

**Questions and Answers**  
**IFNEC Webinar – July 8 2020**

***The Multinational Repository Concept: Shared Solutions for Solving the Radioactive Waste Management Challenge facing Emerging Countries and those with Small Nuclear Programs***

Question	Asker Name	Answer(s)/[answered by]
1. Would Deep Isolation deep geological drill hole repository qualify as "geologic repository"?	Kalev Kallemets	<b>[Christophe Xerri]</b> yes <b>[Sean Tyson]</b> It should be noted that a deep borehole repository may not be an optimal solution if there is a possibility that the operator/owner may want to retrieve the contents some point, e.g., reprocessing or environmental issue.
2. What is the status of the programs for small modular nuclear power plants in Lithuania, Estonia and Latvia?	rebecca harms	<b>[Tomaž Žagar]</b> This webinar was not focused on strategies for developing SMRs reactors.
3. Why are you dealing only with SNF and HLW for a Multinational Geological Repository? ILW not suitable for surface disposal shall be as well disposed of into a Geological Repository.	Angelo Paratore	<b>[Christophe Xerri]</b> It can also be an option for ILW. There are also examples for LLW
4. Can I get some more information about the study on multinational repository option commissioned by Jordan and US?	rebecca harms	<b>[Sean Tyson]</b> The study will focus on measures that Jordan should take to allow it to pursue a dual track approach to disposal (exploring multinational options while developing a national disposal program). For example, it may be necessary for Jordan to amend legislation to allow funding for nuclear waste disposal to support participation in a multinational project. At this time, DOE and Jordan are engaged in identifying the scope and other parameters of the study.
5. Thank you for an introduction in the problem. Yet one more question appears: why we are wording as "multi-national" while in a majority of cases it seems enough to rely on bi-lateral (two-nation) collaboration in terms of SF and RW?	Evgeny Ivanov	<b>[Christophe Xerri]</b> MNR can involve more than one country. It was the ambition of the South Australia project. In a different situation, France and UK have had customers from several countries (Europe, Asia, ..) each for the service of spent fuel reprocessing (final waste is returned to the customer). <b>[Sean Tyson]</b> Studies indicate that a repository operator can achieve economies of scale for disposal, so encouraging multiple countries to participate in an MNR project could benefit the operator and potentially reduce costs for participants.
6. Dear Sean, thank you for the summary and overview of all past meetings. Can you tell us more about results	peter breitenstein	<b>[Alan Brownstein]</b> -Mr. Brownstein's presentation addressed the reasons why there is room for optimism about the future path forward for MNR's

and a potential way forward? Is there light at the end of the tunnel?		
7. Could you comment the subject of responsibility if we will have generation in one region and final disposal in another, thank you	Evgeny Ivanov	<p><b>[Panel]</b> It is generally understood that the country accepting the spent fuel for disposal will ultimately have ownership. The specific terms and conditions would be subject to negotiations between the parties.</p> <p>The Joint Convention states: <i>“ultimate responsibility for ensuring the safety of spent fuel and radioactive waste management rests with the State” and “as far as is compatible with the safety of the management of such material, [it should] be disposed of in the State in which it was generated”</i> but it also recognizes that, <i>“in certain circumstances, safe and efficient management of spent fuel and radioactive waste might be fostered through agreements among Contracting Parties to use facilities in one of them for the benefit of the other Parties, particularly where waste originates from joint projects.”</i></p> <p>Thus, participation in a MNR project may be one way of assuming ‘ultimate responsibility’. The country exporting spent fuel will have fulfilled its responsibilities providing that the MNR is a state of the art facility in a willing host country. The intergenerational transfer of responsibility is then the same issues as in a national disposal program.</p>
8. What are the actual technical problems for the project in Forsmark, Sweden?	rebecca harms	<p><b>[Charles McCombie]</b> There do not appear to be any insurmountable technical problems in the current project.</p>
9. Question to Christoph Xerri: shall a MNR be able to accept all "national" forms of HLW conditioning? E.g. copper or other spent fuel canisters, vitrified residues in different packages etc...	peter breitenstein	<p><b>[Christophe Xerri]</b> Whoever hosts an MNR will have to establish “acceptance criteria”. From a technical stand point, it can be possible to accept in the same geological disposal glass canisters and conditioned spent fuel.</p> <p><b>[Charles McCombie]</b> This is indeed one of the additional technical challenges in a multinational repository. It may well be necessary to have a broader range of handling capabilities to cope with the diversity of waste forms arriving. Of course, it would be sensible for potential partners in a multinational repository to coordinate as early as possible their Waste Acceptance Criteria and their technical concepts.</p>

<p>10. For which national DGR projects is Mr Brownstein expecting progress in the near future? Especially because the US is still struggling with the challenge of intermediate and high level waste....</p>	<p>rebecca harms</p>	<p><b>[Alan Brownstein]</b> Despite the setbacks in the U.S., Finland has received approval of its construction license, Sweden has submitted its construction license which has been approved by its regulatory authority, and France is expected to submit its construction license later this year.</p>
<p>11. What is position in relation to DBD as shared solution</p>	<p>Nadja Zeleznik</p>	<p><b>[Christophe Xerri]</b> The MNR concept is technology neutral.</p> <p><b>[Tomaž Žagar]</b> The Working group is considering a future webinar on different technical solutions for MNR (including DBD, DBHD, HBD, ...).</p> <p><b>[Charles McCombie]</b> In practice, intermediate or deep boreholes may well be an entry mechanism for multinational disposal projects. Currently various studies are underway looking at possibilities for multinational disposal of small quantities of research reactor fuel in a borehole.</p>
<p>12. How will eventual spent fuel arising from MMRs and SMRs be handled?</p>	<p>Alberto Jaramillo</p>	<p><b>[Tomaž Žagar]</b> Technical management of spent fuel depends on the reactor core technology. Spent fuel from MMRs and SMRs using PWR technology are handled in a way similar to spent fuel from PWR NPPs.</p>
<p>13. Comment on resolution of Finnish utility Fennovoima being denied access to Posiva Oy (repository for TVO and Fortum utilities) which at one point led to announcement of plan to develop a second Finnish repository.</p>	<p>Andrew Orrell</p>	<p><b>[Charles McCombie]</b> The current situation in Finland is summarized in <a href="https://www.world-nuclear.org/information-library/country-profiles/countries-a-f/finland.aspx">https://www.world-nuclear.org/information-library/country-profiles/countries-a-f/finland.aspx</a> (updated June 2020) as follows, <i>“In June 2016 Fennovoima announced plans to build its own repository for used fuel, having failed to reach agreement with Posiva to share the Onkalo repository. It submitted its own environmental impact assessment to the Ministry of Employment and Economy. Geological studies will be undertaken at Pyhajoki near the Hanhikivi plant and also Eurajoki, near Posiva’s Onkalo repository and the Olkiluoto plant. The location is to be selected in the 2040s and disposal can begin in the 2090s. Posiva Solutions, a new subsidiary of Posiva, has entered a ten-year contract to advise on the project, and Fennovoima declared that its “goal is to achieve long-term cooperation with Posiva, TVO, and Fortum.”</i></p>

<p>14. Speaking of the future of the concept of MNRs, it is obvious that SNF repositories require hundreds of years of constant operation and management. However, national borders, governing regimes and political circumstances may change quite frequently. How can one ensure that an MNR based on the territory of one state will continue to operate safely in case this state - or regime - disappears from the political map?</p>	<p>Alexey Polyakov</p>	<p><b>[Charles McCombie]</b> This question could be equally asked regarding a national repository. The relatively rapid changes in all of the issues mentioned when compared to the timescales for geological disposal indeed make their whole concept of national borders being decisive for siting rather questionable. The general view is that any country deciding to implement a multinational repository will eventually have to accept full responsibility for this facility, although there are concepts for this transfer of responsibility being extended or ongoing. In any case, the existence of an operating repository, or indeed of a sealed repository, will be clearly known in any country and therefore also during any movement of geographical boundaries or of changes in political regimes.</p>
<p>15. The South Australian Royal Commission into the NFC was a success as it was well resourced and well researched. Unfortunately, the Citizens Jury which were consulted on their outlook to the NFCRC resulted in a lukewarm response and the SA gov. at the time decided against going forward with a proposal of the something like the MNR. How Link to the SA Citizen Jury  <a href="https://nuclear.yoursay.sa.gov.au/the-program/citizens-jury">https://nuclear.yoursay.sa.gov.au/the-program/citizens-jury</a>ever, the findings and conclusion of the SA NFC RC are mainly positive and still stands on its own. After the SA NFC RC, there are three other Fed. and State Inquiries into nuclear power &amp; mining.</p>	<p>Mark Ho</p>	<p><b>[Charles McCombie]</b> This comment accurately summarizes the events that took place in Australia. Personally, I believe that the “lukewarm” outcome of the citizen juries was predictable given the way in which they were set up. The huge positive advantage of the South Australian process originally was the bilateral political support that studying the possibility of hosting an MNR seem to have. This bilateral support crumbled when it appeared that there was no political advantages in promoting the project.</p>

<p>16. In a MNR framework who would own the spent fuel?</p>	<p>Mark Haldane</p>	<p><b>[Charles McCombie]</b> This issue has been discussed in previous publications such as “<i>Viability of Sharing Facilities for the Disposal of Spent Fuel and Nuclear Waste. IAEA TECDOC No. 1658</i>” and in papers such as “<i>Multinational repositories: ethical, legal and political/public aspects, Christina Boutellier and Charles McCombie, Int. J. Nuclear Law, Vol. 1, No. 1, 2006.</i> The general opinion seems to be that ownership of the spent fuel must eventually be transferred to the repository operator and long-term responsibility must eventually lie with the government. It is, however, conceivable that this transfer of ownership could take place over a long period of time, even several decades.</p> <p><b>[Alan Brownstein]</b> It is generally understood that the country accepting the spent fuel for disposal will ultimately have ownership. The specific terms and conditions would be subject to negotiations between the parties.</p>
<p>17. Would be nice to see a typical sketch of a geological repository, the deepness, and the characteristics of the soil, seismic stability, water table, etc.</p>	<p>Oscar Mignone</p>	<p><b>[Christophe Xerri]</b> available on websites of many countries (France, Finland, Sweden, China,...) and details available in IAEA's publications and e Learnings (free)  <a href="https://elearning.iaea.org/m2/course/index.php?categoryid=60">https://elearning.iaea.org/m2/course/index.php?categoryid=60</a>  <a href="https://elearning.iaea.org/m2/enrol/index.php?id=357">https://elearning.iaea.org/m2/enrol/index.php?id=357</a></p> <p>There are a range of geological disposal concepts, in different host rocks and applying different engineered barriers. The IAEA’s NE Series report on “Design Principles and Approaches for Radioactive Waste Repositories”, which will be published soon will provide a good overview. Typical characteristics are:</p> <ul style="list-style-type: none"> <li>▪ Depths over several hundreds of metres (Finland: ca. 450 m, France: ca. 500 m; Sweden: 500 m) isolating the waste from the biosphere and from surface processes/perturbations</li> <li>▪ Stable geological formation preferably with low permeability and low fracturing: typical host rocks meeting those criteria are crystalline rocks (planned repositories in Finland and Sweden), salt (RD&amp;D in Germany and US) and clay (planned repository in France and likely in Switzerland as well).</li> </ul> <p>Engineered barrier system (EBS): The differences in EBS are often due to differences in the host rocks. For example, the crystalline rocks in Sweden and Finland have fractures which could provide a potential pathway for radionuclide migration. Therefore they will use copper canisters which contain the spent fuel for longer timescales than the EBS foreseen in for example France. Most geological disposal concepts however design canisters or containers so that they contain</p>

		the high-level waste/spent fuel for thousands of years, sufficient for the so-called thermal phase to be over (the thermal phase is the period during which there are elevated temperatures due to the heat from the waste/spent fuel).
18. what are the potential threats due to MNR on public domain?	Krishna Kumar	<b>[Tomaž Žagar]</b> MNR can be understood as a threat for national programs, this can be seen as negative effect. MNR concept as an opportunity to change public acceptance of nuclear energy in positive direction.
19. It seems to be that this issue of the multinational repository comes since long time ago. Would suggest to have the basis of the technical-economic feasibility of the MNR, in order to make easier for an embarking country to evaluate and decide possibility for building a MNR	Oscar Mignone	<b>[Charles McCombie]</b> This is a very good question and, as I suggested on one of my concluding slides, it would be very useful if there were more analyses of the existing “business cases” for MNR’s (e.g. those of the Pangea project and of the Australian Royal commission project) and also further analysis of the technical-economic feasibility. <b>[Sean Tyson]</b> It is also worthwhile examining other potential benefits to the operator of an MNR to show that providing such services is not a purely economic/financial calculus. There are many other potential benefits to the “host” country and to the international community. As I noted in my presentation, there is currently an ongoing study conducted by the IAEA/INPRO which examines this issue in detail, and of course Dr. McCombie addressed these issues in his presentation. Identifying such benefits could make such a project more attractive to a public that may not be persuaded by purely financial incentives.
20. Do you believe that a consent-based bottom-up scenario would succeed in siting a MNR in a country?	Angelo Paratore	<b>[Charles McCombie]</b> Yes, if the question is reframed as “could” succeed. Consent-based siting is the increasingly preferred approach in national disposal programs and it has (after a lengthy period) led to success in Sweden, Finland, and France. For an MNR, the consent at the country level is obviously a pre-requisite. Following that, the local process for siting could be similar to that in the national program, with the issue of accepting spent fuel from other countries being weighed against the reasons for its consideration in the first place. Those potential reasons, or Incentives (economic, social, ethical and political) were addressed in my presentation.

<p>21. from the employment point of view, how many people would be needed (approx range) for building a MNR, and once built, to operate it, counting direct employment and indirect support</p>	<p>Oscar Mignone</p>	<p><b>[Christophe Xerri]</b> The IAEA does not have detailed studies on that yet</p> <p><b>[Charles McCombie]</b> The staffing needed depends on the scale of the project in exactly the same way as for national repository. Estimates from national programs vary greatly. For example, the UK which will need a very large repository to disposal of all its legacy and power reactor wastes has estimated 838 persons during construction, 565 during the long operational period and 188 during the closure phase (<a href="http://www.westcumbriamrws.org.uk/documents/179-Geological%20Disposal%20-%20Manpower%20and%20skills%20requirements%20-%20NDA.pdf">http://www.westcumbriamrws.org.uk/documents/179-Geological Disposal - Manpower and skills requirements - NDA.pdf</a>). In Canada, another country requiring a large repository staffing levels during operation have also been estimated at 500-600 (<a href="https://www.nwmo.ca/~media/Site/Files/PDFs/2015/11/17/23/24/1031_costestimate_deepgeologicalrep.ashx?la=en">https://www.nwmo.ca/~media/Site/Files/PDFs/2015/11/17/23/24/1031_costestimate_deepgeologicalrep.ashx?la=en</a>). Smaller programs such as Slovenia, Finland, Sweden and Switzerland have estimated much lower operational stall number is the range 150 250.</p>
<p>22. for moving forward on MNR, would an international nuclear authority would be needed first?</p>	<p>daniel DELORT</p>	<p><b>[Christophe Xerri]</b> An international nuclear authority would not be needed. The national safety authority must ensure safety in its country (national responsibility). It is expected that there will be a close cooperation between the safety authorities of the countries which would be involved in an MNR project. The IAEA safety Standards could be a useful common reference for the safety authorities of the countries involved.</p>
<p>23. What kind of other technical studies do you foresee to be needed for multinational shared repository</p>	<p>Nadja Zeleznik</p>	<p><b>[Christophe Xerri]</b> The IAEA NE Series NW-T-1.5 (Framework and Challenges for Initiating Multinational Cooperation for the Development of a Radioactive Waste Repository; <a href="https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1722_web.pdf">https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1722_web.pdf</a>) contains a good and comprehensive list of what is needed. Quoting from the description of that report: <i>“It describes the phased approach that would be needed, indicating the decision processes to be undertaken by partners in the multinational project, both within a national context and in the scope of the joint endeavor. It highlights a wide range of <u>legal and institutional aspects, including the contractual obligations among partners, the economic and financial arrangements, liabilities, nuclear security, regulatory and legislative aspects, waste transportation arrangements, and social issues.</u> It also addresses <u>the uncertainties and risks involved in the implementation of a multinational repository.</u>”</i></p>



		As I mentioned in my concluding remarks, the financial and contractual structure (incl. risk sharing) is one topic which needs more detailed development.
24. can we use this repository for nuclear plant and scale from oil industry?	Yasser Said	<b>[Charles McCombie]</b> I am not sure what the focus of this question is meant to be. Certainly, the nuclear disposal community has in the past learned from the oil industry – but maybe more slowly than it should have done. In practice, the technologies for drilling deep boreholes and for testing in these boreholes was originally taken from the oil industry. However, the much higher demands on the quality and accuracy of data required meant that many special procedures had to be developed for the waste disposal community – with a corresponding increase in the costs of such fieldwork.
25. Sean has given a good example. The USA agrees to disposal the waste from research reactors in client countries in the US. France, USA and Russia have exported nuclear power plants to other countries. Will the repositories in France, USA and Russia become multi-national repositories? Have these three countries considered this option?	Jinfeng Li	<b>[Charles McCombie]</b> Again, quoting from the IAEA Viability Assessment document: One option would be for nuclear-fuel suppliers to take back the spent fuel under a fuel ‘leasing’ arrangement, in which they would provide fresh fuel and take it back after irradiation. They would then add this leased spent fuel to their own larger stocks to be stored for later disposal, or for reprocessing and recycling into new fuel.  The concept was included in the Global Nuclear Energy Partnership (GNEP) program launched in 2006 by the USA, with the goal of restricting sensitive nuclear technologies to a limited number of supplier states. However, GNEP has been discontinued. Of all the nuclear suppliers, Russia has expressed the most support for fuel leasing and take-back and has, for example, agreed to do this for Iran and Vietnam. Russia has not yet offered such services widely.  In the past, Russia, France and the UK have all agreed to add foreign HLW from spent fuel from reprocessing to their national disposal inventories. This situation changed, however, in the 1970s when contracts were amended to specify that these wastes must be returned to the country of the spent fuel owner. Meanwhile, France is one of several countries which have a legal ban on the import of radioactive wastes.
26. In EU Taxonomy nuclear energy is rejected due to no fill the "do not	Józef Sobolewski	<b>[Tomaž Žagar]</b> EU Taxonomy has nuclear energy considered as positive for climate, since nuclear energy is producing energy with no or practically no CO2 emissions (12 g/kWh). So nuclear



<p>significant harm" condition in waste management. What is your opinion?</p>		<p>energy is not excluded. However, it is not included, since the experts did not find enough data to prove "do no significant harm" (DNSH) criteria for long term high level waste management. The MNR concept builds on the successful safety case for national DGR. The Working Group's MNR concept promotes and disseminates information that the safety case for DGR is very well developed and there is expert consensus that it is very robust and ensures safe disposal of waste with no significant impact on the environment and human health. This supports the message that DNSH criteria is fulfilled for nuclear energy, and nuclear energy should be included in EU taxonomy. The Working Group may address this question in future work.</p>
<p>27. How to respond to the typical questions from the layman (man from the street) about the safety of the MNR, i.e. exposition to earthquakes, extreme weather conditions, stability and duration of the containers (100, 1000 years or ....)</p>	<p>Oscar Mignone</p>	<p><b>[Charles McCombie]</b> All such questions about the safety of a multinational repository are exactly equivalent to the same questions being asked in national disposal programs. Over the past several years a number of national programs have produced extended safety assessment reports which directly examine the consequences and the probabilities of all of the events mentioned. This has been done in, amongst other countries, Sweden, Finland, France, USA, Switzerland, Netherlands, Belgium, UK.</p> <p><b>[Tomaž Žagar]</b>, see #26 Safety case for DGR is very well developed and robust.</p>
<p>28. Hello. I'm interested in understanding where the panel thinks South Australia went wrong and what the lessons are that have been learned for future discussions - particularly with regard to political and community engagement. Would be grateful for your thoughts.</p>	<p>Geordie Graetz</p>	<p><b>[Live answered in discussion by Charles McCombie]</b> See also response 15</p>
<p>29. If a country cannot solve the nuclear waste problem is it legitimated to export the problem? Which country is ready to offer solutions for smaller countries? Is Russia for example from your experts view offering acceptable reliable solutions?</p>	<p>rebecca harms</p>	<p><b>[Tomaž Žagar]</b> The MNR concept does not mean you are, "exporting the problem." Small countries retain all national responsibility for the waste, MNR is here to help smaller countries to pull together resources for a more effective and safer shared solution.</p>

30. Is there any possibility that MNRs will be the international repositories in the international waters?	Keiko Chitose	<b>[Christophe Xerri]</b> We are not aware of any active project considering a repository under water. Assuming the legal challenges could be overcome, the technical challenges of underwater work would add to the usual engineering and scientific aspects of a geological repository.
31. Would multinational repositories facilitate new business model in the context of spent fuel reprocessing in the future? Would the panel foresee any change or addition to the existing policy or regulatory framework on spent fuel storage?	Victor Nian	<b>[Charles McCombie]</b> The most obvious changes to business models in the reprocessing area might be if a provider of reprocessing services agreed to retain the resulting high-level waste and dispose of it in a multinational repository (most probably in the reprocessing country but, in principle, possibly in third country). The nexus between spent fuel storage and final disposal in a multinational repository is interesting. In the South Australian case, the concept advanced was that future users of the disposal service could couple that to a more immediate use of a spent fuel storage service. This could be a win-win situation because the service user country can avoid spent fuel storage costs and the service provider country can have an earlier income flow that can help finance the longer term construction of the disposal facility.
32. I think the technical community is convinced that multinational disposal is a good idea. How do you think the society can be 'educated' to see the advantages of multinational disposal?	Saskia Van Hensbergen	<b>[Charles McCombie]</b> (I'm pleased to see you put "educated" in inverted comments since we have learned that this is not the best way to address the issue of public understanding and consent!). It is true that the potential advantages of an MNR are quickly seen and acknowledged by the technical community, whereas the public communication is more challenging. The first requirement is that there must be broad recognition of the safety of geological disposal per se. This is still a challenge in many national disposal programs and is not helped by groups lobbying for extended surface storage. Further powerful arguments are the economic and societal benefits that developing an MNR can bring. But the ethical aspects are also important in the public debate. An MNR must not be seen as a mechanism for moving unwanted wastes to an economically underdeveloped state. It is a major infrastructure development that will bring a low-risk, high-benefit state-of-the-art technical facility to a willing community – and at the same time enhance global security and safety.
33. Why not Euratom as regulatory body for MNR in the EU?	Andrew Orrell	<b>[Tomaž Žagar]</b> Euratom is not an EU regulator. ENSREG is the association of EU regulators.
34. See <a href="http://www.posiva.fi">www.posiva.fi</a>	Mika Pohjonen	<b>[Charles McCombie]</b> The Posiva website gives entry to a huge reservoir of data on the Finnish program. See also question 13.

35. An important issue is the transportation of HLW between countries. How is this issue resolved?	Michael Simakov	<b>[Christophe Xerri]</b> It is already a proven and implemented practice for 50 years
36. Has IAEA published any safety guidelines related to multinational repositories? Does the IAEA recommend member countries to revise their regulations to prepare for the future multinational repositories?	Jinfeng Li	<b>[Christophe Xerri]</b> There is not much which is specific to multinational repositories compared to a national repository. Existing IAEA safety standards already address each step, including transportation.
37. How much time it will need to solve the political problems Mr. Xerri? Before the technical solution you already know can be done?	rebecca harms	<b>[Charles McCombie]</b> This issue is addressed also in the IAEA report, “ <i>Viability of Sharing Facilities for the Disposal of Spent Fuel and Nuclear Waste. IAEA TECDOC No. 1658</i> ” where the following text can be found: <i>The time expected to be taken for the overall siting program (i.e. up to the point of commencement of repository operation) is likely to be between 15 and 20 years. This is based on experience from successful national programs such as those in Finland and Sweden. The actual time required will be affected by factors whose impact it is difficult to judge. An optimistic minimum schedule would allow around 5 years to establish the organizational infrastructure and agreements and to carry out the initial site identifications, a further 5 years to carry out detailed site investigations for the surface and another 5 years to construct access works, carry out further confirmatory underground investigations and submit a license application to begin operations. The time required for consultation and decision making is likely to be a constraint on progress in any siting project. Experience has shown that, even in national programs, this time is difficult to predict, and that these processes can introduce uncertainties about the outcome at key decision points. In the multinational case, making contact with all relevant stakeholders in participant countries is obviously more challenging than in the national case, and consideration may need to be given to a staged approach, where stakeholders are brought into the process at the most appropriate time. For example, it may not be practicable or appropriate to try to engage with all municipalities in a country at the time of the first high-level decision by a government. However, it is essential to communicate openly with the public to inform them of progress in the project and to solicit feedback on interim decisions. This can help minimize the time needed for societal debate and political verdicts on later choices and decisions.</i>