



Building Public Trust for Fusion Impact

Briefing on Regulatory Approaches for Fusion Energy Devices

November 8, 2022

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Key Ingredients to Scale Energy Technologies

Technical Performance

Economically Competitive

Regulatory Approval

Scalable Supply Chain

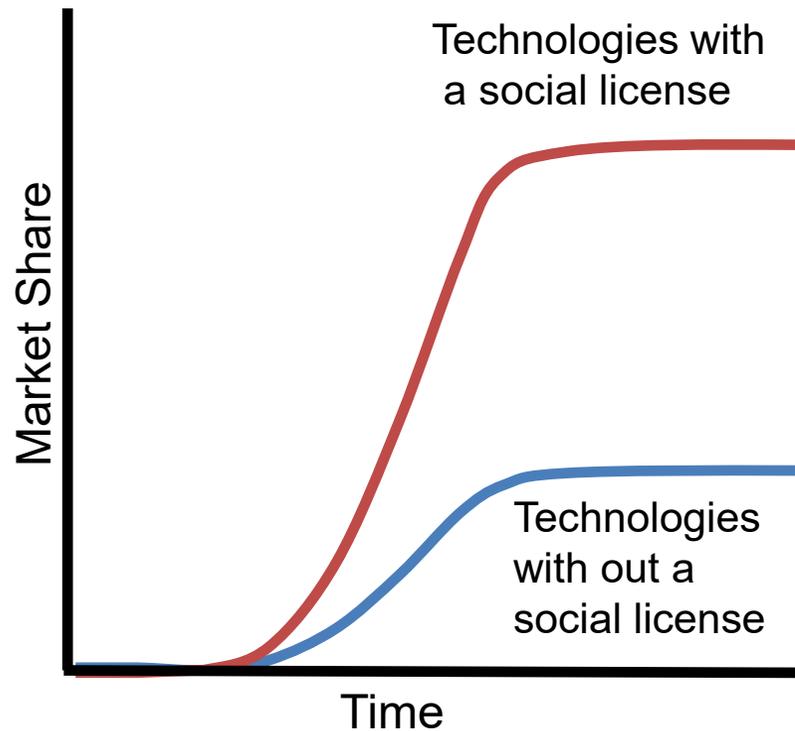
Trained Workforce

Public Acceptance¹

1. Kaslow J et al. (1994) Criteria for practical fusion power systems: Report from the EPRI fusion panel. Journal of Fusion Energy, 13(2):181–183. <https://doi.org/10.1007/BF02213958>

Without Public Acceptance Energy Technologies Stall

A lack of acceptance inhibits scale by raising capital costs, litigation costs and risks, and regulatory burdens¹



Transmission lines²



Offshore/onshore wind³



Nuclear fission⁴

1. Gunningham N, Kagan RA, Thornton D, "Social license and environmental protection: why businesses go beyond compliance," *Law & Social Inquiry* 29:307–341 (2004).
2. Voters pull the plug on Central Maine Power's transmission line. <https://www.wbur.org/news/2021/11/03/maine-ballot-question-transmission-corridor-hydropower-no-vote>
3. Rand J, Hoen B (2017) Thirty years of North American wind energy acceptance research: What have we learned? *Energy Research & Social Science*, 29:135–148. <https://doi.org/10.1016/j.erss.2017.05.019>
4. Bickerstaffe, J., Pearce, D., "Can there be a consensus on nuclear power?" *Social Studies of Science* 10:309:344 (1980); Slovic, P., "Perceived Risk, Trust, and the Politics of Nuclear Waste" *Science* 254:1603-1607 (1991).

Established Methods to Facilitate Public Acceptance

1. A “Social License”¹
2. Ethical Review Committees²
3. Responsible Research and Innovation³ (emerging)

Risk-reducing technical solutions, regulatory compliance, and better “communication” or “education” are unlikely, on their own, to alleviate a lack of social acceptance⁴

1. Gunningham N, Kagan RA, Thornton D, “Social license and environmental protection: why businesses go beyond compliance,” *Law & Social Inquiry* 29:307–341 (2004).
2. UNESCO, *National bioethics committees in action*. (2010); Watts G, “Novel techniques for the prevention of mitochondrial DNA disorders: an ethical review.” Nuffield Council on Bioethics.(2012); Warnock M, “Report of the Committee of Inquiry into Human Fertilisation and Embryology.” U.K. Department of Health & Social Security, London. (1984) <https://www.hfea.gov.uk/media/2608/warnock-report-of-the-committee-of-inquiry-into-human-fertilisation-and-embryology-1984.pdf>.
3. Stilgoe, J. and Owen, R. and Macnaghten, P. (2013) 'Developing a framework of responsible innovation.', *Research policy*, 42 (9). pp. 1568-1580; R. Owen, P. Macnaghten and J. Stilgoe. (2012), “Responsible research and innovation: From science in society to science for society, with society.” *Sci. and Pub. Pol.*. Vol. 39(6):751-760. DOI: 10.1093/scipol/scs093; Teunis Brand & Vincent Blok (2019) Responsible innovation in business: a critical reflection on deliberative engagement as a central governance mechanism, *Journal of Responsible Innovation*, 6:1, 4-24
4. Otway HJ, Maurer D, Thomas K, “Nuclear power: The question of public acceptance,” *Futures* 10:109–118 (1978). doi: 10.1016/0016-3287(78)90065-4

Key Feature of the Social License Method

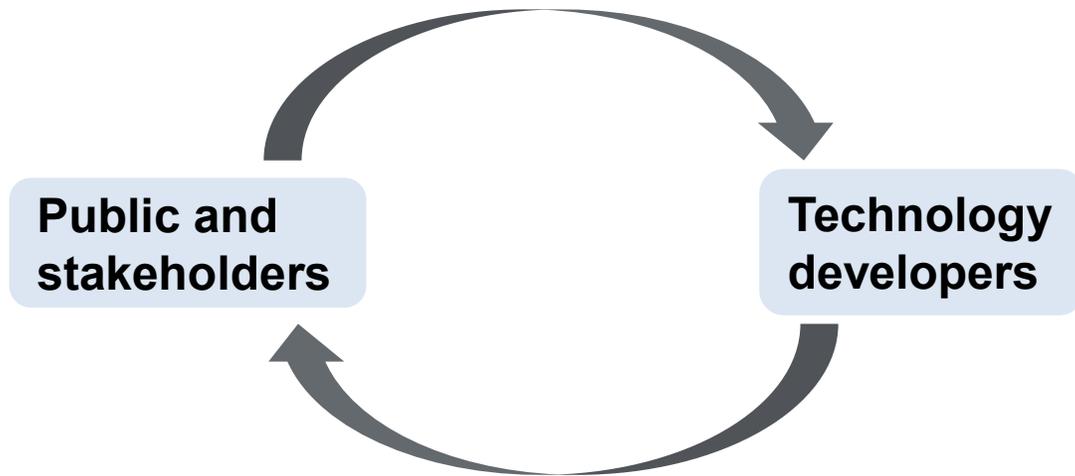
A **process of meaningful public engagement**^{2,3,4} that:

1. Opens expertise to new questions and perspectives¹
2. Addresses what people actually worry about, rather than what they “should” worry about
3. Engenders trust²
4. Is transparent^{2,3}
5. Protects human health and safety⁵
6. Is more than “education,” public relations, or “letting the public see the experts at work”⁶

1. Stilgoe, J, *The received wisdom: opening up expert advice*. Demos, London, 2006. <https://www.demos.co.uk/files/receivedwisdom.pdf>; Grunig J.E., & Grunig L.S., Toward a Theory of the Public Relations Behavior of Organizations: Review of a Program of Research, *Public Relations Research Annual*, 1:1-4, 27-63, DOI: [10.1207/s1532754xjpr0101-4_2](https://doi.org/10.1207/s1532754xjpr0101-4_2)
2. Rooney, D., Leach, J., Ashworth, P., “Doing the Social in Social License.” *Social Epistemology* 28:209-218 (2014); Hall, N., Lacey, J., Carr-Cornish, S., Dowd, A-M., “Social licence to operate: understanding how a concept has been translated into practice in energy industries.” *Journal of Cleaner Production* 86:301–310 (2015); National Academies of Sciences, Engineering, and Medicine, “Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values,” National Academies Press (2016).
3. Coglianese C, Kilmartin H, Mendelson E “Transparency and public participation in the federal rulemaking process: Recommendations for the new administration.” *Geo Wash L Rev* 77:924 (2008); Long JC, Scott D “Vested Interests and Geoengineering Research” *Issues in Science and Technology* 29:45–52 (2013).
4. Institute of Medicine “Oversight and Review of Clinical Gene Transfer Protocols: Assessing the Role of the Recombinant DNA Advisory Committee.” National Academies Press (2014).
5. Gunningham N, Kagan RA, Thornton D, “Social license and environmental protection: why businesses go beyond compliance,” *Law & Social Inquiry* 29:307–341 (2004).
6. Raman, S, Mohr, A, “A social license for science: capturing the public or co-constructing research?,” *Social Epistemology* 28:258-276 (2014).

Engagement through Meaningful, Two-Way Conversations

1. Listen to the public, identify concerns and deeply understand them



2. Address concerns by adjusting technology and business models

Strengthens outcomes¹:

- Identifies problems, issues and solutions that experts miss²
- Is sensitive to social and political values that expert's models do not acknowledge²
- Creates a sense of “procedural justice” and a positive feedback-loop that enhances trust³

1. Reed MS (2008) Stakeholder participation for environmental management: A literature review. *Biological Conservation*, 141(10):2417–2431. <https://doi.org/10.1016/j.biocon.2008.07.014>
2. Fiorino DJ (1990) Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms. *Science, Technology, & Human Values*, 15(2):226–243. <http://www.jstor.org/stable/689860>
3. Gwen Ottinger (2013) Changing Knowledge, Local Knowledge, and Knowledge Gaps: STS Insights into Procedural Justice. *Science, Technology, & Human Values*, 38(2):250–270. <https://doi.org/10.1177/0162243912469669>; National Academies of Sciences, Engineering, and Medicine (2016) *Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values*. <https://doi.org/10.17226/23405>

Requires **public trust** in the fusion industry and government regulators

Application to Regulatory Approaches: Building Trust

*The public needs confidence that the NRC and other regulators adopt a regulatory framework that has the authority to manage the full range of risks that the **public cares about***



The **process** by which the regulations are developed needs to be transparent, based on the full range of risks, and undertaken with **meaningful** public engagement

- Actively solicit concerns from communities nationwide
- Address these concerns through a **transparent** health and safety analysis
- Support **independent** health and safety assessments

Public input is essential, even at this early stage



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