## The Ambivalent Role of Participants in Nuclear Waste Decisions – 16360

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# ABSTRACT

Today's global nuclear sector has entered a critical juncture. Waste management solutions have the potential to influence the prospects of whether new plants will be built and when aging plants will be decommissioned. Even in countries without nuclear power plants, the siting of nuclear waste can present communication challenges and opportunities for public involvement.

As new nuclear programs withstand scrutiny, local communities share their want for solutions to nuclear waste before new plant construction commences. Developing nations have begun to explore the potential of adding nuclear power production to their energy mix. They carefully watch established nuclear players to accelerate their plans with lessons learned elsewhere. Some newcomers to nuclear energy will make decisions on new construction based on other operators' abilities to reconcile public concerns regarding radioactive waste.

Distinct forms of government, cultural norms and means of public discourse present innovative approaches and changing expectations worldwide. This paper explores how practitioners are evaluating ways to activate stakeholders on nuclear waste siting in nations embarking on new nuclear programs. It investigates the incentives that people have to participate and legitimize the formation of laws, regulations and standards for nuclear materials management. Finally, it highlights examples of public participation techniques from established operating environments and posits that overly prescriptive requirements for stakeholder engagement can reduce the authenticity of public involvement and weaken confidence among participants in the decision making process.

## INTRODUCTION

The International Association for Public Participation lays out a familiar spectrum of goals for practitioners interested in stakeholder involvement.[[1]] It highlights the various levels of influence the public may have on the decision making process. A decision-making process that invites diverse stakeholders to contribute in risk analysis and management improves the probability that decisions will be commonly accepted. The concept of "stakeholders" often extends beyond authorities and affected communities to include the public at large.

The level of influence the public may have on decision-making reflects the actual or perceived interactions with the decision-makers. The IAP2 spectrum of involvement includes activities that inform, consult, involve, collaborate and empower.

Practitioners must define how to use community input and whether or not they will decide among alternatives defined by public process. The spectrum does not represent the forms of participation in order of preference. Even in representative democracies that strive to empower their citizens, many agencies are legally bound to their decision authority. Accountability and legal responsibility to the outcome cannot and in some cases, need not, be dispatched to the public.

Culture theorists assert that discrete ways of life and associated worldviews can be mapped into four or five distinct groups. These worldviews range from egalitarian to hierarchical, individualist to communal. These ways of life facilitate the congregation of like-minded people and the resulting communities tend to selectively perceive risk according to their shared systems of beliefs.[2] High and low values on these scales will affect the perceived role of participation in government decision making norms. In effect, the role for public participation in any of its forms becomes part of ongoing debate about the ideal society.

The connectivity and interdependence of today's global economy has led to growing sophistication among citizenry worldwide on issues of participation. Technology and globalization enable and increase demand for transparency. As a result, intersections of social forces emerge across national borders.

While nuclear waste siting remains a highly localized task, the multinational nature of the intergovernmental cooperation and nuclear supply chain within the nuclear field present a complex landscape of proven practices. The challenges of science communication merge with political science as nuclear organizations seek to gain public consent for siting activities. Conflicting attitudes about the costs and benefits of advanced technology and industrial development produce debate. Ambivalence about the decision making process emerges when the status quo offers the most certain future.

Examples of successful public participation will always require careful deliberation and calibration to succeed in new locales. In Asia, North American and European experiences offer valuable lessons. Transnational boundaries create relevant territorial concerns in how neighboring governments can address "not-in-my-back-yard" attitudes.[3] Greater awareness of the effects of ambivalence provides insight into the ways individuals respond to the cognitive dissonance of conflicting positive and negative attitudes. From this perspective, this paper seeks to lay out conditions for meaningful co-determination through stakeholder involvement and public participation.

## BACKGROUND

The International Atomic Energy Agency (IAEA) produced in 2007 its first guidance for member states looking to implement new nuclear energy programs.[4] The proposed

"milestone approach" includes radioactive waste siting as a necessary criteria. To making a commitment to pursing a nuclear energy program, the IAEA recommends that countries begin their programs with attention to siting options for waste disposal and begin to revise laws and regulations, including those for stakeholder involvement, before construction has begun.

During Phase 1, governments are advised to create a nuclear energy program implementing organization (NEPIO) to prepare policy and strategy recommendations to the decision makers in government with respect to each of the 19 infrastructure issues identified by the IAEA. Once a nation has made a clear commitment to proceed with a nuclear energy project, the NEPIO moves its recommendations into firm action plans and begins to assign institutions to formalize rules in a permanent structure for the construction and operation of nuclear plants.[5]

Stakeholder engagement and public communication are integral pieces within these infrastructure issues. The IAEA's technical assistance in these areas includes guidance on public participation. It highlights the various levels of influence the public may have on the decision making process. Effective stakeholder involvement is not offered as a guarantee that new nuclear programs will be successfully implemented; however, emphasis for NEPIOs is that increased public participation is a necessary condition.[6] Decision-making processes that invite diverse stakeholders to contribute in risk analysis and management is repeatedly shown to improve the probability that decisions will be commonly accepted.

# DISCUSSION

As nuclear energy enters a critical juncture, waste management solutions will influence the prospects on whether new plants will be built and when aging plants will be decommissioned. Like many large infrastructure projects, nuclear waste siting has been subjected to long, intractable opposition. Public protest, legal intervention and political standoffs characterize the burden of the last stages of the nuclear fuel cycle. While technical constraints exist, the far greater challenge appears to be governance.[7] Governments across the planet are working to define processes which will legitimize decisions.

Many nuclear newcomers already maintain low-level and intermediate sites for radioactive waste. As they approach Milestone 2 in embarking upon a new power production program, they need to revise laws and regulations, including requirements for stakeholder involvement. The types of participation range from informative, deliberative, and decisive.

Different types of participation receive careful consideration to determine the best approaches. The challenge lies in two primary areas:

1. Defining meaningful, yet flexible, requirements for impact assessments in government regulation.

2. Creating shared systems for evaluating intangibles during deliberative processes.

#### Making Requirements that Produce Authenticity

A predetermined and overly defined process for public participation may result in the public's refusal to participate. Efforts to define measures for assessing social and environmental impacts can produce unintended effects. Weakness in regulation, lack of awareness and inexperience among citizens can reduce the effectiveness of public representation in the decision making process.[8]

A predetermined process can define the issues before appropriate public consultation. This can reduce confidence in the proposed solutions as well as the process for choosing among solution sets. As nations define prerequisites for stakeholder engagement in the decision-making process, their citizenries may judge their designated role in the process. An authentic process may be perceived to reflect stakeholders' interests from the initial point of problem identification, before the process to solve the challenge is defined. To build public confidence in their self-determination, decision-makers must balance between using public participation as a means of obtaining permission and minimizing negative impacts on affected communities.

Despite potential shortcoming of existing impact assessment procedures, regulation from the U.S., Canada and other nuclear operators serve as models to other countries. In 2012, the U.S. Environmental Protection Agency delivered a two-day workshop in Jakarta, Indonesia, which was co-sponsored by the Indonesian Ministry of Environment, USAID, and the Asian Environmental Compliance and Enforcement Network. The development and implementation of public outreach programs under the guidance of Environmental Impact Statement (EIS) may meet the requirements (40 CFR 1506.6) of the National Environmental Policy Act (NEPA) may serve as a useful legislative framework, but countries seeking frameworks should proceed with caution. These regulations can persist without inspiring the meaningful action intended.

In the U.S. context, divergent agencies demonstrate the challenge of competing technical and governance requirements in siting nuclear waste. Litigation on the proposed site for a national repository at Yucca Mountain highlighted the difference between preferred means for decision making at the Environmental Protection Agency and Nuclear Regulatory Commission. Both agencies meet ongoing requirements for public participation under NEPA regulation. However, stakeholder engagement has failed to produce a final solution.

In this case, ten years after initial plans were made for siting the deep underground repository, performance requirements of such an engineered barrier system were

litigated, highlighting the opposing preferences for risk versus performance based standards. The performance requirements included 1. Duration of containment and 2. Not-to-exceed release rate. The contradictions between policies at the two agencies were subjected to litigation through Energy Policy Act. Third party reviews by the National Academy of Science produced recommendations on the technical basis of the proposed solution but avoided the topic of what level of release limits would be acceptable. This case demonstrates that despite clear and specific regulation guiding requirements for public participation, the question of science versus societal norms on acceptable risk remains an obstacle.

### **Creating Participation that Addresses Intangibles**

The lack of definitions for sustainable development presents opportunities for controversy with regard to overcoming neglect of environmental and other intangibles.[9] National versus regional or local goals come into conflict. Due to nuclear energy's production of baseload electricity, the cost/benefit analysis tends to focus on national priorities rather than local.

Public participation offers a way to understand and integrate shared values for environmental accounting into the decision making process. In the UK, the use of information in public activities seldom occurs without dialogue.[10] Here, the "viable system model" frames siting objectives relative to social norms.[11] Conversations with local residents help to define needs for mitigation versus compensation.

Socio-economic impact assessments for large industrial projects such as nuclear facilities exist in the regulatory context of many countries. Participation mechanisms such as compensation auction and consent-based siting seek to assign dollar value to services yielded from the environment while also indicating indefinable value of things like scenic views, noise pollution, clean water and air.

The opportunity cost of solutions is also a factor. A decision may present the loss of alternative choices. For example, money spent on siting cannot be spent on health, education and other infrastructure improvements. While Finlandonly engaged the public on repository options, outreach in the Czech Republic determined that stakeholders wanted to discuss alternatives, not just relative risk, leading to an expansion of education efforts to include transmutation.[12]

In Indonesia, nuclear waste concerns became an obstacle to nuclear plant siting. The transfer of negative externalities to future generations generated objections to the new nuclear program. Positive impacts such as more jobs, reduced reliance on coal and fewer emissions met objections. In an effort to exert "soft" influence, the community near the proposed site was offered lower electrical bill.[13]

Despite diverse experiences setting guidance for public participation and evaluating

social values and risk perception in the decision making process, practitioners find this consistent criteria: expectations are set early on how legitimate the proposed solution may be. The definitions of participation illustrate reigning attitudes about democracy, individual rights and empowerment and show that public participation is an important process in the planning system, with a big impact on executive decisions from the top.[14]

### **Preparing Frameworks for Action**

New frameworks are being influenced and co-determined by interconnected communities. The open, transparent process declared in the United Arab Emirates serves as a model to other countries. But accounting for the differences in government, culture and social norms is relevant to translating these processes and requirements for public participation to new environments.

In Singapore, state authority structures sought to accommodate active citizenship interests in the fast growing economy. *Remaking of Singapore* and the Singapore 21 documents created guidance for public participation in the nation state.[15] While the country tabled its own plans for nuclear energy in 2012, authorities continue to engage the public and educate on related issues. In 2014, the country initiated a \$63 million, five-year program to conduct research and education in nuclear safety, science, and engineering. Developments in the region have given rise to ASEAN to address transboundary issues such as the management of nuclear waste and risk management.

Malaysia also offers robust government documentation advising on public participation methods. Its "Guideline on Public Consultation Procedures" was issued by the Regulatory Review Department in 2014 and has been used by the nation's NEPIO to inform stakeholder outreach. Crisis over poor management of radioactive material at a rare earth mining company has put waste at the center of public concerns about the potential for nuclear plants in the country.

Skepticism in government issued guidelines will persist throughout any process. Stakeholder involvement programs can be expanded from simple delivery of the information needed to dialogue on what information is actually needed and the specifics on how to achieve a mutually accepted solution. In order to engender trust in the process, clear goals, roles and responsibilities need to be established. Regulation plays a role, but is insufficient in itself.

Successes and failures in managing waste siting efforts show that effective stakeholder involvement helps to assign responsibility for the risks of the decision across the society. It also enhances the competence of the decision making. Stakeholder engagement programs identify specific stakeholders, including federal, state and local elected and appointed officials, government agencies, tribes, religious leaders, nongovernmental organizations and private individuals. A preliminary stakeholder base contact list may serve as a benchmark throughout the life of projects to site and construct nuclear facilities.

Centralization and attitudes toward authority influence the relevance of key stakeholder groups. In some locales, over representation by vocal minorities may distort the process. Cultural norms may also suppress meaningful debate on proposed solutions. Technology also influences the flow of information and the awareness of involvement opportunities. Moreover, resistance to proposed stakeholder engagement activities provides a mechanism to sustain opposition and undermine undesired decisions.

#### CONCLUSIONS

The limited analysis of the Asian experience of NIMBY[16] demonstrates that there are potential approaches yet untested in nuclear siting. Practitioners need to stay alert as new frameworks for public participation take shape in nuclear newcomer nations. Multilateral nuclear approaches will also spur changes influencing the factors which facilitate co-determination at the local and regional levels.

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