Programa Marco de la EU: H2020
Plataforma tecnológica Europea (SNETP)

ASAMBLEA GENERAL del CEIDEN 15 octubre 2015

E. González (CIEMAT)

1) Horizonte 2020 – Euratom Fisión
   a) Convocatoria 2014/2015
   b) Convocatoria 2016/2017 acciones indirectas
   c) Otras acciones y financiación por el EIB (InnovFin)
2) Novedades SNETP
   1) Información de la plataforma
   2) Objetivos de la SNETP
   3) Visita del presidente del Governing Council a la SNE
   4) Deployment Strategy
   5) ESNII
   6) Colaboración SNETP-CEIDEN

Horizonte 2020 – Euratom Fisión: Convocatoria 2014-2015

Event	Date
Adoption Leg	11/12/2013
Publication ...	11/12/2013
Deadline NFF	17/09/2014 @ 17:00
Evaluations .	29/09/2014 – 18/01/2015
Negotiations	19/01/2015 – 18/05/2015
Deadline NFF	20/11/2014 @ 17:00
Grant Agreement signature.....	05/2015
First projects launched	01/04/2015 (fixed date)

69 proposals...
Total Costs 382 Mi€
EC Requested 233 Mi€

22 projects selected
Total Costs 129.6 Mi€
EC Funded 102 Mi€*
+ 1 reserve list 2.5 Mi€

* **Incl. JHR Access rights**

http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/calls/nfrp-2014-2015.html

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

~ 20% **Geological disposal**

~ 40% **Reactor systems**

- Safety of existing nuclear installation
- Future nuclear systems for increased safety
- Fuel cycle, Partitioning and Transmutation
- Cross-cutting aspects

~ 20% **Radiation protection**

~ 20% **Research infrastructures**
Training and mobility
Cross-cutting

Grand Total:
Euratom Fission ~ 50 Mi€ / Year
Is ~ 10 % EU Public/Private R&D

European Commission

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/euratom/h2020-wp1617-euratom_en.pdf

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

A - Support Safe Operation of Nuclear Systems

NFRP 1: Continually improving safety and reliability of Generation-II and -III reactors
NFRP 2: Research on safety of fast neutron Generation-IV reactors (ASTRID, …)
NFRP 3: Investigating the safety of closed nuclear fuel cycle options and fuel develops
NFRP 4: Research on the safety of Small Modular Reactors
NFRP 5: Materials and fuel research for Generation-IV reactors

B - Contribute to the Development of Solutions for the Management of Radioactive Waste

NFRP 6: Addressing key priority R&I issues for the first-of-the-kind geological repositories
NFRP 7: Research and innovation on the overall management of radioactive waste other than geological disposal. (ATC, decommissioning/dismantling,...)
NFRP 8: Pan-European knowledge-sharing and development of competence in radioactive waste management

C - Foster radiation protection

NFRP 9: Impacts of low-dose radiation exposure

Varias prioridades propuestas por miembros el CEIDEN
Oportunidad de liderar proyectos

D - Management of research reactor availability in Europe

NFRP 10: Support for the optimized use of European research reactors
NFRP 11: Support for the EU security of supply of nuclear fuel for research reactors

E - Support the development of nuclear competences at EU level

NFRP 12: Support for careers in the nuclear field

F - Fission/fusion cross-cutting actions

NFRP 13: Fission/fusion cross-cutting research in the area of multi-scale materials modelling
NFRP 14: Cross-cutting support to improved knowledge on tritium management in fission and fusion facilities

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

Time schedule H2020-Fission-2016-17

Event	Date
Pre-information PC-Fi WP2016-17	**10/2014-07/2015**
Orientation paper NFRP 2016-17.....	**10/09/2015**
Publication	**14/10/2015**
Deadline	**05/10/2016 (tbc)**
Evaluations ...	**10/2016 – 01/2017**
Negotiations/Finalisation of Grants	**01/2017 – 05/2017**
Grant Agreement signature.....	**06/2017**
First projects launched	**06/2017**

A Single stage call ...

European Commission

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

Other actions

European Investment Bank — The EU bank

B.1: Support for fission research & innovation (R&I) investment projects of pan-European relevance through the InnovFin instrument. Fission Research and innovation investment projects of pan-European relevance need to be supported, on a case-by-case basis by the EIB involving an in-depth analysis of the project consortium composition, business plan and associated revenue streams. Euratom financial contribution will be matched by EIB and could have an overall multiplier effect of around six in terms of volume of EIB loans (estimated at around EUR 240 million overall)

Funding scheme: InnovFin

InnovFin Large Projects

InnovFin Advisory

B – Other actions	Budget 2016-2017	Budget Total
B.1 InnovFin (indicative)	**x-20**	**20**
EIB Direct lending (indicative)	**EUR 25-300 million/proj.**	
Nuclear Fission projects budget (2016-2018)....	**EUR 240 million (estimated)**	
Total Projects costs (indicative) (Maximum EIB lending at 50%)	**EUR 480 million (estimated)**	

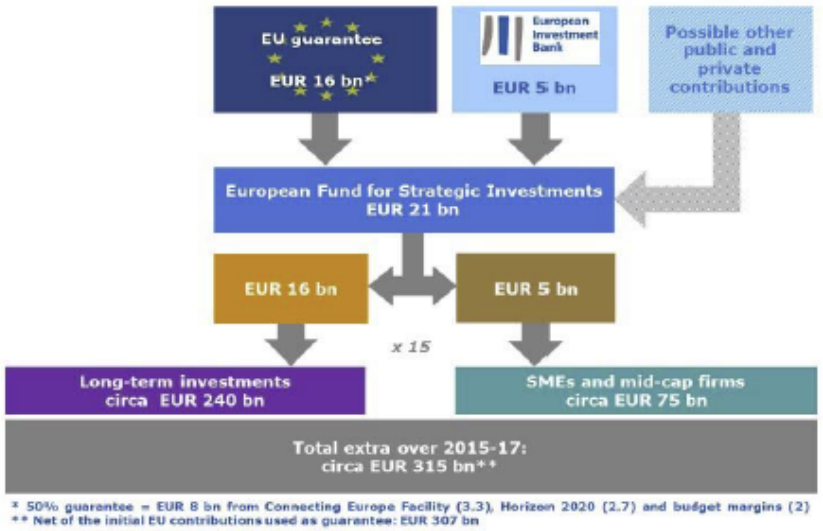
European Commission

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

New 2015-2017 …EU Investment Plan for Europe

European Commission

A new European Fund for Strategic Investments (EFSI)



* 50% guarantee = EUR 8 bn from Connecting Europe Facility (3.3), Horizon 2020 (2.7) and budget margins (2)
** Net of the initial EU contributions used as guarantee: EUR 307 bn

The **Investment Plan has the potential to add €330 to €410 billion** to the EU's GDP and **create 1 to 1.3 million new jobs** in the coming three years.

Member States providing the joint Commission-EIB Task Force with the list of projects according to three key criteria:

1. EU value-added projects 2. Economic viability and value 3. Projects that can start at latest within the next three years
And listed projects should have the potential to leverage other sources of funding. They should also be of reasonable size and scalability

LAUNCH PRESS RELEASE http://europa.eu/rapid/press-release_IP-14-2128_en.htm
WELCOME http://ec.europa.eu/priorities/jobs-growth-investment/plan/index_en.htm
Communication EUR-LEX http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2014:903:FIN
Related DOCS http://ec.europa.eu/priorities/jobs-growth-investment/plan/documents/index_en.htm

Horizonte 2020 – Euratom Fisión: Convocatoria 2016-2017

New 2015-2017 …EU Investment Plan for Europe

European Commission

December 2014 / January 2015

- The European Council and the Parliament should endorse the Investment Plan for Europe, including the decision to set up a European Fund for Strategic Investments and agree to fast-track the adoption of the relevant regulation.
- The Commission proposes the regulation in January 2015.
- The Parliament and Council discuss the regulation with a view to ensure its entry into force by June 2015.
- The European Investment Bank Group starts activities using its own resources.
- Member States should finalise the programming of European Structural and Investment Funds to maximise impact.
- Project identification is accelerated at EU level, based on the report of the Commission-EIB Task Force.
- First steps are taken by the EIB and key stakeholders to build an investment advisory "Hub".

By mid-2015

- The new European Fund for Strategic Investments is operational.
- The European Structural and Investment Funds produce their impact, in synergy with EU programmes.
- A transparent pipeline of projects is in place at EU level, which will be developed over time.
- The new investment advisory "Hub" is operational.
- Follow-up activities have started at EU, national and regional levels, together with relevant stakeholders.
- A dedicated website allows to monitor progress on the Investment Plan in real-time.

By mid-2016

- Progress will be reviewed, including at the level of Heads of State and Government.
- Further options may be considered ahead of the mid-term review of the Multi-annual Financial Framework.

- **Strategic infrastructure** including digital, transport **and energy** in particular energy interconnections and urban development
- **Education, research and innovation**
- **Environmentally sustainable projects**, expansion of renewable energy and resource efficiency
- **Smaller businesses**

EIB EFSI infos http://www.eib.org/about/invest-eu/index.htm

SNETP

SNETP
Sustainable Nuclear Energy Technology Platform

- SNETP was **set up in 2007 under the auspices of the European Commission, to gather stakeholders building a common vision: industry, research centres, safety organisations, universities, non-governmental organisations, SMEs, etc.**

- SNETP's official **European Technology Platform label was renewed in 2013.**

- The overall goal is to **support technological development for enhancing safe and competitive nuclear fission in a sustainable energy mix, as part of the EU's SET-Plan**
  - Low greenhouse gas emissions
  - Security of energy supply for Europe
  - Stable electricity prices

- R&D is necessary to **further enhance the safety and sustainability of nuclear fission, and to open new markets**

- SNETP has expressed its **strategic orientations around three technological pillars, and launched task forces to implement them**

www.SNETP.eu

SNETP

Pan-European fission R&D and the role of SNETP?

1. Jointly share and develop best-practice to ensure safe operation of existing nuclear facilities
2. Enable assessment of new technologies through pooling resource (finance, intellectual) and sharing of infrastructure
3. Promotes pan-European industry engagement in globally competitive markets
4. Enables coherent approach within Europe and externally when facing international partners
5. Facilitates EU harmonisation, particularly for safety
6. Enhances researcher education, training and EU mobility

SNETP is in line with its expected ETP role (as defined by the EC):

1. Deliver “Research and innovation agendas”: SRA in 2009, SRIA in 2013
2. Act as “Open innovation platform”: ESNII, NUGENIA, NC2I bring together actors of industry & research
3. Ensure “Partnership with MS and MS based platforms”: dialogue is ensured via individual members, joint programming happens in practice

Situación SNETP

- Buena relación entre SNETP y CE. CE tiene en cuenta propuestas de SNETP para identificar las prioridades de sus convocatorias.
- SNETP+ESNII ya cumplen con las funciones de la nueva estructura propuesta por le CE European Technology and Innovation Platforms (ETIPs).
- The European Nuclear Gen II, III, IV Days, en Brussels del 17-19 Marzo 2015, organizado por SNETP, NUGENIA, ESNII y NC2I.
- Nominación nuevo Governing Board 10/11/2014.
- El mandato del Ex Com extendido hasta el 04/2016
- Financiación secretariado: parte básica con cuotas – Program. y difusión: **SPRINT**
    - Cuotas: (Industria: 2000 €/a Univ+I+D: 1000 €/a SME: 500 €/a)
- Contribuyendo al ***Update on the SET-Plan Integrated Research Roadmap***
- ***La SRIA y DS de la SNETP referencia para el NI2050 (NEA)***
- Actualización del "**Deployment Strategy**" (de la Tecnología Nuclear y su I+D)

The structure of DS 2015

SNETP
Sustainable Nuclear Energy Technology Platform

OUTLINE

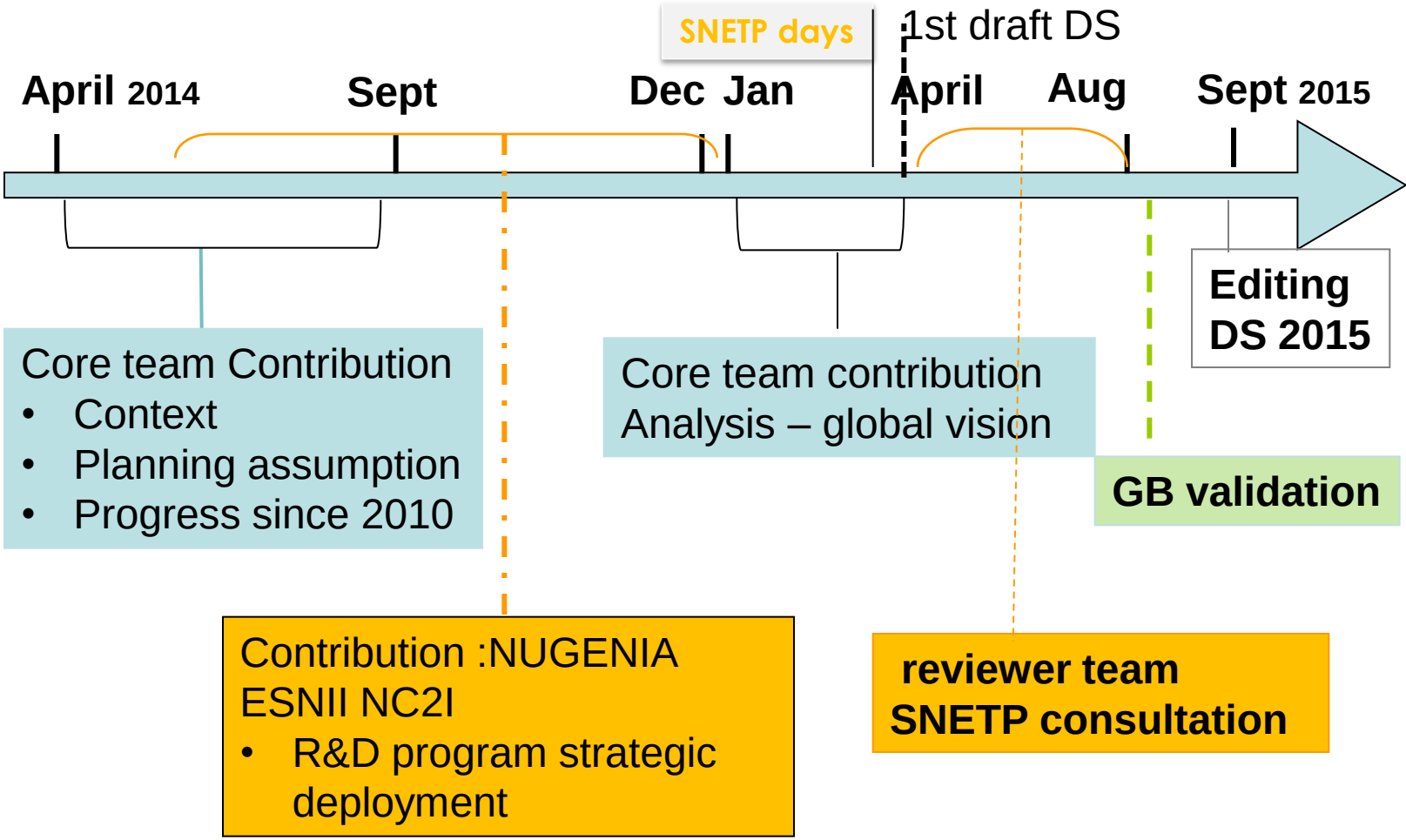
- **Elements of context**
- **Challenges and planning assumptions for nuclear energy**
- **Major progress since last DS 2010**
- **Strategic vision for Research & Innovation deployment**

  NUGENIA – ESNII - NC2I
- **Integrated vision and global deployment for SNETP**

Appropriate R&D program contribution to reinforce the role of nuclear energy :

- Low carbon electricity generation
- Secure supply chain – competitive price of electricity
- Mature and reliable technology
- Continuously enhanced safety

Planning for DS release



Core team formed with representatives from:
SNETP ExCom – NUGENIA – ESNII – NC2I

DS 2015 outline

- **Elements of context**
  - Electricity demand evolution worldwide till 2050
    - Breakdown per technology
  - Energy policy for Europe
    - EC targets: 2020 – 2030 - 2050
      - Evaluation of different low carbon scenarios :
        mix energy - share of nuclear electricity around 15%-20%
  - The nuclear electricity market evolution
    - Country specific energy policy
    - Renewable resources
  - Societal challenges for nuclear products
    - Public acceptance
    - Environmental impact
    - Education & training- knowledge management
    - Growth – jobs

Input from
- **EC publication**
- **ENEF**
- **FORATOM**
- **OECD/NEA**
- **IAEA**

DS 2015 – outline (cont'nd)

SNETP
Sustainable Nuclear Energy Technology Platform

❑ Challenge and planning assumptions for nuclear energy

- Nuclear systems technology drivers : **safety & performance**
- Technology evolution of the products
  - Gen II-III (LWR technology) : **EU fleet ageing** **New build**
  - Gen IV : sustainable fuel cycle **Industrial deployment ≈ 2050**
  - Co generation: **Process heat application**
- Fuel cycle –and waste management

Key issue for supporting the product evolution
→ Switch from LWR to Fast Neutron reactor

- Decommissioning & dismantling **Reactor & fuel cycle facilities**
- Energy Mix
  - Increased share with renewable energy set out new requirements for NPP
    - operation mode - usage factor
    - fuel management – cost economics
  - Market sizing on nuclear power generation to be installed

flexibility

Prioritization of R&D program for each pillar

Detailed tables– technical objective –challenge - milestone

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- **NUGENIA milestones: 5-10y 10-15y 15- 25 years**
  - Prioritization according to 8 high level objectives crossed with the priorities of the 8 TAs:

- **Base techno** : *structural component – fuel - systems – operations (normal & accidental)*
- **Drivers:** *enhanced safety – performance – harmonization - innovation*

- **ESNII milestones: 10y 20y 30y**
  - Prioritization between the prototypes development AND roadmap for each prototype
  - Fast reactor MOX fuel fabrication and recycling
  - Transmutation

- **NC2I milestones: 5y 10y 20y**
  - Roadmap for nuclear prototype construction: HTR
    - » Technology R&D in support : material – fuel – power conversion system – waste management
  - Nuclear process steam supply system and transport

Priorización entre actividades de NUGENIA

High level objective	Technical objective	(TA specific) challenge	Expected major milestone (T0 + X y)
Improve safety in operation & by design	Minimize the impact of internal and external loads and hazards on the safety functions	Improve methodologies to assess impact on barriers, structures, systems and components considering single and multiple events,	T0 + 5 - 10y
	Eliminate accidental sequences that could yield in very important consequences	Developing methods to better assess the probability of rare events and their consequences	T0 + 5 - 10 y
	Develop advanced safety assessment methodologies	-Integrating deterministic and probabilistic safety assessments in order to better quantify safety margins with best estimate methods -Dynamic PSA	T0 + 10 y
		Implementation of stress test in Europe	T0 + 5 - 10 y
	New systems for mitigation of consequences of severe accidents	-Identification of solution -Validation & qualification	T0 + 5 -10 y
High reliability & optimized functionality of systems	Operational excellence	Innovative asset management approaches, sharing of best practices	T0 + 5 - 10 y
	Reliability and security of digital systems	Maintaining the necessary cybersecurity level by continuous improvement	T0 + 5 - 10 y
	Reliability of NPPs as complex socio-technical systems	Development of system resiliency concept (interaction of safety- human organization capabilities– I&C systems)	T0 + 5- 10 y

peak of activity

Integrated vision of SNETP Gen II III IV Co-generation - Best case scenario

SNETP Deployment Strategy

T(y): objective achievemen	2015	2020	2025	2030	2035	2040	2045	2050
LWR European fleet	Plant life time management		Long Term Operation		NPPs age > 50 years in 2035			
	new build				in average 100 units in EU			
		decommissioning & dismantling		NPP & fuel cycle facility				
FUEL CYCLE open	direct disposal of spent fuel							
partially close	MOX fuel for mono recycling in LWR and deep geological repository							
closed		MOX fuel for Fast Neutron Prototype						
			MOX Multi recycling facility prototype for FNR					
transmutation			MA bearing fuel irradiation at lab scale					
			basic design & license MA bearing fuel facility - fabrication of MA fuel assembly					
PROTOTYPE ASTRID	Basic Design/Lic	Construction	commissionning & operations				*SFR FOAK*	
MYRRHA	Concept/Pr	Basic Design/Lic	Construction	commissionning & operations				
ALFRED	Concept/PreLicensing		Basic Design/Lic	Construction	commissionning & operations			*LFR FOAK*
ALLEGRO	concept viability		Concept/PreLic	Basic Design/Lic	Construction	commissionning & operations		
HTR - cogen	Concept/PreLicensing	Basic Design/Lic	Construction	commissionning & operations				
		steam production System design		steam production unit coupling				
METHODOLOGIES	harmonization of licensing process for new prototypes							
	harmonization of licensing new build :		LWR -			FNR -		other
	small modular concept: construction techniques - safety approach							
LWR -FNR-cogeneration	Flexible operations for existing and next fleet- ensure stability of electricity generation with mix energy sources							
	enhanced safety in operation and by design:		LWR-			FNR-		other
cross cutting issues	**Performance and ageing for long term operation of NPP:**							
	structural integrity - component ageing phenomena -instrumentation - on site monitoring & diagnosis							
BASIC TECHNOLOGY	**high reliability components**							
LWR - FNR - co generation	advanced manufacturing & assembly process - accident tolerant fuel - qualification & control - advanced material & surface engineering							
Mutualization in: capabilities methods & tools	**high reliability & optimized funcionalities of systems**							
	I&C - digital system - cyber security - system resiliency under severe conditions							
innovative technology transfer of knowledge	**Research infrastructure - modelling & numerical simulation - transfer of knowledge**							
	irradiation & hot lab - characterisation capabilities - physical modelling - multi physics & multi scale simulation - severe accident calculation code - education & training							

SNETP contribuye a SET-PLAN Integrated Roadmap y NI2050

SET-Plan / Integrated roadmap / Energy Union

SET-Plan Communication – 10 key actions COM(2015)6317

1. Development, integration 2. Cost reduction	3. Smart home 4. Resilient, secure and smart energy system	5. Energy efficiency in industry 6. In buildings	7. Batteries 8. Renewable fuels	9. CCUS	10. Nuclear

Energy Union Research & Innovation 4+2 priorities COM(2015)80

1. Number one in renewable energy	2. Smart energy system, consumer	3. Develop and strengthen energy efficient systems	4. Diversify and strengthen energy options for sustainable transport	5. CCUS	6. Safety in nuclear energy

SET-Plan Integrated Roadmap themes – 13 and cross-cutting [2014]

	Active Consumers 1. and 2. 1. Engaging consumers 2. Activating consumers	Energy efficiency 3. 4. and 5. 3. Buildings 4. Heating and cooling 5. Industry and services	System Optimisation 6. 7. 8. and 9. 6. Energy grids 7. Energy storage 8. Energy system flexibility 9. Smart cities and communities	Supply 10. 11.12 and 13. 10. Renewable, Heating and Cooling 11. CCS 12. Nuclear Fission 13. Alternative fuels	Cross-cutting Eucation and training Socio-economics Innovative financing

Preparación de actividades de miembros del CEIDEN en proyectos ESNII

Se organizado una reunión (1-2 de Junio de 2015) con el CEA para identificar formas de participación en ASTRID.

En la reunión participaron CIEMAT, Empresarios Agrupados, Iberdrola, Gas Natural Fenosa y Tecnatom.

Se discutieron dos formas de participación como socios industriales (grandes contribuciones) y en el marco de ARDECO (ASTRID R&D European Cooperation).

Se intercambiaron descripciones de necesidades de I+D por parte de ASTRID y capacidades e intereses de las instituciones españolas.

Se discutió en particular de dos propuestas específicas de I+D para los que el CEA proporcionó una descripción del problema, objetivos y alcance.

Todos los participantes encontraron interesante evaluar las propuestas del CEA y seguir discutiendo posibles formas de colaboración en los próximos meses.

Estamos pendientes de preparar una reunión de seguimiento e estas discusiones.

Situación SNETP

El nuevo Governing Council esta fomentando nuevas actividades para la SNETP:

- Dar más valor añadido a los socios aumentando la eficacia en preparación de proyectos y de utilización de recursos de la CE.
- Mayor aproximación e interacción con los representantes oficiales de los M.S. de sus socios para explicarles la Visión, SRIA y DS de la SNETP.
- Objetivo es influir en la definición de los planes nacionales de I+D y en las prioridades de I+D percibidas y defendidas por los representantes oficiales de los M.S. aumentando la coherencia con los objetivos identificados por los miembros de la SNETP en ese mismo M.S., en particular en el SET Plan y otros foros de la CE.
- El presidente del Governing Council hizo una presentación de la SNETP en la reunión Anual e la SNE y mantuvo previamente una entrevista con miembros del CEIDEN.
- La SNETP propuso colaborar con el CEIDEN, en acciones piloto, para identificar herramientas útiles en este objetivo de aumentar la coherencia entre los objetivos de las instituciones implicadas en la I+D y sus plataformas tecnológicas y las prioridades defendidas en organismos oficiales por los M.S.
    - Esto podría incluir la organización de eventos nacionales o europeos de encuentro entre la SNETP, el CEIDEN como plataforma nacional y los representantes oficiales del país en los foros de la EC.