duch-Brown, García-Quevedo, J. (2019). Innovation strategies of energy firms. Corporate Social Responsibility and Environmental Management, 2019. <https://doi.org/10.1002/csr.1787> (in press).
- Costa-Campi, M.T., García-Quevedo, J. (2019). Why do manufacturing industries invest in energy R&D? Economics of Energy & Environmental Policy (forthcoming).

