

# How people perceive ionizing radiation: comparison in four countries

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Nuclear and Energy from perspective of Social Sciences and Humanities

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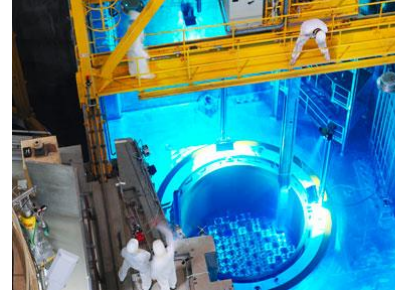
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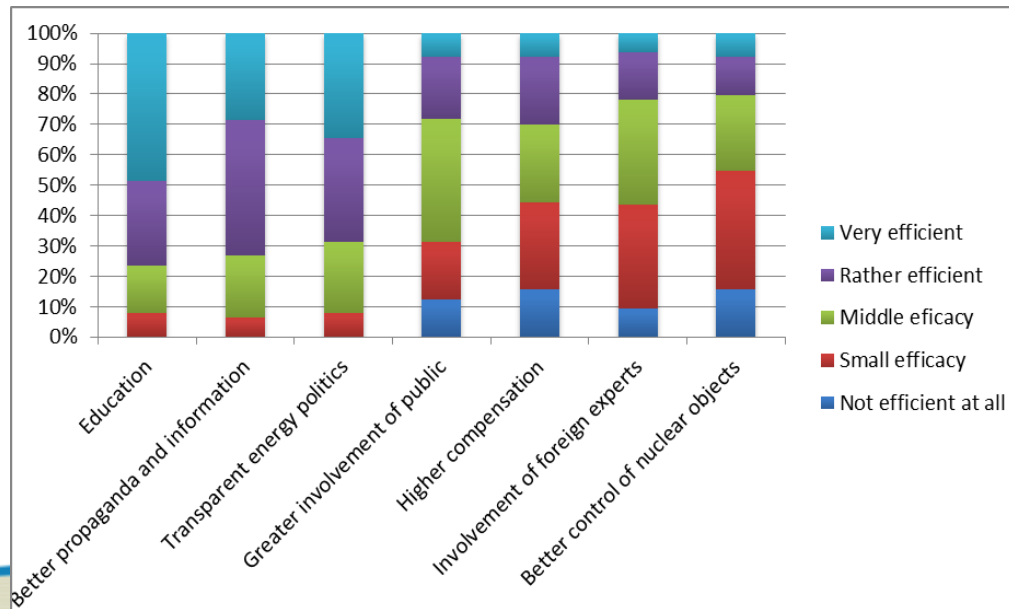
PLATENSO, Building a platform for enhanced societal research related to nuclear energy in Central and Eastern Europe

# Context for project

- Use of ionizing radiation is wide.
- But perception in public mainly negative.
- Nuclear experts believe in power of education and propaganda.
- What is really needed?
  - investigation in EAGLE project



Efficacy of different measures for changing general public negative attitudes toward NPP, survey in Slovenia 2013 within experts



## Enhancing educAtion, traininG and communication processes for informed behaviors and decision-making reLarEd to ionizing radiation risks



- FP7-EURATOM project, 7 EU countries, 3 years project
- Goals:
  - Assess the current education, training and information (ETI) process and real needs e.g. preparation of information on ionizing radiation, dissemination of information to the public and public understanding.
  - Establish a network of stakeholders in order to identify education, information and communication needs and coordination possibilities at the European level supported by web-based Platform.
  - Provide practical guidance and tools for best practice to support the ideal of a participative, citizen-centered communication.
- Stakeholders:
  - Information sources
  - Media
  - Public



# Objectives

To identify **approaches improving ETI activities** regarding the **understanding** of the effects of ionising radiation so as to support the EU citizens in **making informed decisions when their risk is concerned**

Analysis of ETI from public perspective, investigating:

- level of general knowledge related to ionising radiation issues among EU citizens both in nuclear and non-nuclear countries
- most used and most trustful information sources
- mental models of general public regarding the effects of IR
- differences, gaps, understandings and perceptions in the general public compared with the ones provided by professionals in the nuclear area?
- good/bad practices regarding ETI about the effects of IR which should be promoted/avoided

Answer to: What kind of public information coordination can ensure an informed civil society in Europe?



# Surveys overviewed

Survey	Sample	Where	When
EUROBARMETER surveys	Adult population (15+)	EU	2008, 2009
Romanian IR survey (2002)	Professionals and non-professionals adults in IR (16+)	Romania	2002
COWAM2 (2005)	schoolchildren survey (13-14 years old)	Romania	2004 - 2005
JSI survey (2013)	schoolchildren survey (14-16 years old)	Slovenia	April 25 and June 12 2013
ARAO survey (2011)	Adult population (18+)	Slovenia	November 2011 - January 2012
SCK.CEN survey (2013)	Adult population, national representative sample (18+)	Belgium	15 August – 13 September 2013
IRSN survey (2014)	Adult population, national representative sample (18+)	France	25-28 April 2014
ARAO survey (2014)	Adult population, national representative sample (18+)	Slovenia	20 October – 11 November 2014

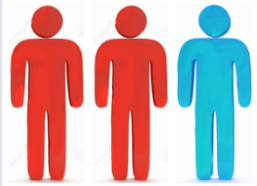
# Knowledge level

- Knowledge at European **level is modest**, but improved in the countries with nuclear power programs.
- **Education and information together with risk perception** (general and personally speaking) play a major role in knowledge level and determine whether views of ionizing radiations are positive or negative.
- A very **large part of population feels uninformed** about ionizing radiations and their applications. A vast majority of Europeans feels the **information the media offers about IR is not sufficient**. However, those feeling informed are more content with the information offered by mass-media.

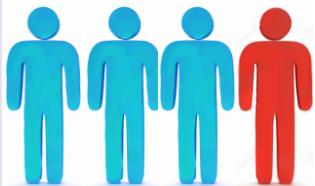




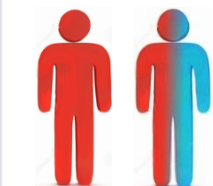
# Low knowledge about ionising radiation



“Exposure to ionizing radiation will always lead to radioactive contamination.”



“Radioactive waste is produced only by nuclear power plants.”



“Vegetables grown near a nuclear power plant cannot be safely consumed because of radioactivity.”



# Correct answers on IR

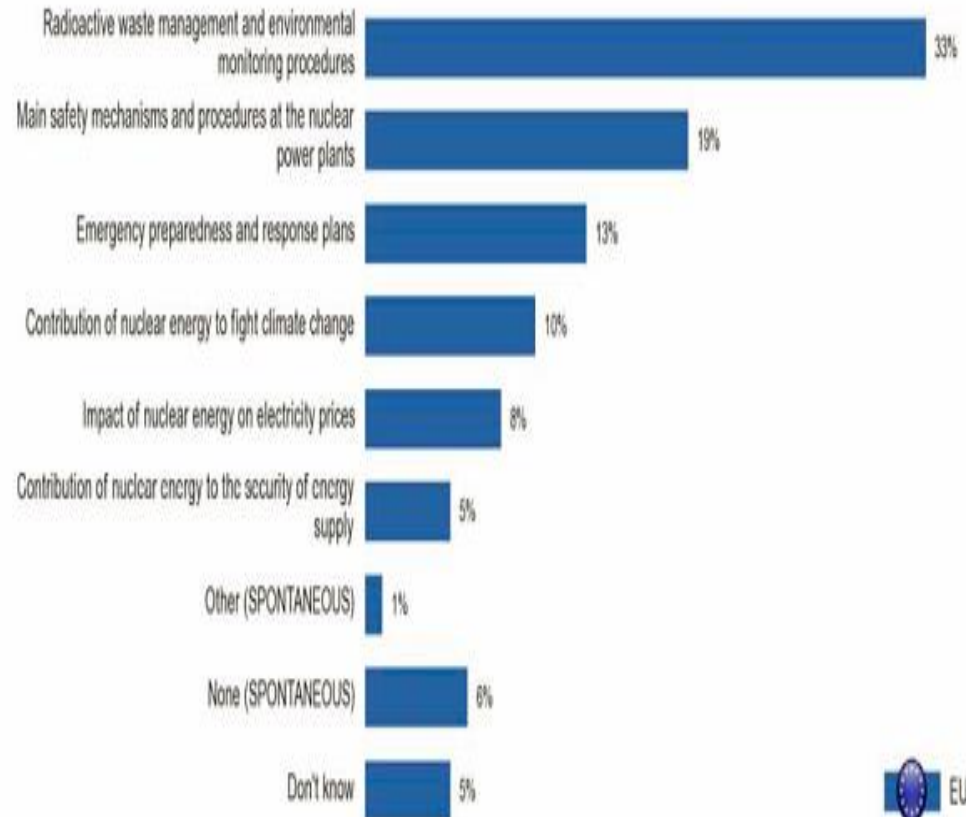
	BELGIUM	FRANCE	SLOVENIA
Knowledge on general elements about radiation:	(%)	(%)	(%)
- measurement	88	91	92
- unit	52	71	Not asked
- decay	47	57	83
- contamination	26	11	Not asked
Knowledge about the use of nuclear technology in:			
- Energy sector	95	92	80
- Medical sector	92	86	54
- Food industry	50	39	6
General knowledge about radioactive waste			
- Production	65	63	56
- Management	87	86	Not asked
General knowledge about natural radioactivity:			
- human body is naturally radioactive.	37	51	15
- Natural radioactivity is never dangerous because we are used and adapted to it	51	54	76
General knowledge about the impact of NPP on environment			
- Vegetables grown near a nuclear power plant are not good for consumption because of radioactivity.	33	38	69



# Population interest

Major concerns related to IR and its applications among the European population are raised by (2009):

- radioactive waste management;
- main safety mechanisms and procedures at the nuclear power plants;
- emergency preparedness and response plans;
- climate change



European public risks perception  
(Eurobarometer 2009)

# Potential risks

2008-2009 -The main risks (EU average) associated to ionizing radiations perceived by European population were:

- threat of terrorist attacks against NPPs,
- radioactive waste,
- misuse of nuclear materials
- nuclear accidents (33% Fr, 25%Be)

2014: survey IRSN, SCK.CEN

	Risk to your health in the next 20 years %(very high or high risk)	
	Belgium	France
Radioactive waste	52	57
Nuclear accident	53	55
Terrorist attack with radioactive sources	51	47
Residual radioactivity	41 (in food)	43 (in the environment)
Food sterilization by irradiation	31	37
Natural radioactivity	20	22
Medical X-rays	20	14
Radiation from mobile phones	26	34

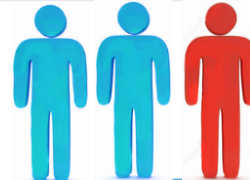


# Population trust in information sources

- People living in countries running nuclear power programs trust the national safety authorities when nuclear issues are raised.
  - the higher the confidence in authorities for a particular risk is, lower is risk perception and vice-versa, associating the level of the measures taken by authorities with the level of danger.
- Top of trust in information sources about IR and its applications:
  - scientists (40%)
  - international organizations working on peaceful uses of nuclear technology (IAEA, OECD/NEA) (38%)
  - national safety authorities (30%)
- The lowest trust comes when information is provided by:
  - Journalists
  - Politicians
  - Nuclear industry

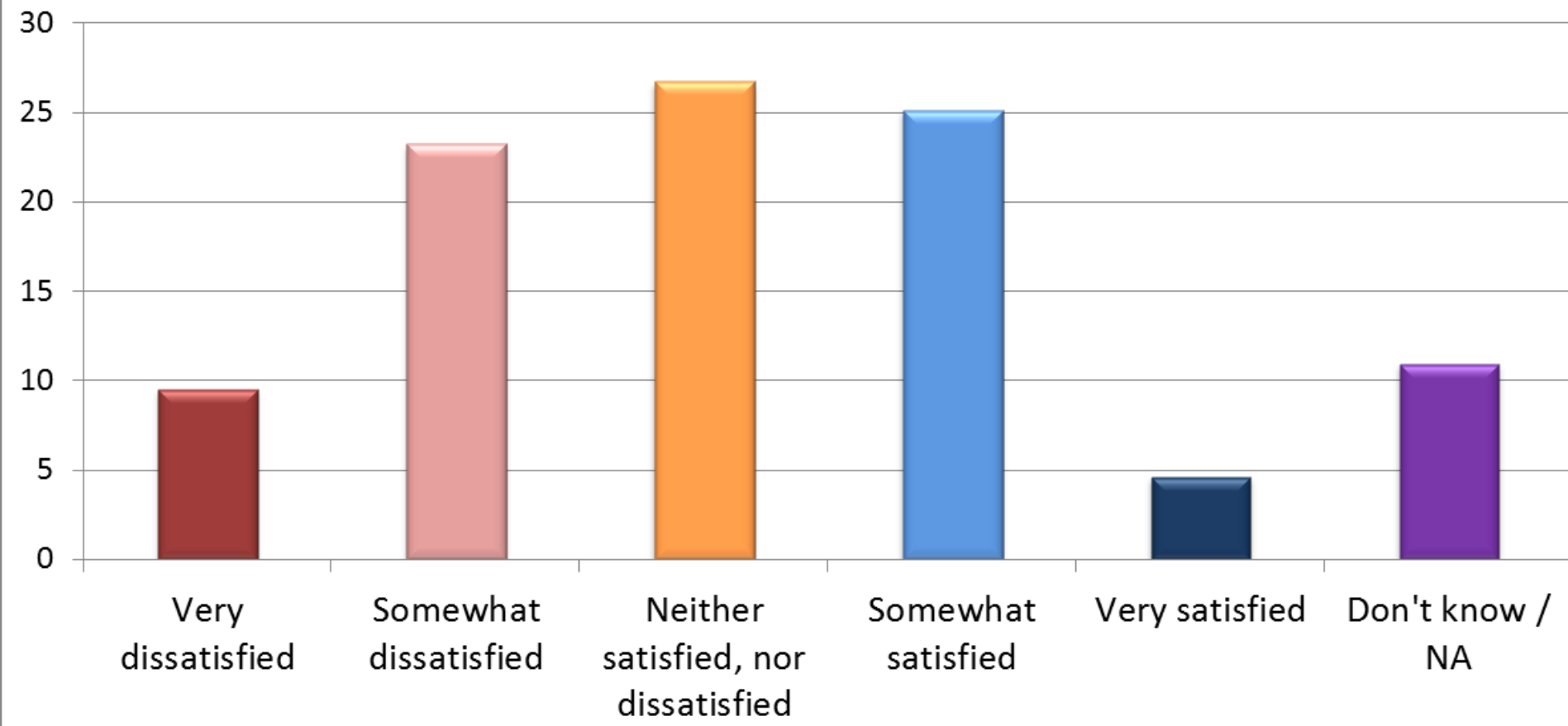


# Room for improvement



Dissatisfied

**In general, are you satisfied with the public information related to ionising radiation provided by the following actors? The Nuclear industry**



# Mental models

*Expected outcome: to understand*

- how people perceive the effect of IR and their risk and why?
- what is the socio-cultural impact?



Improved information process



# Research

- The survey based on mental model approach:
  - creation of mental models of IR based on the experts' knowledge
  - conduction mental models interviews based on open-ended protocol to obtain people's believes,
  - analyse the differences between experts' and lay people and
  - develop the risk communication to address the incorrect beliefs and knowledge gaps.
- 4 countries involved: France, Poland, Romania, Slovenia
- Small number of individuals involved – qualitative assessment





# Material

- section 1 - warming up to open discussion on the ionizing radiation where the first connection with the terms were looking for.
- section 2 - investigation divided in effects, phenomena, protection, risks: (concept of IR, composition of matter, representation of IR, sources of radiation, relation between artificial and natural radiation, effects of IR on the humans and environment, non-energy use: medicine, industry, associated risk and what can happen, protection)
- section 3 – perception of nuclear accidents, and in particular Fukushima accident, decision making process, information and trust.
- section 4 - demographics data on interviewees (gender, age, education, settlement).



# Findings - 1

- The knowledge about ionizing radiation is rather low although in some countries that exert some significant educational effort it may be slightly better. The structure of matter, particularly the structure of atomic nucleus, is rather unclear; therefore the reasons for the decay of a nucleus are very badly known. The interaction of IR with other atoms and nuclei are not known.
- All of the interviewees are aware, that the radiation may cause different damages, in worst case death.
- Most of the people know the fact that there is a natural radiation all around the Earth. However the majority believes that there is a difference between the natural (harmless) and artificial (always dangerous) radiation.
- There are many misunderstandings concerning the sources of IR.
- The majority of interviewees do or would accept the methods used in nuclear medicine (trust to the doctors).



## Findings - 2

- Nuclear power is somehow accepted by the majority of questioned people, however not with any great astonishment. In case of any other possibility they would have mostly opted for that.
- The last nuclear accidents in last decades increase the people concerns the operation, management and safety precautions in these installations may not be sufficient for their safe operation.
- Radioactive waste is another confusing topic. Very few people are aware that the RW comes also from industry and medicine, and that relatively low amount in volume comes from NPPs. The respondents confuse the low, middle and high radioactive waste. Therefore the construction of low and middle radioactive waste repository is not acceptable in the close proximity of the majority's homes.



## Findings - 3

- The majority of information regarding accidents in nuclear installations comes from TV. Recently people rely more and more on the internet, since some relevant pages may not be influenced by governmental institutions and thus obscured or misleading.
- Many of the interviewees do not trust the governmental sources of information. The media are often not considered to be independent.
- Decisions connected with the construction and operation of nuclear facilities should be the domain of the experts, scientists and technicians. The public should be consulted and its opinion respected to a certain extent, but definitely the people should be extensively informed and warned against any possible hazard.



# Conclusions

- It is evident that better knowledge on IR improve the acceptability of IR practices and applications.
- There is a clear division between medical use perception and nuclear energy production perception.
- The improvement of knowledge is not an easy task: very demanding and depends on many factors (not just the availability of information but also willingness to learn).
- More important is building trust:
  - Empathy and care 45 %
  - Honesty and openness 20 %
  - Commitment and dedication 20 %
  - Competence and experience 15 %
- Confidence building - is a continuous mission of all information sources, so it is proposed to build national strategies.



Thank you for your attention!

