JRC SCIENCE AND POLICY REPORT

EURATOM Projects, radioactive waste management and public participation: What have we learnt so far?

A synthesis of principles

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Abstract

Since 2000, the EURATOM Framework Programmes (FPs) have dedicated political attention and economic support to public participation in radioactive waste management (RWM). Although a one-fit-all solution for a participatory RWM does not exist, the diversity that characterizes the European Union (EU) offers a relevant pool of knowledge and experience. The JRC has used the knowledge and experience cumulated by relevant EURATOM projects to define a list of general principles for a more participatory approach to RWM. The principles explained in this report can ultimately work as indications for the changes and strategic actions that are needed for a better RWM in the EU.

EURATOM Projects, radioactive waste management and public participation: What have we learnt so far? A synthesis of principles.

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LIST OF ABBREVIATIONS

ARGONA	Arena for Risk Governance
COWAM	Community Waste Management
COWAM2	Community Waste Management 2
CIP	COWAM in Practice
DG ENER	Directorate-General for Energy
DG RTD	Directorate-General for Research and Innovation
E-TRACK	Energy – Transparency Centre of Knowledge
EC	European Commission
EU	European Union
HLW	High-level waste
InSOTEC	International Socio-Technical Challenges for implementing geological disposal
IPPA	Implementing Public Participation Approaches in Radioactive Waste Disposal
JRC	Joint Research Centre
LC	Local Committee
MSs	Member States
RWM	Radioactive waste management
RISCOM II	Transparency and Public Participation in Radioactive Waste Management
WMOs	Waste Management Organizations

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1.   INTRODUCTION

For decades, radioactive waste management (RWM) has been considered as a technical topic which could be dealt with exclusively by national authorities and scientific experts. The emphasis has mostly been on technical solutions that are capable of guaranteeing safety. The increasing local opposition experienced by national governments and Waste Management Organizations (WMOs) during the siting of RWM facilities has shown the salience of public involvement and local support. This has pushed for more public participation in decision-making.

RWM is a controversial topic because it manages a special type of waste (radioactive, indeed) that is characterized by potential risk and a long-term scale. For instance, the management of high-level waste (HLW) overpasses by far a real-life setting. Consequently, RWM is surrounded by a degree of scientific uncertainty. While scientific uncertainties may exist to some extent about the solution of the problem, strong disagreements characterize RWM on the basis of the personal values and beliefs which frame the definition of the problem. RW is the product of a contested activity, i.e. the production of electricity through the generation of nuclear power. Accepting the manageability of RW implicitly would mean accepting the solvability of RW and, thus, turning nuclear power generation into an industrial activity like any other (O'Connor & van den Hove 2001). Scientific uncertainties and the polarized socio-political context make RWM a "wicked" problem. Because of their complexity, wicked problems can only be tackled through the involvement of all interested actors (Bergmans et al. 2008). In RWM, thus, issue-framing and problem-solving cannot be addressed from a mere techno-scientific perspective.

In the past, a lack of communication from the side of national RWM agencies towards the public, in general, and the targeted local communities, in particular, has determined the strong opposition of localities to national RWM plans and, more importantly, RWM facility siting. The evident policy failure has pushed many national governments to embrace a new, more participatory approach to policy-making, understood as the opening of RWM agencies and the related decision-making process to non-state actors. It is currently commonly acknowledged that public and local participation is pivotal for any RWM policy, programme and project, from laboratories to storage and disposal, for all types of RW (high-, medium- and low-level RW).

More in general, public participation is believed to benefit public policy-making because it brings ideas (and knowledge), trust (for the government) and (more) democracy into the policy process (OECD 2001, 2008). In the light of these considerations, it becomes important to understand how we can build and maintain across time a fruitful relationship between the public and the host community, on the one hand, and the RWM system around a given facility, on the other hand.

Since 2000, the EURATOM Framework Programmes (FPs) have dedicated political attention and economic support to matters of public participation and the local dimension in RWM, together with the complex set of questions that this implies: What is the purpose of public and local involvement in RWM? Does it aim at the acceptance of already-decided technical solutions? Or is the technical project completed with additional recommendations from the public and the municipalities? Or are the general public and local actors involved in the technical discussions about facilities which precede any decision? Are public discussions likely to improve the quality of the decision-making process? Etc.

Although there is not a one-fit-all solution, mutual learning among different categories of interested actors (or "stakeholders") across countries is important. The national diversities that are present in the European Union (EU) are extremely useful to understand public participation in RWM, since they offer a relevant pool of knowledge and experience. The 'Energy – Transparency Centre of Knowledge' (E-TRACK) wishes to make this knowledge useful for all interested parties. E-TRACK is a joint initiative agreed between the Directorate-General for Energy (DG ENER) and the Joint Research Centre (JRC) of the European Commission (EC) for the promotion and enhancement of public participation in the implementation of energy policies. The first project of E-TRACK addresses public participation in the field of RWM and constitutes a pilot project for the whole E-TRACK initiative.

In order to make the pool of knowledge and experience coming from diverse national settings available in the whole EU, we have used a number of EURATOM projects (see below section 3 on Methodology) to define a list of general principles for a more participatory approach to RWM. We do not want to suggest specific participatory practices, which are often bound to given social, political and temporal contexts; hence, the report does not discuss which practice or technique or tactical measure is the most helpful (since it heavily depends on the context). The report rather provides a list of generic considerations for improved RWM. Our focus is on strategic actions for better RWM which can be of relevance for all EU countries. The principles reported in this report can, indeed, work as indications of the changes and modifications needed.

2.   THEORETICAL ANCHORAGE

The purpose of this report is to synthesize the major principles emphasized by the EURATOM projects that have dealt with public participation in RWM. A comprehensive list of these projects is provided in table 1. The richness of empirical material provided by the cases analysed by the EURATOM projects needs some analytical structure. Therefore, the empirical material has been organized along the insights on policy implementation that have been developed by the study of public policies. This section wants to highlight the main explanatory factors that have been investigated by the academic literature on public policy and administration to explain policy success and failure. These factors have been traced across the EURATOM projects to organize and synthesize the empirical data and the lessons learnt. The research methodology is presented in the next section.
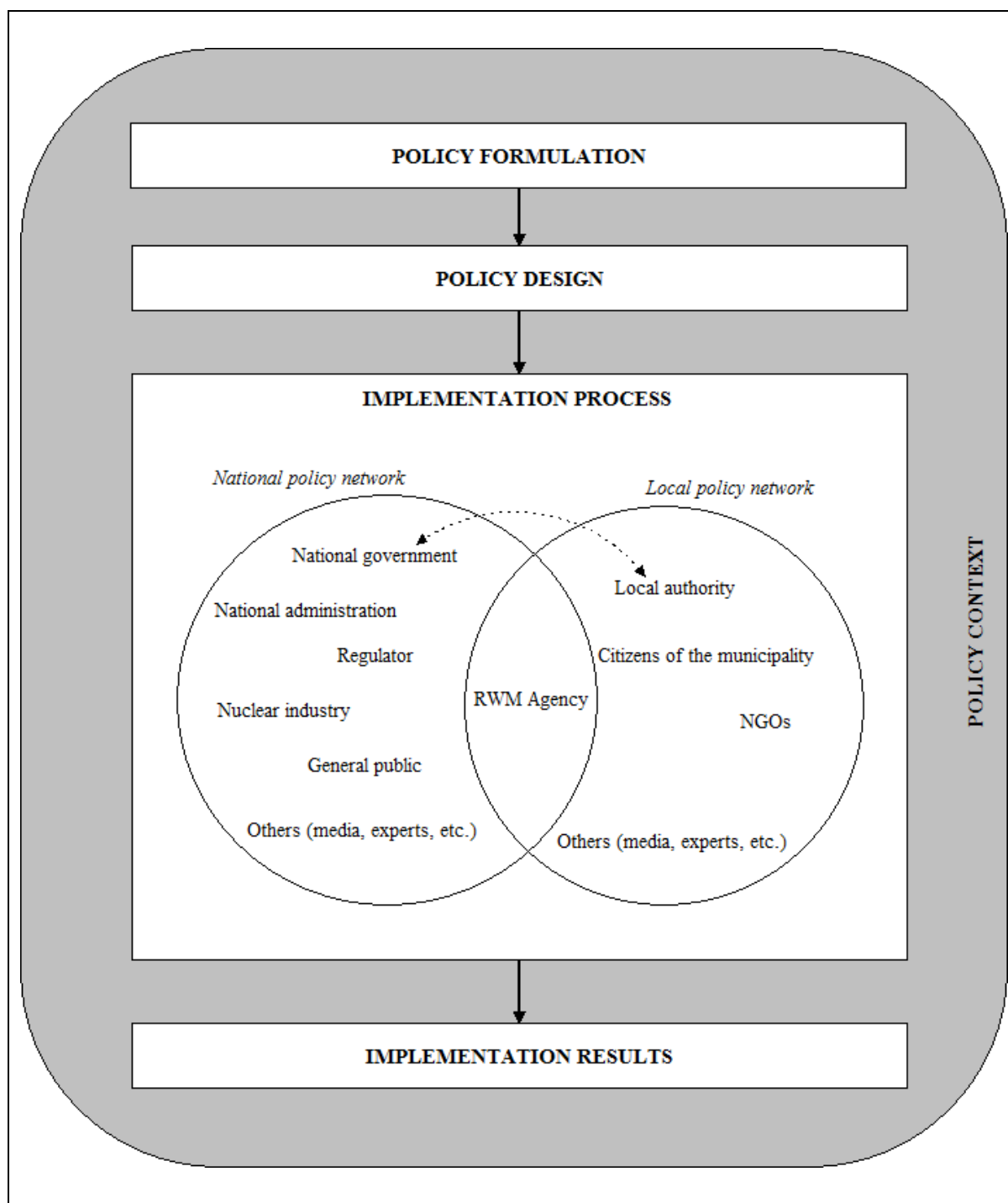
In the disciplinary fields of Public Administration and Public Policy, the implementation of national policies has been studied since the 1970s from different analytical perspectives (Winter 2003). Initially, policy implementation was studied from a top-down perspective. The top-down approach was hierarchical in nature and looked at implementation as a mere administrative execution of political decisions made by the decision-makers located at the top of the central government (Barrett 2006; Matland 1995; Younis & Davidson 1990). From this perspective relevant explanatory value has been recognized to the clarity of the content of a public policy (or policy design, with its objectives and means), the amount of resources made available and the chain of command and control steering the whole process (Maarse 1984; Parsons 1995). The most relevant limit of the top-down approach is the emphasis on the capability of central policy-makers to control the whole process of implementation, and the lack of attention on lower-level officials and target groups (Howlett & Ramesh 2003; Matland 1995). In response to this focus on leadership and control typical of top-down studies, a second strand of policy research developed around a bottom-up approach. The bottom-up approach emphasized the salience of negotiation and consensus between policy-makers and administrative implementing agencies, and participatory mechanisms (Barrett 2006; Parsons 1995). Implementation started to be conceptualized as an open and dynamic process, where the bottom of bureaucracy delivering the service (e.g., local implementers) as well as the target groups of a given policy became relevant (Andresen et al. 1995; Maarse 1984; Matland 1995). Particularly, Hjern and Porter (1981) emphasized the importance of interactions between various organizations involved in implementation (or "implementation structures"[1]) which include clusters of public and private actors targeted by or interested in the same programme.

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[1]   Both the organization of the implementation structure and the attitude of the target groups are influenced by a specific national politico-administrative culture, which includes the values, opinions and attitudes of a given society towards its political system and administration (Siedentopf & Hauschild 1988).

By the end of the 1990s the contribution of both approaches was generally recognized together with the acknowledgement that policy implementation is a complex process that stands between central guidance and local autonomy. Explanatory factors (or "independent variables") located both at the top- and at the bottom-level have been accepted as important tools for understanding implementation (O'Toole 2000; Winter 2006). Consequently, new approaches have attempted to combine top-down and bottom-up theoretical frameworks by synthesizing the variables proposed. In particular, Winter (2003) suggests that implementation and the success/failure of public policies should be understood on the basis of three factors: policy formulation (i.e., how the policy was decided), policy design (i.e. the content of a given policy) and the implementation process (i.e. the set of interactions that take place among various state and non-state actors at the national and local level). Finally, policy implementation occurs in a specific socio-economic context (i.e., social conditions, economic trends, etc.) which varies from case to case.

The analytical framework developed by Winter (2003) provides a useful heuristic tool to order the empirical material produced by the EURATOM projects. The data gathered have been ordered around the explanatory factors explained above. Winter's analytical framework (figure 1) has been adapted in order to include the broad range of actors involved in RWM at the national and local level. The national policy network and the local policy network (of actors) have, thus, been specified in the implementation process of figure 1.

Figure 1
Theoretical anchorage

Source: Adaptation from Winter (2003)

In the implementation process, the set of national and local actors and their interactions have been specified for the case of RWM on the basis of the insights developed by the EURATOM projects analysed for this report. A certain degree of simplification was necessary in order to deliver a clearer message to a broad audience.

3. METHODOLOGY

The report must be read as a review of the most salient policy recommendations that have been developed by project consortia in the EU under the Framework Programmes for Research and Technological Development of the European Commission (EC). The report is based on the final reports of the projects funded under the EURATOM scheme which have addressed public participation in radioactive waste management. We have reviewed only those projects that have focused on public participation, in other words those projects that were funded under a governance topic in the EURATOM calls for proposal. Table 1 provides an overview of the projects which have been reviewed for this report. For two of these projects (i.e. ARGONA and CIP), specific guidelines produced by the project consortia have also been used. The OBRA project (2006–2008) was not included in this review because it assessed the feasibility of creating an observatory for long-term governance on RWM in the EU rather than elaborating policy recommendations for public participation. Insights developed by the CARL project (which falls outside the EC funding scheme) have been taken into due account because of the relevance of the project[2]. The report attempts to build on the generalizations developed by these projects in their final reports. Thematic areas that recur across the projects' conclusions, rather than country-specific information, are the object of this report.

There can be no selection bias about the sources used for this report in the light of the explanation given above. However, arbitrary choices may have been done about the aspects and themes selected as the focus of this synthesis report. In other words, some topics may have been emphasized to the detriment of others. In order to avoid the risk of neglecting or overlooking parts developed by the EURATOM projects, the report has been reviewed by the organizations that took part to the European project consortia and relevant services of the EC (namely, project officers of DG RTD who were familiar with the projects). Insights and comments from the researchers and practitioners who were directly involved in the projects has, thus, worked as quality control on the synthesis of principles that is provided in this report[3].

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[2] The CARL network supported a comparative social science research project focussing on stakeholder involvement in RWM and the effects this generates on the decision-making process. The countries involved were Belgium, Sweden, Slovenia and United Kingdom. The research project ran from October 2004 till December 2007.
[3] Not all comments provided by the InSOTEC project consortium could be integrated because they were submitted after the deadline planned for review.

Table 1
EURATOM projects on public participation in RWM and main objectives

Years and funding Scheme	Acronym and full name	Brief description	Countries involved
2000-2003 FP5	**RISCOM II** Transparency and Public Participation in Radioactive Waste Management	The overall objective of the project was to support transparency of decision-making processes in the radioactive waste programmes of the participating organizations by means of a greater degree of public participation. Although the focus was radioactive waste, findings are expected to be relevant for decision-making in complex policy issues in a much wider context.	Czech Republic, France, Finland, Sweden, United Kingdom.
2000-2003 FP5	**COWAM** Community Waste Management	The project established connections between territories concerned by radioactive waste in Europe. The COWAM seminars were a novel opportunity to exchange views, issues and good practices among local communities, all facing similar concerns. The network also included experts, implementers and regulators. The practical outcome of this first project was to come up with a research framing of radioactive waste governance.	Belgium, Czech Republic, Finland, France, Germany, Slovenia, Spain, Sweden, Switzerland, United Kingdom.
2004-2006 FP6	**COWAM2** Community Waste Management 2	The project carried out a collective and inclusive dialogue on ways to improve decision-making processes in RWM at local and regional level. COWAM2 built on the exploratory conclusions of the COWAM project and delivered practical recommendations for implementation.	France, United Kingdom, Switzerland, Spain.
2006-2008 FP6	**ARGONA** Arena for Risk Governance	The project showed how participation and transparency link to political and legal systems, and how new approaches can be implemented in discussion and policy-making for RWM programmes. Decision-makers and stakeholders at both national and local level were involved in the project.	Belgium, Czech Republic, France, Finland, Norway, Slovakia, Sweden, United Kingdom.

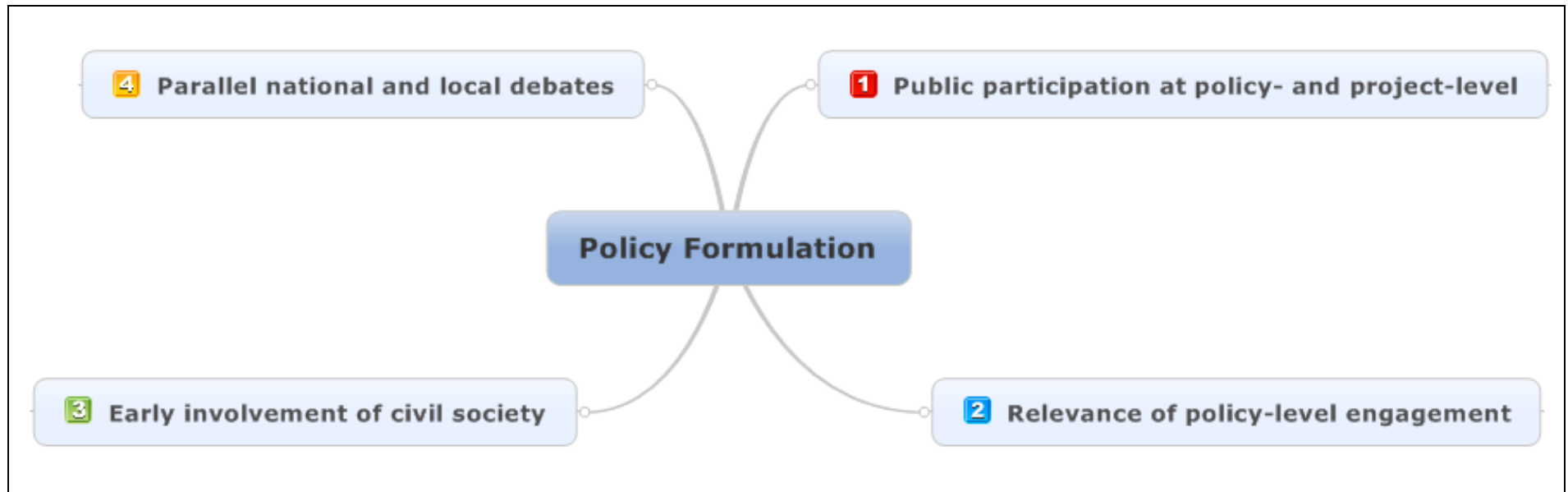| 2007-2009 | **CIP** | The objectives of the project were to contribute to real, tangible progress in the public governance of RWM programmes. The project analysed five national processes of RWM governance and offered support to a variety of stakeholders involved in the process, particularly local communities. | Belgium, France, Romania, Slovenia, Spain, United Kingdom. |
FP6	COWAM in Practice		
2011-2013	**IPPA**	The project wanted to enhance the quality of decision-making processes in RWM through clarity, awareness, fairness and trust. A key principle is the implementation of participative processes and transparency, and the involvement of stakeholders in 'safe spaces'.	Bulgaria, Czech Republic, France, Finland, Germany, Hungary, Poland, Romania, Slovakia, Slovenia, Sweden, United Kingdom.
FP7	Implementing Public Participation Approaches in Radioactive Waste Disposal		
2011-2014	**InSOTEC**	The project aimed at generating a better understanding of the complex interplay between the technical and the social in radioactive waste management and, in particular, in the design and implementation of geological disposal.	Belgium, Czech Republic, Finland, France, Germany, Hungary, Norway, Slovenia, Spain, Sweden, United Kingdom.
FP7	International Socio-Technical Challenges for implementing geological disposal		

4.   LESSONS LEARNT

This section groups the major lessons learnt from the EURATOM projects under the factors explained in section 2: policy formulation (section 4.1), policy design (section 4.2) and implementation process (section 4.3). The relevance of the socio-economic context mentioned in the theoretical part is confirmed by the EURATOM projects. Notwithstanding the importance of abstracting general principles, national contexts and traditions cannot be neglected in any attempt of mutual learning across different countries. The empirical data coming from the EURATOM projects called for the inclusion of an additional important element which is neglected in the theoretical anchorage presented above. This element consists of resources and their allocation (section 4.4).

4.1.   Lessons learnt about policy formulation

Policy formulation refers to how a given policy has been decided. The major lessons learnt from the EURATOM projects about policy formulation are listed here and summarized in figure 2.

- The general public and local communities can be involved in RWM at two main levels: in the formulation of the national policy and programmes ("policy-level"), and in their execution through specific projects which develop in phases such as siting, operation, etc. ("project level").

- The general public and local communities should participate in the formulation of the national policy and programme for RWM and not only, at a later stage, in its implementation through specific projects.

- An early involvement of the civil society seems to benefit the whole decision-making process.

- In particular, the early engagement of local communities in the decision-making process is pivotal in RWM. Therefore, national and local debates on RWM should run in parallel and start as early as possible.

Figure 2
Policy formulation

4.2. Lessons learnt about policy design

Policy design consists of the content given to a policy, with its objectives and means (i.e. the organizational structure responsible for the development and delivery of a policy). As a general remark stressed by the EURATOM projects analysed, the social dimension of RWM (i.e., public concerns, social values, national traditions, etc.) and the technical aspects of RWM (i.e., type of waste, properties of containers for storage/disposal, etc.) should both shape the design of a national RWM policy. Implementers, regulators and the techno-scientific community should include concerned social actors to participate not only during the phase of implementation of specific technical solutions (that have already been approved and adopted) but much earlier, in the technical debate and in framing the complex socio-technical issue at hand.

The major lessons learnt from the EURATOM projects about policy design are listed here and summarized in figure 3.
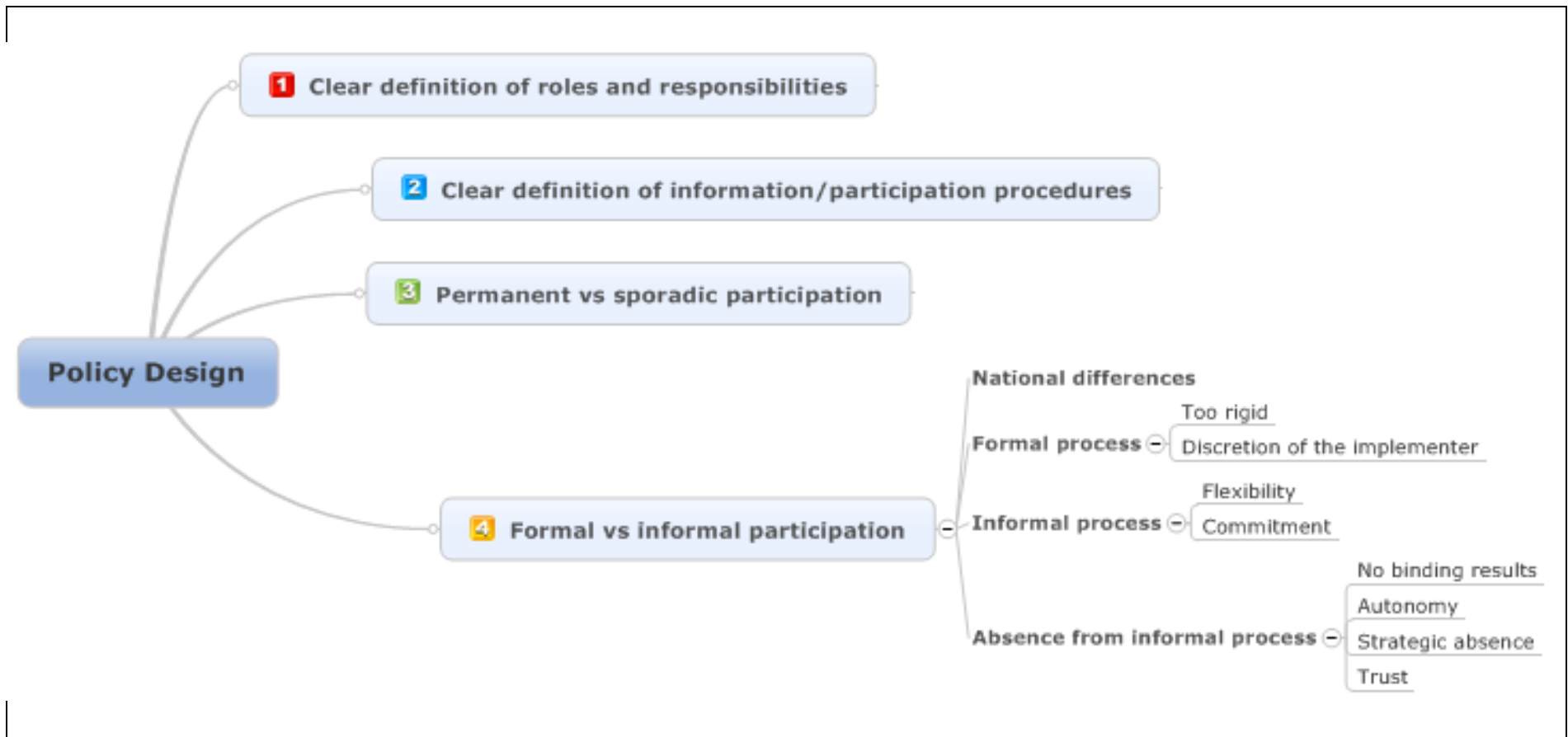
- The national policy should clearly define roles and responsibilities in the state apparatus for the issuing of laws and regulations, for the implementation of the legislative and regulatory framework, for monitoring and control, and for the funding of all these activities.

- The national policy should also define procedures for public access to information and public participation.

- Public and local participation should occur on a regular basis rather than being occasional and sporadic.

- An important aspect is whether the national legislative framework gives the public and local communities any space of involvement in the RWM decision-making process through legal (formal) provisions. The issue of formal/informal participation is discussed in detail in the following section on 'Formal vs informal participation'.

4.2.1. Formal vs informal participation

- The nature and use of procedures and instruments for public participation varies across Member States (MSs).

- Instruments for public participation are sometimes included in national legislative frameworks ("formal process").

- However, the legal requirements for citizens' involvement can be so vaguely defined in the primary legislation of a country that it is up to the implementer to give them practical application.

- Practices of public participation have often been introduced in MSs informally and without any change in the legislative framework ("informal process").

- A formal process is legally guaranteed but can become too rigid to allow creative input. By contrast, an informal process is more flexible and open to changes and evolution, but heavily depends on the good will of the actors involved.

- Informal approaches to public participation may be less rigid and, hence, facilitate public participation and dialogue among actors. However, there are a number of possible reasons for stakeholders not to take part in informal approaches to public participation such as:

  — The results of these processes may not be binding for decision-makers; hence, some stakeholders may not regard the process as meaningful;

  — Local stakeholders and Non-Governmental Organisations (NGOs) may want to maintain their autonomy; hence, they may not want to be part of a process in which also the developer takes part;

  — Even if autonomy can be guaranteed, a stakeholder can have tactical or strategic reasons to stay outside the process in which their "opponents" take part;

  — Legitimate participants may lack trust in the neutrality of the process or its organizer.

Figure 3
Policy design

Policy Design

1. Clear definition of roles and responsibilities

2. Clear definition of information/participation procedures

3. Permanent vs sporadic participation

4. Formal vs informal participation

National differences

Formal process
- Too rigid
- Discretion of the implementer

Informal process
- Flexibility
- Commitment

Absence from informal process
- No binding results
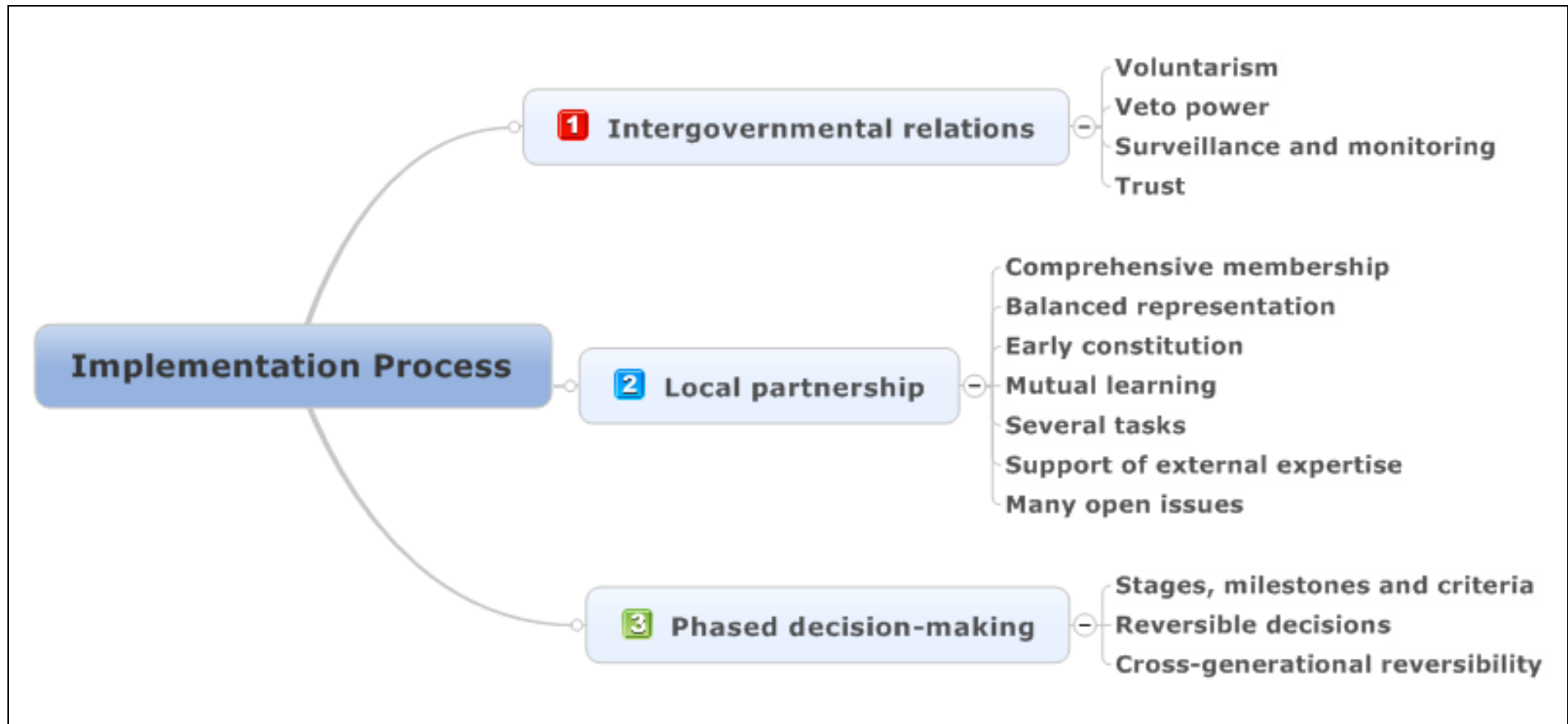- Autonomy
- Strategic absence
- Trust

4.3. Lessons learnt about the implementation process

The implementation process consists of the set of interactions that take place among various state and non-state actors at the national and local level. Three major subtopics under the implementation process seem to recur in the EURATOM's projects reviewed for this report: the distribution of authority and power along the centre-local dimension ("intergovernmental relations"), the creation of local bodies and committees ("local partnership") and the structure of decision-making per stages (or "phased decision-making"). The major lessons learnt for these three subtopics are listed in the following sub-sections and summarized in figure 4.

4.3.1. Intergovernmental relations

- Local communities should be empowered to enter and withdraw voluntarily with regard to a siting process.

- Local communities seem more willing to participate in site selection when they are granted a (formal or informal) veto power, which acknowledges them as genuine partners in dialogue and decisions.

- Local involvement should continue after the siting phase. For instance, national and local actors should also be integrated in the decision-making around surveillance and monitoring.

- An important element that facilitates or hinders participation practices is, respectively, the presence or absence of trust. The topic recurs in several reports. There is a general degree of scepticism of local communities and the general public towards national RWMOs, nuclear industry and central governmental organizations.

Figure 4
Implementation process

Implementation Process

1 Intergovernmental relations
- Voluntarism
- Veto power
- Surveillance and monitoring
- Trust

2 Local partnership
- Comprehensive membership
- Balanced representation
- Early constitution
- Mutual learning
- Several tasks
- Support of external expertise
- Many open issues

3 Phased decision-making
- Stages, milestones and criteria
- Reversible decisions
- Cross-generational reversibility

4.3.2. Local partnership

- Local participation improves when it is organized in a more structured way through local committees (or "local partnership"). These local bodies should include a membership that reflects the local fabric; hence, it should bring together local elected representatives, local economic actors and trade unions, community representatives from the public at large, regulatory bodies and implementers. Particularly, regulatory bodies and implementers should participate to provide information and answer questions.

- Mechanisms should be put in place which ensure that all parties are represented and that their inputs are balanced. However, it is difficult to establish what is "representative" and to choose representatives who are accountable to specific groups.

- Local partnerships should be established very early in the decision-making process.

- The ultimate goal is not necessarily a decision; an important achievement is mutual learning among the actors involved.

- The local partnership may carry out several tasks and activities:

  — Formulate the local requirements on the project;

  — Conduct studies and analyses during siting;

  — Follow-up after the siting;

  — Gather information from various viewpoints;

  — Interact with the available sources of expertise;

  — Inform the public about the arguments and propositions;

  — Lead and structure dialogue at the local level;

  — Dialogue with and inform the regional and national levels;

  — Strive to involve the silent majority;

  — Train its members;

  — Etc.

- The local body can be supported by external experts and will provide local elected representatives the results of its work so that local politicians are sufficiently prepared to carry out dialogue with national authorities.

- When it comes to local committees some important questions may rise: How does a Local Committee (LC) operate? What are its rules and composition? What legal texts determine its structure and organization? How are its members chosen? Who presides over it? What is the role of, or relationship with, waste producers, implementers and

regulators? How can LCs represent their community and verify the will of the people? How can they inform and interest the community? How do they receive suggestions? What methods can be used to check whether LC orientations are representative, or check local support and consent for LC actions? Etc.[4]
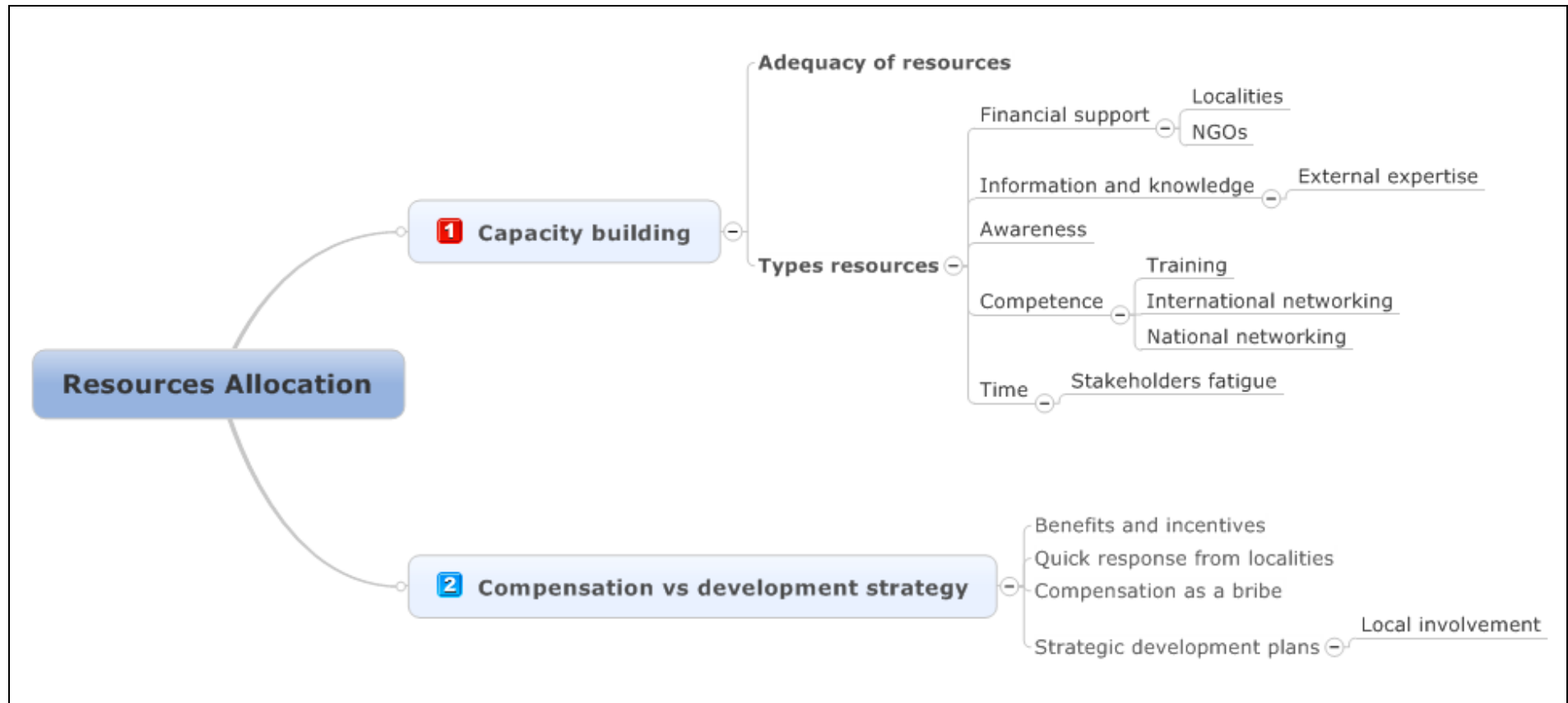
4.3.3. Phased decision-making

- The decision-making process should be structured in a series of clear stages with milestones. The evolution of the project through the various stages identified should be discussed at the national and local level with clear definition of criteria for 'go' or 'do not go' to the next step. At the end of each stage several possible options should be foreseen in order to avoid dead ends in the project.

- A phased (or stepwise) decision-making proceeding per stages may allow the municipality to ponder its participation to the project at each stage of its development. It is important to identify stages, milestones, roles (of different actors) and rules (e.g., clarifying when the decision-making process can move to the next stage). Local communities should also been entitled to block or reverse a decision at the end of any stage ("stepwise and reversible decision-making processes").

- Future generations, too, should be allowed to reconsider the decisions taken by their predecessors.

4.4. Lessons learnt about resources allocation

In the policy discourse, resources usually include a long list of physical and immaterial assets used and mobilized to form and implement policies (funds, personnel, talent, appropriations, equipment, knowledge and information, leadership, energy, time, etc.). The issue of resources that emerges from the EURATOM projects has a twofold nature: it needs to be understood as capacity building and compensation. The two aspects are discussed in the following subsections; the major lessons learnt are summarized in figure 5.

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[4] The COWAM project developed a guide for the construction of local committees, i.e. the "Roadmap for Local Committee Construction" (2006), which addresses many of these questions.

Figure 5
Resources Allocation

4.4.1. Resources as capacity building for public participation

- The development and execution of practices of public participation heavily depends on the availability of resources.

- Resources are not only funds; they include knowledge, experience, time, etc.

- Adequate financial resources should be made available by the central level to local governments and NGOs. Financial support should be given to local communities so that they have the adequate means to inform and involve citizens. The financial support provided to localities should be independent from the implementers. Adequate funding is needed not only for the correct involvement of localities but also for the participation of other actors such as NGOs.

- Information is an important resource that should be provided in order for actors to be empowered with sufficient knowledge for grasping the complexity of RWM.

- Local actors need to build their competencies in order to enter a fair dialogue with national decision-makers. Therefore, localities should be given the financial means to consult experts on their own.

- Once local engagement into the policy- and rule-making of the country is made possible by the national framework through formal and informal processes, these entry points into the national policy process must be known to local actors. Similar considerations are valid for public participation in general.

- Capacity building is particularly important for local communities and NGOs if they are expected to take part in participatory processes. Unlike NGOs, local involvement may be limited by the lack of competences of specific groups and individuals which can be of many kinds (technical knowledge, organization capabilities, communication skills, etc.).

  — Material resources are particularly important for local competence building. For instance, training should be provided to localities to allow them to understand the complexity of RWM.

  — Trough linkages and exchanges among localities across countries, municipal actors could learn from one another's experience. A stronger link among European localities emerged as a strong need.

  — Networking of local communities of the same country is also often missing; platform should be put in place to help intra-state connections among localities which may share similar problems and similar possible solutions. Intra-state linkages among communities also determine achieving a sufficient critical mass to influence national decision-making.

- Time is needed for stakeholders to grasp the issues at stake.

- Enough time should be guaranteed so that local players have the time to develop dialogue and build their input. However, the long extension of a process may induce a "stakeholder fatigue" and the withdrawal of individuals with many other responsibilities.

4.4.2. Resources as compensation vs regional development policy

- Benefits packages are often offered to hosting communities.

- However, financial compensation seems to be a narrow approach which may trigger a quick positive reply from localities without a pondered decision about the local long-term strategy.

- Compensation should not function as a form of "bribe".

- RWM policies should rather be included in a broader strategic socio-economic development plan for the local community so that local development is compatible with the hosting of a RWM facility. The siting of a RWM facility should be inserted into a long-term strategic plan of local development (including infrastructures, employment, etc.) in which the facility is a pivot for local economic growth.

- Local communities should be involved by the national authorities in this debate.

5.   CONCLUSIONS

For many decades, RWM has commonly been addressed on the basis of a strong division between its technical and social dimension, with a predominance of a technological focus. Only recently, the social dimension of RWM has been acknowledged by policy makers and other practitioners from governmental agencies and the nuclear industry. The social and technical dimensions of RWM are intertwined and subject to change over time. Recognising the socio-technical nature of RWM might be a starting point for understanding the challenges ahead.

When the social dimension of RWM is taken into account, the debate reveals a clear opposition of beliefs systems between the believers and non-believers in the manageability of radioactive waste. The confrontational culture that exists in the domain of RWM confirms the relevance of public participation for effective RWM.

The EURATOM projects have developed some important insights on the issue of public participation in RWM which the report has tried to summarize in a concise and schematic way. These conclusions work as "take away points".

Public and local participation may occur both upstream, during the formation and definition of national laws and regulations (policy formulation and policy design in figure 1), and downstream, in the implementation of the regulations and execution of projects (implementation process in figure 1).

However, the shift of focus towards public participation has not always determined a real shift in power; forms of co-governance, for instance, are absent from the majority of key decisions. For the involvement of civil society and local actors to be possible, some national legislative and administrative frameworks should be changed. Changes may also be needed to allow the adequate support in terms of resources to make public participation possible in practice. A fair interplay between national state actors and public/local interests implies that the correct background conditions are developed by each state in terms of allocation of resources and support, creation of expertise and supportive structures. Only in this way can inclusive decision-making processes be put in practice. However, several factors – such as the legal and institutional frameworks, the policy style and the political culture, etc. – are specific of each country and (often) each locality so that a "one-fit-all" solution cannot be provided. Public and local involvement may also take different forms according to the stage of RWM in which a country is at a given moment.

International legal instruments (e.g., the Aarhus Convention) seem to empower civil society, local interests and NGOs to request the creation or enhancement of instruments of public participation. Can the EU Directive 2011/70/EURATOM (establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste)

be expected to play a similar role? Will it be able to steer 28 MSs with so different policy-making traditions towards a more participative policy style? E-TRACK, with its work on RWM, will work to promote public participation in RWM in the EU28 by collecting information, connecting actors and sharing knowledge.

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