Feedback on the roadmap for the "EU action plan Digitalising the energy sector"

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Text:

We are glad to see to see the EU taking serious action on guiding the convergence of the energy and the ICT sector. This important development is increasingly taking shape, and without conscious guidance, it is unsure whether this development will result in a more sustainable energy and ICT system.

The roadmap describes a couple key points to ensure the twin green and digital transition leads to a better-functioning, smart, integrated and cleaner energy system. Four key issues, however, remain unaddressed.

First, this roadmap (and many directives that came before this roadmap, such as the Directive on common rules for the internal electricity market ((EU) 2019/944)) emphasizes citizen empowerment but does so in an incomplete way. Empowerment is often misused, focusing only on enabling citizens to use ICT to enter the market and ensuring privacy and data protection[i]. A broader perspective is, however, necessary. With the convergence of the energy and ICT sector, elements arise which are disempowering for citizens. For example, citizens require digital skills and ICT knowledge to be able to effectively join decision procedures regarding ICT-based energy systems[ii]. Therefore, empowerment should not only mean to enable citizens (and communities) to sell energy and flexibility; it should also entail capacity building, ownership over energy assets and ICT platforms, transparency, and an active role of citizens in shaping ICT platforms to ensure that ICT enables activities in line with both EU Directive 2019/944 and community values and goals (e.g. energy sharing, maximizing collective self-consumption)[iii]. If we do not take a broader perspective on citizen and community empowerment, we risk of ending up with a system that is unfair, non-democratic, and also less

effective in generating flexibility. This is because we would end up with ICT systems that do not fit in the daily lives and ambitions of citizens.

Second, and related to this, is that the initiative aims to empower citizens and to enhance the cybersecurity of the energy sector are currently discussed separately. We believe they should be connected. As citizens become more active in the energy system, citizens should be made aware of their responsibilities. This, too, falls under empowerment. Every device connected to the energy system (and especially devices active in the electricity grid) is a potential vulnerability for non-authorized access, false data injections, and other types of disruptions[iv]. Apart from stimulating citizens to play an active role in the energy system in transition, citizens should thus also be empowered by raising awareness for cybersecurity for themselves and the whole system.

Third, and connected to the second point, is that it should be considered is that energy and many infrastructural companies responsible for the infrastructure, are public utility companies, whereas ICT companies are predominantly private companies. As such, these companies differ in interest, which can lead to conflicts[v]. Publicly owned utility companies aim to make the energy system reliable, affordable and, steered by different policies, also increasingly sustainable[vi]. ICT corporations can support public utility companies in these tasks but have private interests to consider. For example, ICT corporations might want to secure a part of the energy market or make profits. In different sectors, such as the communication services sector, major ICT corporations (e.g. Alphabet, Facebook) are dominating parts of the market; corporations with perhaps more sustainable incentives and motivations are unable to break through their market hold. The EU is currently attempting to mend this and keep online platforms in check (for example with the proposed Digital Services Act). Instead of having to make reparations in the energy system as well in a few years, EU guidelines should ensure that public interests are prioritized over private interests when critical infrastructure such as the energy system is concerned.

Finally, a key question to be asked is whether more ICT is the solution for improving the energy system. ICT has the ability to make the energy system more efficient. The roadmap rightfully acknowledges, however, that the increase in ICT and digital infrastructure also results in an increase in energy consumption[vii]. It does not help that large parts of the digital infrastructure are 'invisible' (Cloud services, electricity) or kept out of the general public's eye (data centers).

This makes decreasing the consumption of additional resources such as energy through the careless use of ICT a difficult issue to tackle[viii]. Therefore, we should step away from the idea that more ICT will make the system more efficient and improve its sustainability. Instead, our use of ICT and data collecting, sharing and usage should be increasingly based on sufficiently. Therefore, it should be critically analyzed which implementations of ICT significantly contribute to sustainability, and which are redundant or consume more energy (and other resources) than it saves.

In short, the current roadmap discusses a great number of points, but omits to discuss crucial issues regarding the connection of citizen empowerment and cybersecurity, differing interests of actors involved in the energy system and the necessity of ICT. If these points remain unconsidered, there is a chance the convergence of the ICT and energy system will not develop in a sustainable way.

[i] Luc F. M. van Summeren, Anna J. Wieczorek, and Geert P. J. Verbong, 'The Merits of Becoming Smart: How Flemish and Dutch Energy Communities Mobilise Digital Technology to Enhance Their Agency in the Energy Transition', *Energy Research and Social Science* 79 (September 2021): 102160, https://doi.org/10.1016/j.erss.2021.102160.

[ii] C. Milchram et al., 'Designing for Justice in Electricity Systems: A Comparison of Smart Grid Experiments in the Netherlands', *Energy Policy* 147 (1 December 2020): 111720, https://doi.org/10.1016/j.enpol.2020.111720; K. Lyytinen, J.V. Nickerson, and J.L. King, 'Metahuman Systems = Humans + Machines That Learn', *Journal of Information Technology*, 25 May 2020, 0268396220915917, https://doi.org/10.1177/0268396220915917.

[iii] Rafaela Hillerbrand, Christine Milchram, and Jens Schippl, 'Using the Capability Approach as a Normative Perspective on Energy Justice: Insights from Two Case Studies on Digitalisation in the Energy Sector', *Journal of Human Development and Capabilities* 22, no. 2 (3 April 2021): 336–59, https://doi.org/10.1080/19452829.2021.1901672; Lyytinen, Nickerson, and King, 'Metahuman Systems = Humans + Machines That Learn'.

[iv] MIT, *Utility of the Future. An MIT Energy Initiative Response to an Industry in Transition* (Massachusetts: MIT, 2016); Abdellah Chehri, Issouf Fofana, and Xiaomin Yang, 'Security Risk Modeling in Smart Grid Critical Infrastructures in the Era of Big Data and Artificial Intelligence', *Sustainability* 13, no. 6 (January 2021): 3196, https://doi.org/10.3390/su13063196; Peng Zhuang, Talha Zamir, and Hao Liang, 'Blockchain for Cybersecurity in Smart Grid: A Comprehensive Survey', *IEEE Transactions on Industrial Informatics* 17, no. 1 (January 2021): 3–19, https://doi.org/10.1109/TII.2020.2998479; H. Lin and N.W. Bergmann, 'IoT Privacy and Security Challenges for Smart Home Environments', *Information* 7, no. 3 (September 2016): 44, https://doi.org/10.3390/info7030044; J. Ryoo et al., 'IoE Security Threats and You', in *2017 International Conference on Software Security and Assurance (ICSSA)*, 2017, 13–19, https://doi.org/10.1109/ICSSA.2017.28.

[v] Roba Abbas, Jeremy Pitt, and Katina Michael, 'Socio-Technical Design for Public Interest Technology', *IEEE Transactions on Technology and Society* 2, no. 2 (June 2021): 55–61, https://doi.org/10.1109/TTS.2021.3086260.

[vi] Irene Niet, Rinie van Est, and Frank Veraart, 'Governing AI in Electricity Systems: Reflections on the EU Artificial Intelligence Bill', *Frontiers in Artificial Intelligence* 4 (2021): 109, https://doi.org/10.3389/frai.2021.690237.

[vii] Eef Masson, Romy Dekker, and Rinie van Est, 'Waardevol Digitaliseren Voor de Energietransitie' (Raad voor de leefomgeving en infrastructuur, 5 November 2020).

[viii] Kathalijne Buitenweg, *Datamacht en tegenkracht* (Amsterdam: De Bezige Bij, 2021).