



# The Future of the Distribution System Operator (DSO) in Europe

*Karim L Anaya*

*Energy Policy Research Group*

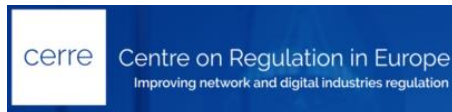
*Cambridge Judge Business School, University of Cambridge*

**EPRG Spring Seminar**

*12 May 2021*

# About this study

With thanks to my colleagues Michael Pollitt and Monica Giulietti, and CERRE and sponsors for funding this study



Full report and webinar published at CERRE website:

[Optimal regulation for European DSOs to 2025 and beyond – CERRE](#)

The report aims to:

- **Suggest how regulation of the distribution system operator (DSO) can be improved** in the period to 2025 and beyond
- Investigate directions in which current regulation might be developed leading to an **improvement in social welfare**



# About this study

## We set out to investigate **three questions**:

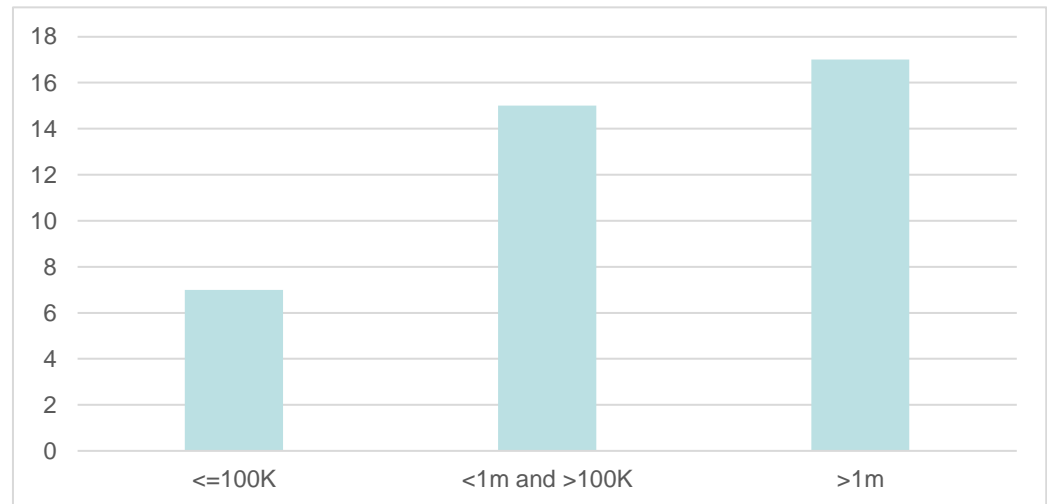
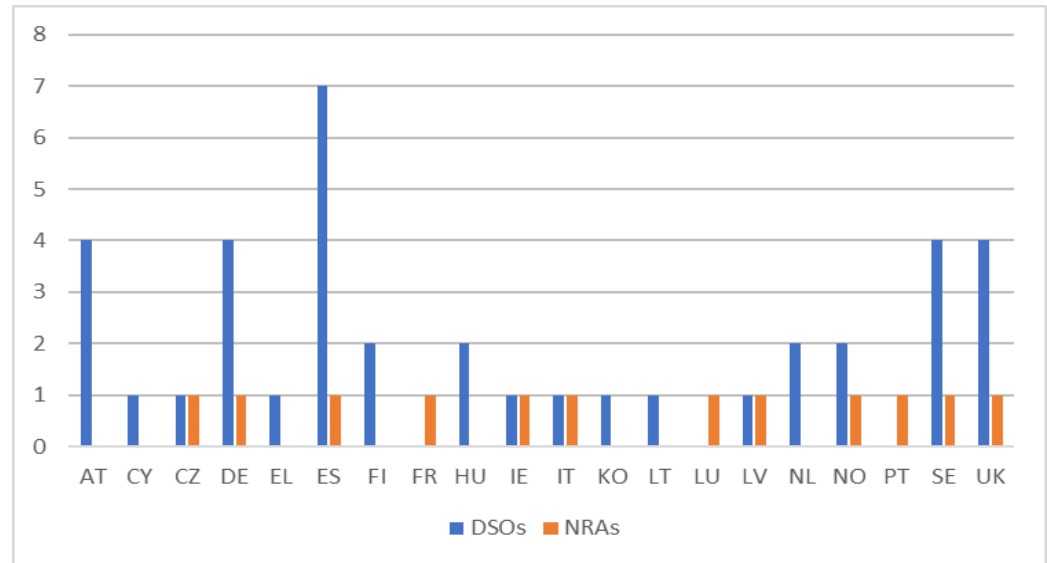
- How can and should the system operation (**SO**) **function of the DSO** be defined and regulated?
- What can regulators and EU policymakers learn from TSO regulation that can be translated down to the DSO?
- How can national regulators and EU institutions **support the capacity of the DSO** to operate and coordinate the system?

## Methodology:

- **2 parallel surveys** to national regulatory agencies (NRAs) and DSOs
- **A set of case studies** (from the survey) of DSOs-covering different roles
- Development of **5 scenarios** where the role of the DSO might be thought to be important

# Survey participants and respondents

- 51 responses, 20 countries represented.
- Respondents from 12 NRAs and 37 DSOs.
- 9 countries with responses from both NRA and DSOs.
- 39 responses from DSOs, 17 countries represented.
- 125m customers served by the DSOs, 225m protected by NRAs
- 40% of DSOs with 1 million or more customers.
- Participation of 2 energy network associations.



# Towards a more Active DSO

- The move towards a more active role for the DSO remains a work in progress for both DSOs and their NRAs, with non fully aligned views.
- DSOs interested in sufficient returns, while NRAs protecting consumers from unnecessary expenditure.
- Little evidence of the expanded role for DSOs and its quantification (in congestion management), many of DSOs with no competitive procurement.
- Much research activity is focussed on trials.
- DSOs identify tariff structure and regulatory barriers among the most significant to a more active DSO.
- NRAs are most concerned about a lack of potential providers of flexibility and a lack of information on the state of the network.
- New EU DSO Entity can learn from the ENTSO-E but with potential tension between a unified voice for DSOs and policies that reflect the DSOs diversity.
- Detailed comparison of 6 European countries suggests the positive impact of a more supportive regulatory environment.

# Future of DSOs projects and scenarios

Local authority wishes to install of a **large number of public charging points**

NRA wants **DSOs to be more innovative and proactive** in the energy transition

A **single battery could solve all local grid management issues at least costs**

## Role of DSO?

Local authority to coordinate the **decarbonisation of the electricity and gas systems**

DER ask **guidance on the development of the electricity system** to explore investment in flexibility

Key scenarios that discuss the existing European legislation in facilitating a more active role for the DSO

Discussion supported by literature and issues raised in the surveys

Identification of areas of future developments...

# Conclusions

- It **will take time for the Electricity Regulation EU (2019/943) and Directive (2019/944) to have a significant impact on European DSOs** (especially as it was drafted in 2016 and pre-dates Net Zero).
- Our survey suggests **there is work for NRAs and DSOs to do in clarifying** the best way forward for the DSO.
- There is **little evidence that the active DSO has progressed very far** in measurable terms, apart from in the UK.
- There should be a **major role for the EU DSO Entity in evaluating, collating and spreading useful information and experiences** from projects related to the ‘future of the DSO’.
- Areas of **future developments** (from scenarios) **need to be addressed**.

# References

- ACER (2020), *Market Monitoring Report 2019 – Energy Retail and Consumer Protection Volume*. Ljubljana: European Union Agency for the Cooperation of Energy Regulators.
- Alexander, I. and Irwin, T. (1996), *Price caps, rate-of-return regulation, and the cost of capital*, Viewpoint: Public Policy to the Private Sector; Note No. 87, Washington, DC: World Bank.
- Anaya, K.L. and Pollitt, M.G. (2020a), *A Review of International Experience in the use of electricity platforms for the procurement of flexibility services (Part 1)*. Project Merlin Milestone One Report, A report for Scottish & Southern Electricity Networks.
- Anaya, K.L. and Pollitt, M.G. (2020b), *Regulation and policies for local flexibility markets: Current and future developments in seven leading countries*. Project Merlin Milestone Three Report, A report for Scottish & Southern Electricity Networks.
- ARERA (2019), *Rapporto Annuale – Stato dei servizi*, volume 1, Milano: Autorita' di Regolazione Energia Reti e Ambiente.
- Baker, P. (2020), *Challenges facing distribution system operators in a decarbonised power system*, Brussels: Regulatory Assistance Project.
- Cambini, C., Congiu, R., Soroush, G. (2020), 'Regulation, Innovation, and Systems Integration: Evidence from the EU', *Energies*, 13: 1670.
- CEER (2020a), *Report on Regulatory Frameworks for European Energy Networks 2019. Incentive Regulation and Benchmarking Work Stream*. Ref: C19-IRB-48-03, Brussels: Council of European Energy Regulators.
- CEER (2020b), *CEER Paper on DSO Procedures of Procurement of Flexibility. Distribution Systems Working Group*. Ref: C19-DS-55-05, Brussels: Council of European Energy Regulators.
- CEER (2019a), *Report on Regulatory Frameworks for European Energy Networks. CEER Report*. Ref: C18-IRB-38-03, Brussels: Council of European Energy Regulators.
- CEER (2019b), *Status review on the implementation of TSO and DSO unbundling provisions: update and clean energy package outlook*. Ref: C18-LAC-02-08, 14 June, Brussels: Council of European Energy Regulators.
- CRU (2020), *Cost of Capital – CRU Approach: A look at how the Weighted Average Cost of Capital (WACC) has been applied in regulating the electricity, gas and water sectors in Ireland*. Information Paper, CRU/20/029, Dublin: Commission for Regulation of Utilities.
- Cunliff, C. and Hart, D.M. (2019), *Global Energy Innovation Index. National Contributions to the Global Clean Energy Innovation System*. August 2019, Washington, DC: Information Technology & Innovation Foundation.
- EC (2019), *Do current regulatory frameworks in the EU support innovation and security of supply in electricity and gas infrastructure? Final Report*. Directorate-General for Energy, Brussels: European Commission.
- ECA (2018), *Methodologies and parameters used to determine the allowed or target revenue of gas transmission system operators (TSOs)*. Final Report submitted to ACER, Washington, DC: Economic Consulting Associates.
- E.DSO (2019), *TSO-DSO Report An integrated approach to active system management: with a focus on TSO-DSO coordination in congestion management and balancing*, April 2019, Brussels: CEDEC, ENTSO-E, E.DSO, EURELECTRIC GEODE.
- ENA (2020a), *Open Networks Project DSO Implementation Plan, Appendix 1: System Coordination*, London: Energy Networks Association.
- ENA (2020b), *Open Networks Project DSO The Interactions between Flexible Connections (ANM) and Flexibility Services*. 2019 WS1A P5, London: Energy Networks Association.
- Energy Data Taskforce (2019), *A strategy for a Modern Digitalised Energy System*, Birmingham: Energy Systems Catapult.



# References

- Eurelectric (2020), *Distribution Grids in Europe: Facts and Figures 2020*. D/2020/12.105/67, Brussels: Union of the Electricity Industry.
- Hadush S.Y. and L.Meeus (2018), 'DSO-TSO coordination issues and solutions for distribution grid congestion management', *Energy Policy*, 120:610-621.
- Jamasb, T., Llorca, M., Meeus, L. and Schittekatte, T. (2020), *Energy Network Innovation for Green Transition: Economic Issues and Regulatory Options*, University of Copenhagen, Department of Economics, Working Paper, No.18-2020.
- Klyapovskiy, S., You, S., Michiorri, A., Kariniotakis, G., Bindner, H.W. (2019), 'Incorporating flexibility options into distribution grid reinforcement planning: A techno-economic framework approach', *Applied Energy*, 254: 113662.
- Knezović, K., Marinelli, M., Zecchino, A., Andersen, P.B., Traeholt, C. (2017), 'Supporting involvement of electric vehicles in distribution grids: Lowering the barriers for a proactive integration', *Energy*, 134: 458-468.
- Makhholm, J.D. (2020), 'Pursuing Grid Modernization: With a 'New Regulatory Paradigm'?', *Natural Gas & Electricity*, 36(7): 26-32.
- Meeus, L. and Saguan, M. (2011), 'Innovating grid regulation to regulate grid innovation: From the Orkney Isles to Kriegers Flak via Italy', *Renewable Energy*, 36 (6): 1761-1765.
- National Grid ESO (2020), *Future Energy Scenarios*. National Grid Electricity System Operator, July 2020.
- Nillesen, P. and Pollitt, M.G. (2021), 'Ownership unbundling of electricity distribution networks', *Economics of Energy and Environmental policy*, 10 (1).
- NVE (2020), *National Report 2020. RME Rapport*, Nr. 5/2020. Oslo: The Norwegian Energy Regulatory Authority – RME, August 2020.
- Oberle, S., Stute, J., Fritz, M., Klobasa, M., & Wietschel, M. (2020), 'Sector coupling technologies in gas, electricity, and heat networks: Competition or synergy?', *Journal for Technology Assessment in Theory and Practice*, 29(2): 24-30.
- Ofgem (2020), *Great Britain and Northern Ireland Regulatory Authorities Reports 2020*, London: Ofgem.
- Origami (2019), *Project Deliverable. Analysis of DSO Flexibility Markets*. A report for Scottish & Southern Electricity Networks.
- Pereira,G.I., Pereira da Silva, P. and P.A. Cerqueira (2020), 'Electricity distribution incumbents; adaptation towards decarbonised and smarter grids: the role of market, regulatory, investment and firm-level factors', *Energy Policy*, 142:111477.
- Pollitt, M.G. (2012), 'Lessons from the history of independent system operators in the energy sector', *Energy Policy*, 47: 32-48.
- Poyry and Ricardo (2016), *An Independent Evaluation of the LNCf A report to Ofgem*, London: Poyry Management Consulting UK.
- Proka, A., Hisschemöller, M., Loorbach, D. (2020), 'When top-down meets bottom-up: Is there a collaborative business model for local energy storage?', *Energy Research & Social Science*, 69: 101606.
- RTE (2020), *Electricity Report 2019*. Paris: Le réseau de transport d'électricité, , Janvier 2020.
- Slooman, J., Wride, A. and D. Garratt (2012), *Economics*, 8<sup>th</sup> edition, Harlow: Pearson Education.
- Svenska kraftnät (2020), *Kraftbalansen på den svenska elmarknaden*. Rapport 2020, 2020/334. Stockholm, May 2020.
- Van der Waal, E.C.; Das, A.M., van der Schoor, T. (2020), 'Participatory Experimentation with Energy Law: Digging in a 'Regulatory Sandbox' for Local Energy Initiatives in the Netherlands', *Energies*, 13: 458.
- WEF (2020), *Fostering Effective Energy Transition. 2020 Edition*, Geneva: World Economic Forum.

# Q&A

---

Thank you!