

Future and Emerging Technologies

Proactive Initiatives in FP7 call 5



Future and emerging technologies	ICT 2009.8.4 Human-Computer Confluence	CP (IP only)
	ICT 2009.8.5 Self-Awareness in Autonomic Systems	CP
	ICT 2009.8.6 Towards Zero-Power ICT	CP (STREP only)
	ICT 2009.8.9 Coordinating Communities, Plans and Actions in FET Proactive Initiatives	CSA
	ICT 2009.8.10 Identifying new research topics, Assessing emerging global S&T trends in ICT for future FET Proactive initiatives	CSA

Overview of presentation

1. FET mission
2. Call 5 FET objectives
3. Human-Computer Confluence objective (8.4)
4. Coordination and Support action objectives (8.9, 8.10)
5. Next presentations
 - Self-Awareness in Autonomic Systems (8.5) - R. Martin
 - Towards zero-power ICT (8.6) – R. Stübner

FET Mission

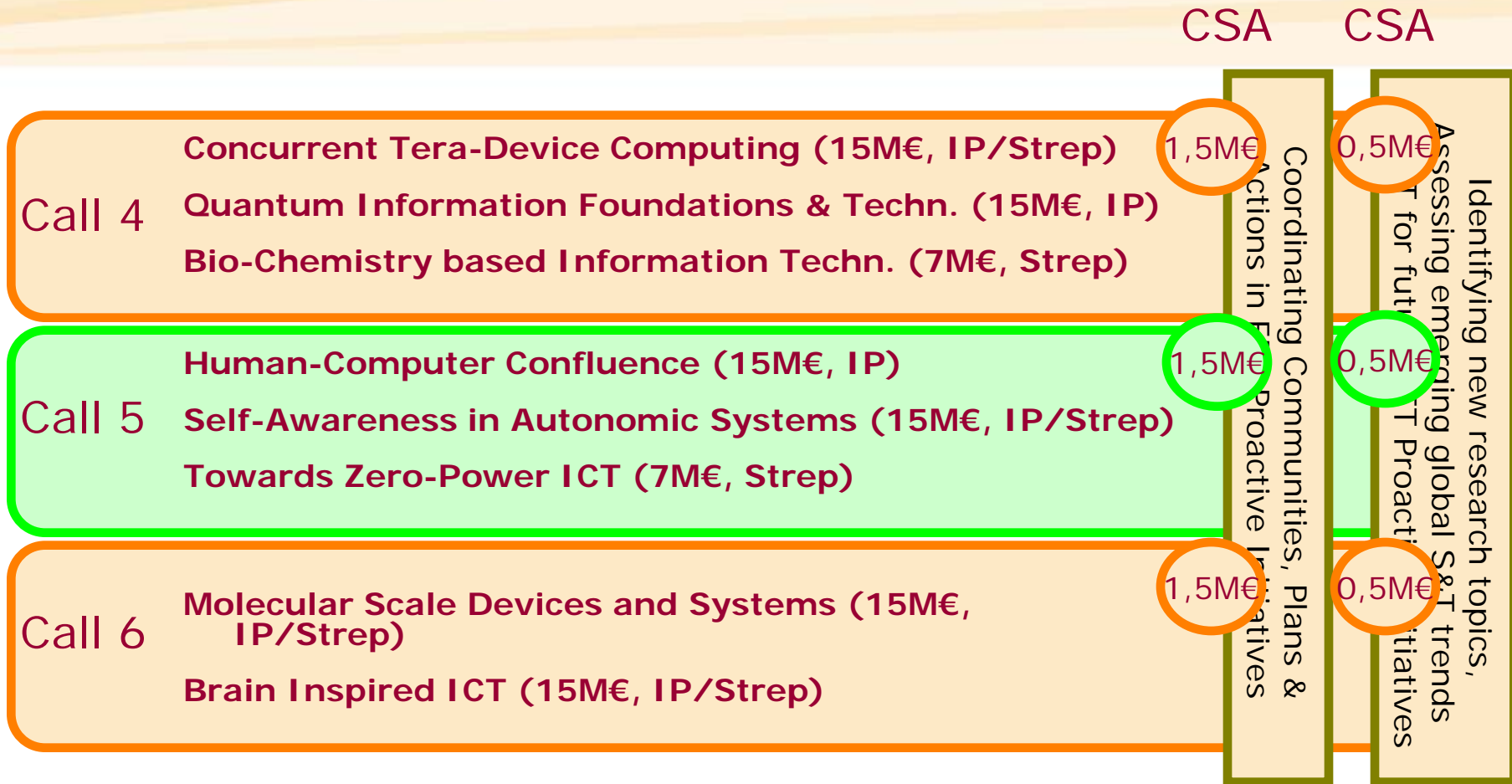
Supporting the emergence of new visionary ICT research

1. Pathfinder and Incubator for exploring new visionary ideas
2. Focusing on long term foundational research
3. Focusing on high risk/high pay-off multi- and inter-disciplinary research aiming at S&T breakthroughs
4. Maturing & structuring emerging research fields, research communities and research practices

NB: specific evaluation criteria are used for FET proposals reflecting these aims

FET Proactive – WP 2009-2010

transformative and foundational research



Human-Computer Confluence

ICT-2009.8.4, a FET proactive challenge in FP7 Call 5

- Budget: 15 M€
- Funding schemes: Integrated Projects only
- Web page on Cordis:
http://cordis.europa.eu/fp7/ict/fet-proactive/hcco_en.html
- Background documents:
ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/hcco-02_en.pdf

ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/hcco-01_en.pdf

Human-Computer Confluence rationale

- Today we have to assimilate massive amounts of data, and there is an ever increasing demand to expand this
- This objective seeks to find new methods of perception so that we can interact with large volumes of data in as natural a fashion as possible, and without undue stress.
- Methods for blurring the perceived boundaries between the real world and associated virtual artefacts are one aspect of this.

Human-Computer Confluence objectives

- HCC researches new modalities for perception, action and experience in augmented virtual spaces, delivering unified experiences involving radically new forms of perception/action.
- proposals should address at least 2 topics from:
 - Perception and interaction with massive amounts of data (topic 1)
 - Seamless merging of real and virtual worlds (topic 2)
 - New forms of perception and action (topic 3)

Human-Computer Confluence

research topic 1

Perception and interaction with massive amounts of data

- New methods for “interfacing” with human senses so that large amounts of data can be communicated and understood.
- Could involve 1 or a combination of “normal” senses, or approaches using neuroprosthetics or brain-computer interfaces
- **Interaction:** a 2-way information transfer to aid data exploration is foreseen

Human-Computer Confluence

research topic 2

Seamless merging of real and virtual worlds

- **New methods for removing perceived boundaries when a combination of virtual artefacts and the real world are involved.**
- **New methods for natural (life-like) interaction with virtual artefacts**

Human-Computer Confluence

research topic 3

New forms of perception and action

- **Demonstration of new ways of perceiving (new senses) and interacting with the real world or virtual artefacts**
- **Involves using a novel combination of senses, possibly in conjunction with brain-computer interfaces**
- **The new “sense” should reinforces existing senses to augment awareness in virtual spaces**

Human-Computer Confluence

Expected impact

Better understanding of how sensory information is delivered to, and interpreted by, the brain

New methods and tools to merge real and virtual spaces

New ways for people to understand and interact with massive amounts of data

Human-Computer Confluence interdisciplinarity and ethics

- The topics in this objective require close collaboration between researchers in many disciplines from both technological domains and the life-sciences.
- Proposers should carefully read the “Guide for Applicants” before writing a proposal.
- Particular attention should be paid to the sections dealing with ethical issues.

Human-Computer Confluence

For further information please contact:

[Julian.Ellis \(at\) ec.europa.eu](mailto:Julian.Ellis@ec.europa.eu)

[Pekka.Karp \(at\) ec.europa.eu](mailto:Pekka.Karp@ec.europa.eu)



Self-Awareness in Autonomic Systems inspirations and challenges

Inspirations

- Biology (societies; reproduction; evolution)
- Autonomic systems (autonomicity; self-^{*}; dynamicity; situatedness)
- Global Computing (heterogeneity; mobility and concurrency; resource virtualisation)
- Social science; Semantics; Ontology

Challenges

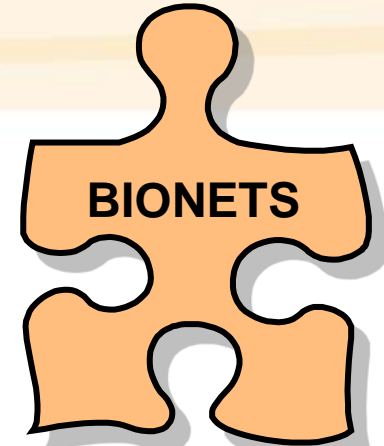
- Global versus local awareness
- Separation versus integration of concerns
- Prediction and evolution

Earlier call « Situated and Autonomic Communication »



Opportunistic
networking
(cross-layer)

Autonomic
service
evolution

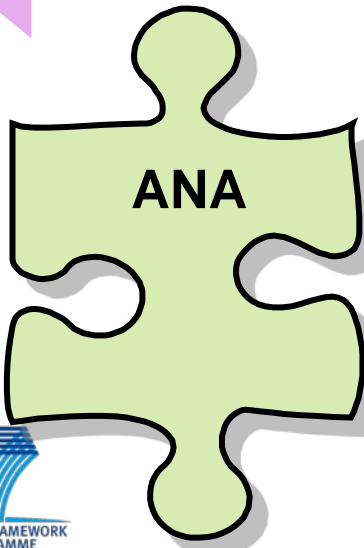


Common research issues:

*Security, resilience,
self-* (organisation,
evolution, healing, ...)
interaction of new
paradigms with society*

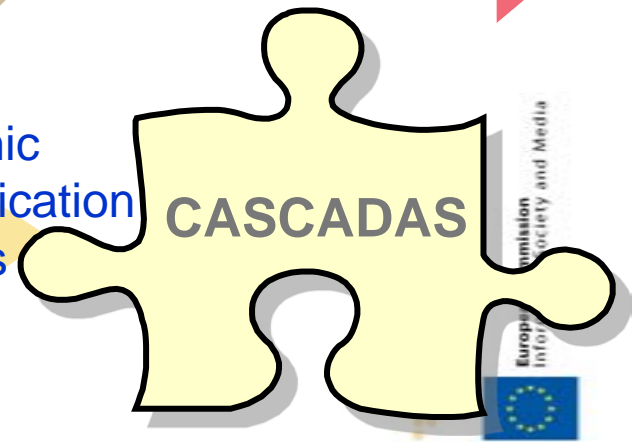
New Architectures

Situated Services



Beyond
IP
self-org.

Autonomic
communication
elements





Earlier call « Global Computing »



Mobius

MOBIUS will investigate trust and security for small devices which are functioning as a part of global computers. The main focus is on proof carrying code aimed at checking previously created proofs with modest computational resources.



Sensoria

Sensoria will develop a novel methodology for engineering service-oriented overlay computers and for building a framework for context-adaptive, personalisable global services.

AEOLUS



Aeolus

Aeolus aims at developing algorithmic principles and implementing the basic functionalities (i.e., programming tools, trust management, secure distributed computation) to enable transparent and efficient access to an internet-based global computer.





Self-Awareness in Autonomic Systems

ICT-2009.8.5, Call 5

- Budget: 15 M€
- Funding schemes:
STREPs (RT 1. or 2.), IPs (RT 1. and 2., >50%)
- Contact: wide.hogenhout@ec.europa.eu
ruediger.martin@ec.europa.eu
- Background documents



FET workshop 'Overlay Computing & Communication', Jan. 08

ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/overlcc-01_en.pdf

'Shaping future FET Proactive initiatives', Sep. 07

ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/fet-proactive/shapefetip-sept07-01_en.pdf

Future and Emerging Technologies



Objective ICT-2009.8.6:
**Towards Zero Power ICT
(2zeroP)**

Towards Zero Power ICT

Rationale & Objective

- Powering all the electronic devices surrounding us in our daily life is still and will remain a challenge.

therefore

- New disruptive directions are needed
 - for energy-harvesting technologies at the nanometer and molecular scale,
 - and their integration with low-power ICT into autonomous nano-scale devices for sensing, processing, actuating and communication.

Towards Zero Power ICT

Target Outcome

- Foundations of Energy Harvesting at the nanoscale:
 - Demonstration of radically new strategies for energy harvesting and local storage below the micrometer scale.
 - Exploration and harnessing of potential energy sources at that scale including kinetic energy present in the form of random fluctuations, ambient electromagnetic radiation, chemical energy and others.
 - Research may also address bio-mimicked energy collection and storage systems.
- Self-powered autonomous nano-scale electronic devices:
 - Autonomous nano scale electronic devices that harvest energy from the environment, possibly combining multiple sources, and store it locally.
 - These systems would co-ordinate low-power sensing, processing, actuation, communication and energy provision into autonomous wireless nanosystems.

Towards Zero Power ICT

Expected Impact

- Possibility of building autonomous nano-scale devices (from sensors to actuators), extending the miniaturisation of autonomous devices beyond the level of the 'smart dust'
- New applications in a vast number of ICT fields such as intelligent distributed sensing, for health, safety-critical systems or environmental monitoring

Towards Zero Power ICT

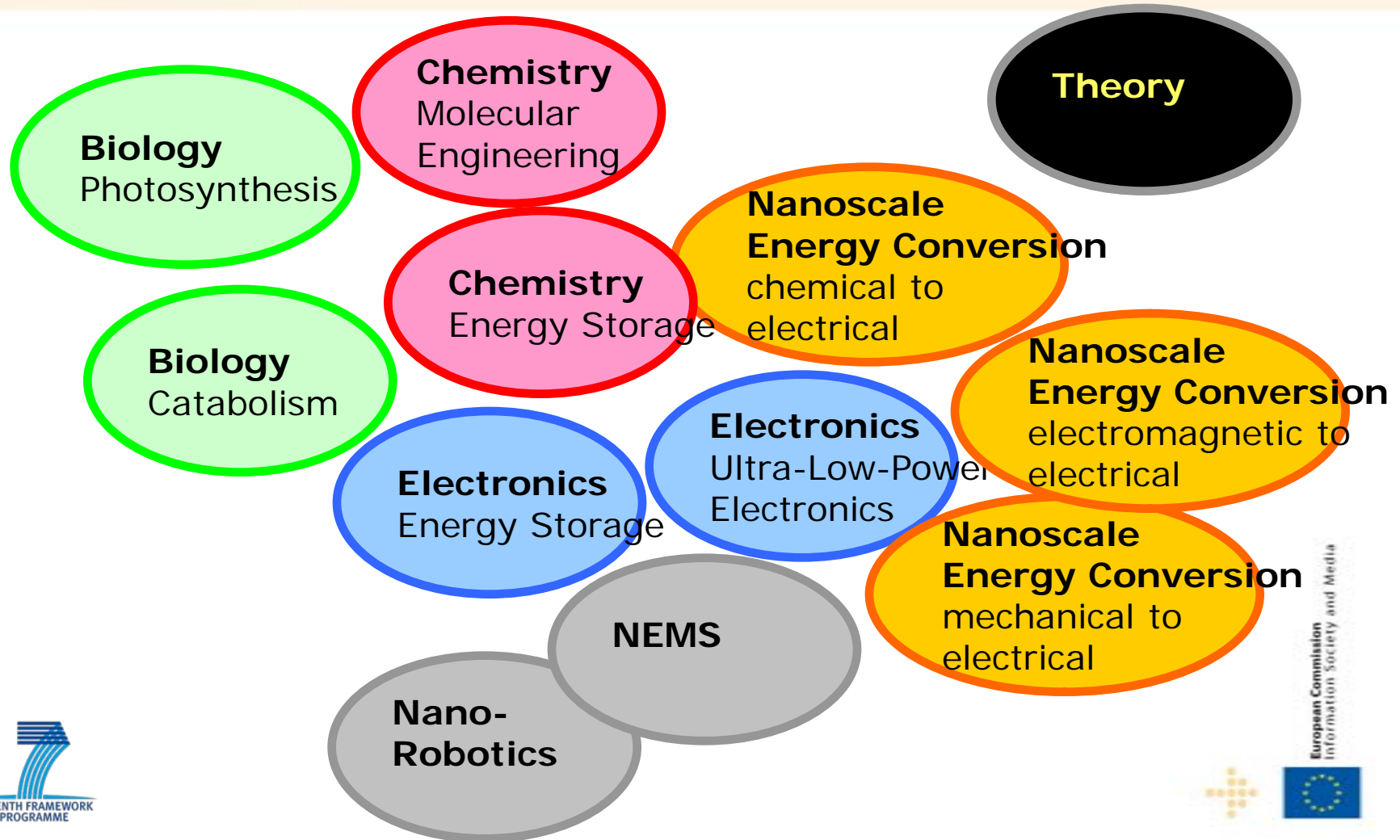
Workprogramme text in brief

- At “nano-scale”
 - harvest and store energy
 - to build up self powered devices
- to serve ICT purposes like sensing, processing, actuating, communicating
- Look for radically new approaches...

Towards Zero Power ICT

Specializations that may be involved

(this list is not exhaustive)



Towards Zero Power ICT

What else?

- This objective is new, nothing similar has been called before within Future & Emerging Technologies.
- The relevant scientific communities have yet to emerge.
- Objective 3.9 has a closely related work programme text, but we are looking for disruptive approaches at the nano-scale.
- What we are not looking for:
e.g. nano-scale features enhancing large scale energy harvesters (e.g. quantum dots improving solar cells)

Towards Zero Power ICT

Additional Information

Objective ICT-2009.8.6 within Call 5

Opening: July 31st, 2009

Deadline: November 3rd, 2009

Funding scheme: STREP only

Budget: 7 million Euro

Contact persons:



Ralph.Stuebner@ec.europa.eu



David.Guedj@ec.europa.eu

Website:

http://cordis.europa.eu/fp7/ict/fet-proactive/2zerop_en.html

FET Objectives 8.9 + 8.10

Coordination and Support Actions in FET Proactive

Objective 8.9, Budget 1.5 M€.

**Coordinating Communities Plans and Actions
in FET Proactive Initiatives**

Objective 8.10, Budget 0.5 M€.

**Identifying new research topics, Assessing
emerging global S&T trends in ICT for future
FET Proactive Initiatives**

8.9 Coordinating Communities, Plans and Actions in FET Proactive Initiatives

Foci for coordination and support actions

- Supporting targeted research communities
 - Increase visibility and collective impact of scientific community, industry & public
 - Consolidation of research agendas
 - Foster coordination of national, regional and international programmes and activities
 - Encouraging establishment of new educational curricula

OR

- Actions specifically aiming at networking of research activities at national or regional level
 - Should involve national or regional research programme owners
 - Coordination of national, regional or international programmes and activities
 - Preparation and implementation of joint trans-national calls
 - ERA-NET plus action in subsequent phase

Research communities can be linked to existing proactives (based around running projects), or communities that are new to FET.

What is expected from CSAs?

- **Coordination action:**
 - Typical: funding around 500K€, 3-6 partners, duration 3 years
 - At least 3 partners
 - A large representation of scientific groups is often better achieved through a scientific board.
- **Specific support action:**
 - Typical: funding around 100K€, 1-2 years
 - can be only 1 partner



8.9: Finding more information

- Examples of running CAs:
 - PEACH (www.peachbit.org)
 - PERADA (www.perada.eu)
 - NanoICT
(www.phantomsnet.net/nanoICT)
 - QUROPE (www.qurope.net)
- Preproposals:
 - Feel free to informally discuss preproposals with Wide Hogenhout (wide.hogenhout@ec.europa.eu)

8.10: What is expected from actions in this objective?

Efforts towards definition of future FET proactives either:

- Identifying new research topics
 - Position paper with need for action, research challenges and impact foreseen in science, technology and society.
 - Suggestions should not be at project level but at proactive initiative level

OR

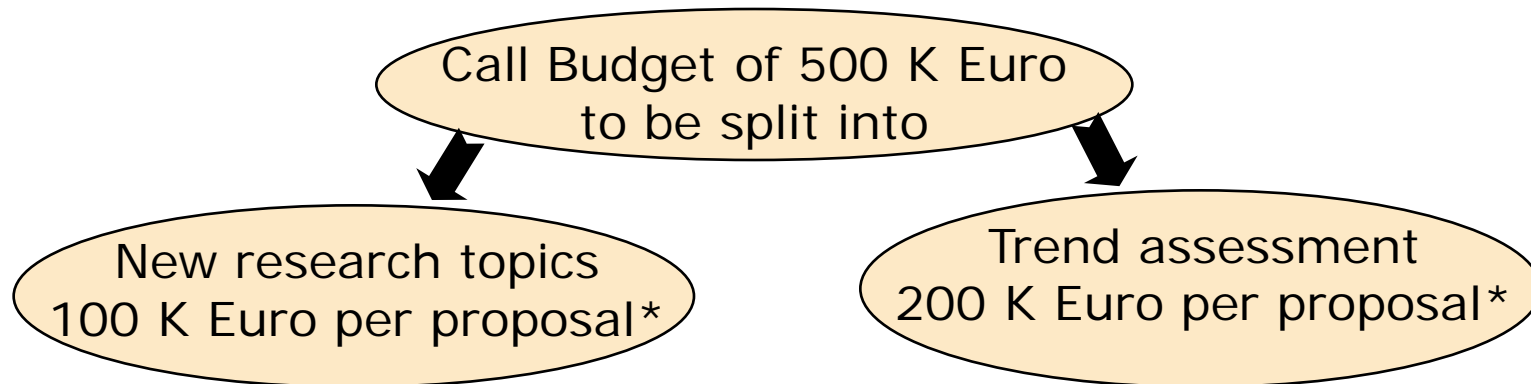
- Assessing emerging global S&T trends in ICT
 - That could lead to the definition of research topics, to overcome roadblocks and set the future picture
 - assess the potential of recent breakthroughs in FET related research

What type of instrument?

Coordination Specific Actions (6-12 months)

Coordination Actions (CAs)
Involvement of different groups (3-5)

Specific Support Actions
(SSAs)
Could be just one group



(*rough expected EU contribution per proposal)

In both cases a clearly motivated idea and assessment of the impact are expected

Examples of candidate topics (not exhaustive)

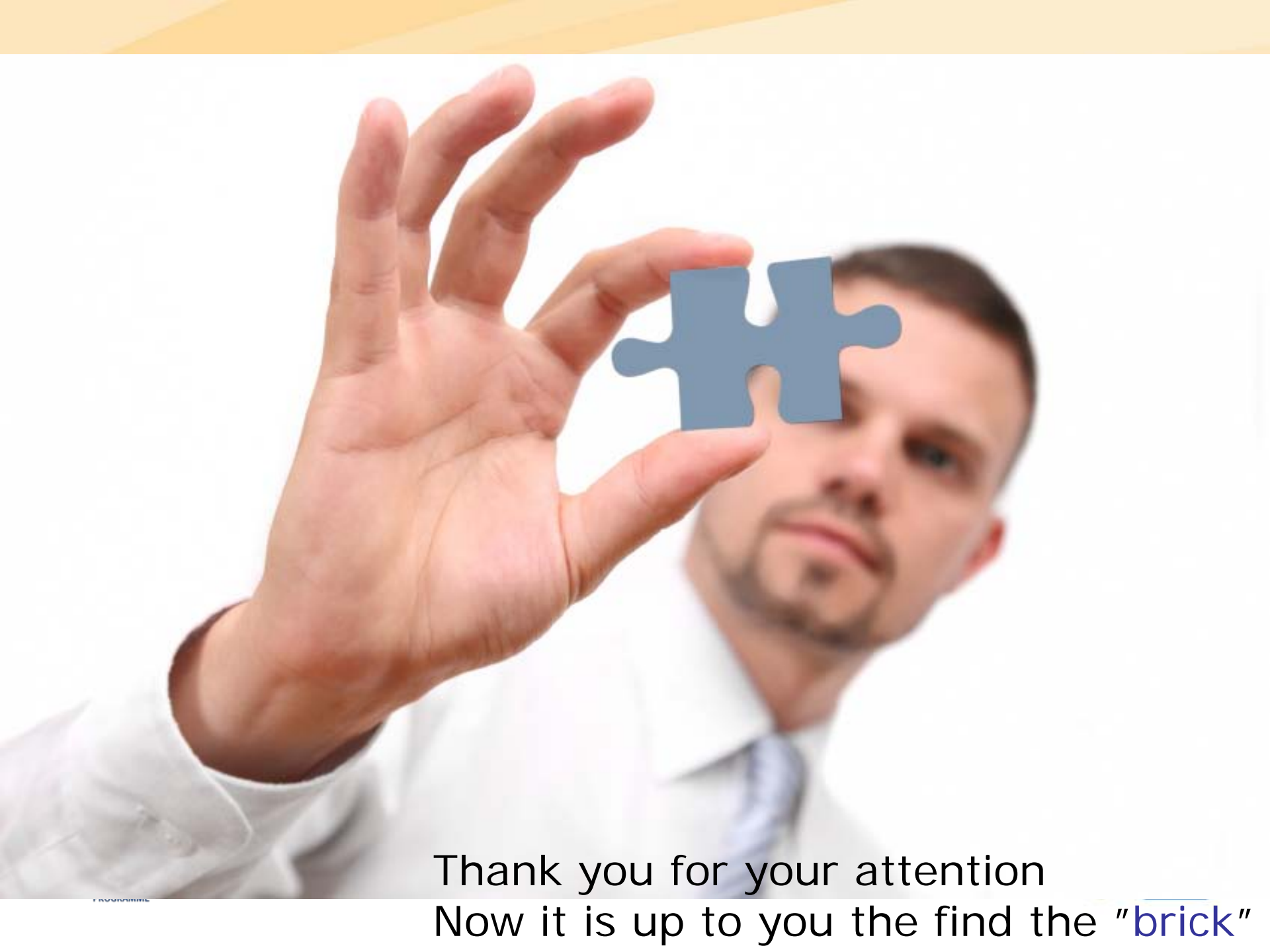
- Emerging global S&T future ICT trends in areas like components, systems or intelligence which could form the basis of new proactive initiatives
- New methods for information processing, possibly drawing inspiration from disciplines outside ICT

8.10: Finding more information

- Preproposals:

Feel free to informally discuss pre-proposals with José Fernandez-Villacanas

[Jose.Fernandez-Villacanas \(at\) ec.europa.eu](mailto:Jose.Fernandez-Villacanas@ec.europa.eu)



Thank you for your attention
Now it is up to you the find the "brick"