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GEODE
The voice of local energy distributors across Europe

Revenue Regulation for Electricity Distribution System Operators:
An exploration of seven European frameworks

DECEMBER 2025

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Executive Summary

Europe's energy transition cannot advance without modern, flexible and investment-ready electricity distribution networks. As most renewables, Electric Vehicles (EV) charging, heat pumps and digital energy services connect at distribution level, Distribution System Operators (DSOs) must deliver unprecedented reinforcement and digitalisation—requiring around €67 billion annually between 2025 and 2050. This joint E.DSO–GEODE paper examines how seven European Union (EU) national regulatory frameworks (**Austria, Finland, Ireland, Italy, Poland, Spain and Sweden**) support DSOs' ability to plan, finance and deliver these investments. Building on GEODE's 2024 principles for effective revenue regulation, this paper assesses how these principles are implemented through real-world case studies. The analysis identifies best practices, structural shortcomings, and opportunities for greater convergence in regulatory design to better enable anticipatory investment, istrategic planning, and financial sustainability.

INSIGHTS FROM THE CROSS-COUNTRY COMPARISON

Across the seven countries, regulatory conditions for DSOs remain uneven, with Italy and Austria offering comparatively stable, predictable frameworks, while Finland, Spain, Sweden and Poland face mid-period changes, short cycles or delays that weaken investment confidence and limit anticipatory grid development. Financeability is under pressure where Weighted Average Cost of Capital (WACC) and Regulatory Asset Base (RAB) methodologies are frozen or backward-looking, cost recovery is delayed and working-capital needs are not fully recognised, although Italy, Ireland and Poland provide more market-reflective approaches. At the same time, persistent Capital Expenditure bias, complex efficiency schemes and patchy innovation incentives mean that modern, flexible and digital solutions are not yet consistently enabled or rewarded across Europe.

The table below shows that no country (of those analysed here) has perfected revenue regulation but that for every principle, there is at least one country that has implemented very good regulation in that area. Good practices are already in Member States, not only these seven, but likely many others as well. Hence, by publishing this analysis, DSOs are not not looking for the adoption of unprecedented approaches, but rather the broader implementation of proven best practices across European countries.

	Long Term Predictability	Anticipatory Investments	Sufficient Cashflow & Financing Mechanism(s)	Competitive WACC & RAB Concerns	Balanced CAPEX + OPEX & Reinvestment vs New Investments	Efficient Operations & Safeguarding Consumer Interests	Incentivise Innovation & Incentivised Sustainable Solutions
Austria	🟢	🟢	🟡	🟡	🟢	🟡	🟢
Finland	🔴	🟡	🔴	🔴	🟡	🟡	🟢
Ireland	🟢	🟡	🟡	🟡	🟢	🟢	🟢
Italy	🟢	🟡	🟢	🟢	🟢	🟡	🟢
Poland	🟡	🟡	🟡	🟢	🟡	🟡	🔴
Spain	🔴	🟡	🟡	🔴	🔴	🟡	🟡
Sweden	🔴	🟢	🟡	🔴	🟡	🟡	🔴

Table 1: Overview of colour-coded analysis by country and principle

E.DSO and GEODE Joint Recommendations

On this basis, mirroring the seven principles, E.DSO and GEODE have identified **seven recommendations** that highlight positive practices and provide concrete guidance for both European policymakers in shaping future legislative and policy frameworks and national regulators in revising their upcoming regulatory periods.

The seven recommendations are as follows:

1. **Embed stability with structured flexibility**

   Stable, multi-year regulatory periods with predefined mid-term adjustments build investor confidence while allowing adaptation to shocks/unforeseen changes with global/regional impacts. Transparent consultations and clear transition rules prevent abrupt regulatory changes that undermine planning and financing, as seen in Finland and Spain.

2. **Strengthen strategic anticipatory planning and alignment**

   Network Development Plans (NDPs) should serve as holistic, forward-looking frameworks guiding investment priorities, not as binding project lists, supported by clear criteria for anticipatory investment approval. Aligning NDP cycles with tariff reviews and using ex-ante cost recognition and digitalisation tools enables timely, risk-managed capacity build-out, whereas unclear recovery rules (as in Spain) discourage proactive expansion.

3. **Keep asset valuation and depreciation aligned with reality**

   Regular RAB revaluations and depreciation linked to real asset lifetimes ensure credible returns and financial resilience. Proper treatment of EU grants and recognition of essential system costs (e.g., cybersecurity) strengthen cashflow, while outdated valuations in Finland and Spain erode investment capacity.

4. Ensure a predictable and risk-reflective WACC

Transparent, forward-looking WACC methodologies that reflect real financing and economic conditions and sector/country risk support investment stability. Setting WACC below risk-adjusted levels (as in Spain and Sweden) undermines financeability; differentiated WACC for higher-risk projects and smart or innovative projects/solutions can improve bankability.

5. Ensure neutrality between CAPEX and OPEX

Regulation should avoid bias toward CAPEX by enabling DSOs to choose the most efficient solutions, supported by flexible models like Italy's ROSS. Clear, neutral treatment of CAPEX and OPEX[1] fosters innovation and digitalisation, while rigid categorisation, as in Spain, restricts efficiency.

6. Guarantee timely and predictable regulatory approvals

Clear regulatory approval timelines and automatic or standing mechanisms reduce uncertainty and keep investments on schedule. Delayed approvals, as in Spain, raise costs and slow network development; future reforms (e.g. Sweden) must ensure smooth transitions and predictable processes.

7. Promote transparency, innovation and accountability while safeguarding liquidity and cash-flow adequacy

Dedicated innovation schemes and transparent regulatory processes foster trust and support future-ready networks. Sustainability broadly understood means that DSOs also require stable liquidity tools—like working-capital allowances and timely cost true-ups—mitigate cashflow pressures, while weak incentives or cashflow constraints (Finland, Spain) limit reinvestment.

[1] Capital Expenditure and Operational Expenditure

Introduction

GENERAL CONTEXT

Distribution grids stand at the very centre of Europe's energy transition, as the majority of renewable generation and new energy uses – such as Electric Vehicles (EVs), heat pumps, and distributed storage – connect via Distribution System Operators (DSOs). Nevertheless, to fully enable this transition, substantial reinforcement, digitalisation, and modernisation of the grids are required to keep pace with growing complexity of our electricity system.

According to Eurelectric's report "Grids for Speed", investment requirements are in the order of €67 billion annually between 2025 and 2050 to ensure that Europe's distribution networks are fit for purpose.[2] These needs have been acknowledged across EU policy frameworks and initiatives. The EU Action Plan for Grids (November 2023) recognises the crucial role of grids in supporting the clean-energy transition, identifying investment needs of around €584 billion this decade for networks alone, and emphasising the importance of modernising distribution grids.[3] Building on this, the European Commission's (EC) Guidance on Anticipatory Investments (June 2025), and EC guidance on Network Tariffs published (July 2025) provide concrete recommendations to Member States, national regulatory authorities, and grid operators on how to plan, approve, and regulate forward-looking investments that prepare European grids for future capacity needs. The grid momentum is expected to continue with the upcoming European Grids Package, which will build on the Grids Action Plan and continue to strengthen the policy framework to accelerate the modernization and expansion of the EU's electricity grids.[4]

However, recognition of investment needs must be matched by regulatory conditions that make such investments viable. Revenue regulation is therefore a central enabler of the energy transition. Stable, predictable, and forward-looking regulatory frameworks are essential to attract the massive capital required for DSOs to invest in modern and flexible networks. Regulation that provides adequate returns, rewards innovation, and enables anticipatory investment decisions is of essence to push the energy transition forwards. The design of revenue regulation directly determines Europe's ability to deliver on its electrification and decarbonisation goals.

[2] Eurelectric. (2024). *Grids for speed: Accelerating Europe's energy transition.* https://powersummit2024.eurelectric.org/wp-content/uploads/2024/07/Grids-for-Speed_Report_FINAL_Clean.pdf

[3] European Commission. (2023, November 28). *Grids, the missing link – An EU Action Plan for Grids* (COM (2023) 757). https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52023DC0757

[4] European Commission. (2025, June 6). *Commission notice on guidance on anticipatory investments for developing forward-looking electricity networks (C/2025/3179). Official Journal of the European Union, C/2025/3179.The Guidance document notes that €730 billion is needed for distribution grids just in the 2024-2040 period.* https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:C_202503179
European Commission. (2025, July 2). *Commission Notice — Guidelines on Future-Proof Network Charges to Reduce Energy System Costs (C(2025) 4010).* https://energy.ec.europa.eu/document/download/8789f345-a6ae-46b6-97d2a7366e516cdc_en?filename=C_2025_4010_1_EN_annexe_acte_autonome_cp_part1_v4.pdf&prefLang=nl

METHODOLOGY

In 2024, GEODE published its paper "Revenue Regulation for Electricity Distribution System Operators: A Crucial Enabler for the Energy Transition", presenting seven core principles for effective revenue regulation.[5] These include Long-Term Predictability, Anticipatory Investments, Sufficient Cashflow, a Competitive Weighted Average Cost of Capital, Balanced Incentives between Capital and Operational Expenditures, the Promotion of Efficient Operation while Safeguarding Consumer Interests, and the Incentivisation of Innovation. In preparation for this paper, those seven principles were re-examined and, in a few cases, expanded somewhat in order to fully capture the intentions of the principle – where applicable, this is noted below.

While the GEODE 2024 Paper outlined these principles and highlighted their strategic relevance for DSOs, it also became clear that translating these concepts into practical application was essential. Establishing the theoretical framework was a first step; however, to ensure that the proposed principles can genuinely support the energy transition, their real-world applicability had to be explored. Practical examples and case studies provide essential evidence of how different regulatory approaches perform in varying national contexts, revealing both best practices and potential barriers. By showcasing how the principles can be operationalised, E.DSO and GEODE aim to move the discussion from high-level guidance to actionable insights.

The intention is to equip national regulators and European policymakers with concrete illustrations of how current regulatory frameworks influence DSO revenues, investment capabilities, grid development and reinforcement, and, ultimately, progress towards decarbonisation and the EU's 2050 climate objectives.

With this in mind, E.DSO and GEODE brought together their members to jointly explore and analyse how these principles are - or are only partially implemented across different regulatory environments. The objective was to identify lessons learned and highlight opportunities for greater alignment across Europe.

For the purpose of this paper, the analysis focuses on seven European countries: Austria, Finland[6], Ireland[7], Italy, Poland, Spain[8], and Sweden[9]. These countries were selected based on their relevance to the principles under review and the shared membership of the two associations, as well as for geographic and regulatory diversity. This selection ensures that the findings provide a broad and balanced picture, reflecting the perspectives of both larger and more locally oriented DSOs operating under diverse regulatory frameworks.

[5] GEODE. (2024, June). *Revenue regulation for electricity distribution system operators: A crucial enabler for the energy transition.* https://www.geode-eu.org/wp-content/uploads/2024/06/20240603_GEODE-Paper-Revenue-regulation.pdf

[6] Elements of the Finnish regulatory framework are part of ongoing court cases at the time of publishing.

[7] Ireland is in the process of agreeing a price review with the NRA and at time of publication of this paper, it is not yet concluded.

[8] The Spanish NRA has submitted a proposal for new methodology for DSOs revenue regulation for the period 2026-2031.

[9] The analysis of the Swedish revenue regulation presented in this position paper should be interpreted in light of a recent proposal by the NRA to revise the revenue regulation framework.

The paper is particularly relevant when considering the need to mobilise investments for the energy transition, especially considering upcoming or recently defined regulatory models. For instance, Ireland, Sweden and Spain are currently negotiating their next regulatory periods (RP). Although their frameworks differ – Sweden applies a Revenue Cap model for a four-year period (2028–2031), Spain follows a cost-based remuneration model for six years (2026–2031), and Ireland is transitioning towards a hybrid approach for a five-year period (2026–2030) – all three countries have raised similar concerns regarding the capacity of current models to support the required level of investment. In Spain, the process is nearing completion, with the regulator having submitted the draft proposal to the State Council on 30 October 2025, whereas in Sweden and Ireland, discussions have recently started and are still ongoing. For the purpose of this paper, and for the above listed countries we shall always specify whether the comments are submitted for the current regulatory period or the one under negotiation.

A new regulatory regime started in Finland in 2024, which has proved controversial. The approved model has already resulted in, and is expected to continue causing, significant reductions in investment levels. Finnish DSOs have also raised legal concerns about regulatory adjustments, arguing that such changes undermine reasonable return of historical and future investments. Ongoing litigation on this matter could have direct implications for the ongoing (2024-2027) and next regulatory period (2028-2031).

Unless stated otherwise, the regulatory periods analysed throughout this paper are the following:

Table 2: Regulatory periods used in this paper

Country	Regulatory Period Analysed
Austria	2024-2028
Finland	2024-2031
Ireland	2026-2030
Italy	2024-2031 (WACC period: 2022-2027)
Poland*	2025
Spain	2026-2031
Sweden	2028-2031

* From 2021 onward in Poland yearly regulatory periods are in place.

As one can see above, in some cases, it is a proposed new regulatory period. E.DSO and GEODE have made every effort to have this paper be up-to-date with the latest version of those proposals at time of publishing; however, it is possible that a change could be made just as this document is published. That being stated, the overall purpose of the paper to look at various regulatory approaches and identify best practices is preserved even if some parameters are changed in those proposals.

This paper uses a "traffic light" analysis to give a quick idea whether a particular country's regulation is close to or at best practice (green) or far from it (red), with yellow indicating a place somewhere in the middle. Such colour-coded analysis is only an approximate and general idea, and the reader is always encouraged to read the textual analysis to understand what the colours indicate.

Analysis

I. Long Term Predictability

Running an electricity distribution network is a long-term responsibility, as many of the assets involved are expected to last for decades. The tariffs customers pay today not only cover investments made years ago but also provide the cash needed to expand and strengthen the grid for the future. In this setting, revenue regulation for DSOs must be steady yet flexible. As highlighted in GEODE's 2024 Paper, predictable rules give operators the confidence to invest and plan ahead, while a degree of flexibility is essential to accommodate unforeseen developments. Striking this balance supports efficient network evolution, helps maintain stable tariffs, and ultimately safeguards the resilience of the grid and the communities that rely on it.

Austria	• The 5-year regulatory period, with the WACC for new investments updated annually, provides the necessary flexibility. • The incentive regulation framework has been continuously refined over successive periods to address new challenges for DSOs, without undergoing fundamental changes, ensuring predictability while preserving flexibility. • Operating-cost factors serve as adjustment tools to reconcile actual versus regulated costs, which are otherwise updated only at the start of each five-year regulatory period. • These factors act as expansion tools, enabling DSOs to accommodate significant cost changes, such as rising network demand or new legal obligations. Minor cost changes are intentionally excluded to maintain incentives for efficiency and cost control. • They remain adaptable and can be revised when legal or operational shifts materially affect DSOs' service obligations, ensuring flexibility within a stable regulatory structure.
Finland	• In 2022, Finland's regulator amended key regime parameters mid-period, increasing unpredictability in the regulatory framework. • The 2024–2031 regime altered asset valuation methods, freezing the pre-2024 asset base at 2022 market prices with no inflation adjustment. • Investments made post-2024 are valued at the end of each four-year cycle, covering all investments during that period. • These adjustments have increased uncertainty in regulatory and investment returns and framework will remain in place until 2031. Finnish DSOs have appealed both changes to the Finnish Market Court.

Ireland

- The regulator recognises the investment required to meet national policy objectives, reflected in a 90% increase in CAPEX baseline allowances versus the previous price review, alongside provisional approval for a higher investment envelope aligned with national plans.[10]
- Delivering a programme of this scale depends on a framework that enables timely access to allowances, clear accountability for investment decisions, and sufficient financial headroom.
- The Irish regulator aims to create a framework that maximizes delivery flexibility while strengthening outcome-focused oversight and regulatory interaction.

Italy

- Italy's regulatory framework prioritizes long-term predictability, stability, and transparency, with multiyear tariff periods (e.g., 2016–2023 with a 2019 mid-term review, and 2024–2031 split into two four-year cycles).
- Predictability is supported by a WACC set ex ante for six years (2022–2027), supplemented by mid-term sub-period updates and an annual "trigger" to adjust for macroeconomic changes.
- Regulatory evolution follows clearly defined steps, including public consultations and active DSOs and stakeholders' involvement.
- Substantive changes are implemented only through formal decisions by ARERA (Italian NRA) with deferred effectiveness, maintaining long-term certainty while allowing intra-period flexibility.

Poland

- Until 2020, Poland applied a long-term model for operating costs and grid losses costs, but the framework shifted to a one-year regulatory period in order to better reflect periods of environmental and economic volatility, including the ongoing war in Ukraine.
- Controllable costs, such as salaries and external services, are based on year t-2 execution and indexed by cumulative inflation for years t-1 and t.
- These parameters are each year jointly determined by the Energy Regulatory Office (ERO) and DSOs, without a guarantee of long-term continuity.
- The Effective Transformation Card for Distribution in Poland introduced a fixed guaranteed WACC for period 2023 - 2028, while DSO development plans cover six years and are updated every two years.
- A multi-year model would be advisable once political and economic conditions stabilize.

[10] Price reviews occur every five years, with PR6 starting on 1 January 2026 and currently under negotiation.

Spain	• Spain continues to face regulatory instability, with investment plans for 2023–2025 still pending formal approval and DSO remuneration from 2023 onward yet to be published. • Legal uncertainty persists due to ex-post inspections of completed investments without predefined criteria, causing procedural inconsistencies and delaying cost recovery. • The absence of a stable remuneration methodology continues to weaken investor confidence and slow progress on energy transition investments. • EU Directive 2019/944, which mandates national distribution development plans and enhanced customer information, has not yet been implemented. A forthcoming draft regulation may streamline investment plan approvals once adopted.
Sweden	• Sweden's revenue regulation has undergone eight major revisions since 1996, with further substantial changes expected in 2028. • Frequent and significant updates create uncertainty for DSOs, investors, and stakeholders, affecting WACC, depreciation, ex ante/ex post rules, and revenue transfers. • The complexity of the regulatory framework has increased administrative burdens for network operators. • Recurring legal disputes between the regulator and DSOs add additional unpredictability.

Among the countries reviewed, Italy stands out for the highest degree of long-term predictability. Its regulatory framework combines well-defined multiyear cycles with transparent rulemaking and precise mid-term adjustments, giving investors and operators confidence in future outcomes. Austria performs strongly as well, striking a sound balance between flexibility and stability through its structured cost-adjustment mechanisms. Ireland's framework, while still developing, shows promising aspects, such as its alignment with national policy goals and its focus on accountability and delivery flexibility. By contrast, Finland, Sweden, Spain, and Poland face challenges: frequent or mid-period changes, delayed regulatory decisions, and shorter review cycles continue to weaken long-term stability and investors' confidence.

II. Anticipatory Investments

The European Commission understands Anticipatory *Investments as investments into grid infrastructure assets that proactively address network development needs beyond the ones corresponding to reinforcements relating to currently existing grid connection requests by generation or demand projects*[11]. With the rapid rollout of renewable energy and increasing electrification, DSOs need the right incentives to align these investments with their Network Development Plans (NDPs). While such forward-looking investments come with economic risks, a stable regulatory framework can help manage them by fairly allocating costs, often to those who benefit from the added capacity. As highlighted in GEODE's 2024 Paper, reliable forecasting and long-term planning are essential. Encouraging anticipatory investments ensures a resilient, future-ready grid that supports electrification, renewable integration, and avoids costly capacity bottlenecks.

Austria	• Austria's approach aligns planned and actual investment costs by recognising capital costs upfront based on planned investments, then adjusting them to reflect actual expenditures. • This method eliminates delays in cost recovery, providing greater investment certainty in the face of volatile interest rates. • It incentivises precise planning by reconciling overestimations using the investment-year WACC and underestimations with the risk-free equity rate.
Finland	• Finnish DSOs develop networks based on regulated development plans, with work in progress capitalised during construction. • The framework lacks incentives for anticipatory investments, as assets without active customers are excluded from the asset base, creating potential stranded asset risks. • Current regulation does not strongly encourage grid modernisation or capacity upgrades needed for the energy transition.
Ireland	• Network planning in Ireland follows a "build once for 2040" approach to enable full decarbonisation by 2050 and avoid repeated incremental upgrades. • Fragmented approval processes risk piecemeal implementation, reducing efficiency and economies of scale across planning cycles. • The sector is seeking regulatory support to embed anticipatory investment within strategic network planning. • Pilot regulatory approval has been granted for five renewable hubs to facilitate future renewable generation connections.

[11] European Commission. (2025, June 6). *Commission notice on guidance on anticipatory investments for developing forward-looking electricity networks (C/2025/3179). Official Journal of the European Union, C/2025/3179.* https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:C_202503179

Italy	• Italy lacks a formal regulatory definition of anticipatory investments; notwithstanding these investments are allowed already within the current framework • Nevertheless, the National Regulatory Authority (NRA) provides targeted incentives for investments included in Network Development Plans (NDPs) and supported by cost-benefit analyses. • These incentives encourage DSOs to strengthen networks, expand hosting capacity, and support the electrification of energy demand. • They also enhance resilience by supporting measures that prevent or mitigate the impact of emergencies on the electricity grid.
Poland	• Poland does not have specific regulatory provisions for anticipatory investments. • Digitalisation and automation are considered priority tasks (i.e., key infrastructure projects that are crucial for ensuring the safety, reliability, and efficiency of the distribution network) and are going to be rewarded with additional bonuses from 2026 under current regulations. • DSO planned capital expenditures are approved by the NRA based on six-year Network Development Plans, updated every two years. • These plans reflect DSO obligations and objectives such as reliability, demand growth, asset replacement, and network cabling. • Each NDP includes forecasts of supply security within the DSO's operating area, ensuring network expansion meets reasonable service needs.
Spain	• The National Integrated Energy and Climate Plan (PNIEC) 2021-2030 foresees more than €53 billion in grid investment to strengthen network capacity and support electrification. • The current framework caps annual investment at 0.065% of Gross Domestic Product (GDP) for transmission and 0.13% for distribution, limiting the rate of expansion. • The government is considering raising the average investment level by around 60% for 2026-2030, conditional on allocating at least 15% to anticipatory investments. • Under the n+2 rule, remuneration for 2024 investments will only be received in 2026, leaving the applicable financial rate of return unknown and increasing uncertainty for DSOs.
Sweden	• Swedish revenue regulation partially supports anticipatory investments, with DSOs often slightly over-dimensioning networks to meet future demand. • The risk of sunk costs is generally shared across all customers. Exceptions arise if a specific customer disconnects or goes bankrupt, in which case costs may not be socialised. • Reasonable additional costs for anticipatory investments are usually allocated to the customer collective, though some uncertainty remains under the updated regulation. • In addition, the electricity act requires that assets be needed and used, and their dimensions should remain reasonable to avoid unnecessary costs to customers. • There are indications that the ongoing revision of Swedish revenue regulation may reduce DSOs' ability to fund anticipatory investments via the revenue cap, instead prioritising rewards for current utilisation of available capacity.

Among the countries reviewed, Austria and Sweden perform well in supporting anticipatory investments. The Austrian reconciliation model reconciliation model for investments costs allows early recognition of capital costs and adjusts for deviations, providing investment certainty and a balanced approach between flexibility and stability. Sweden encourages slightly over-dimensioned networks, with risks generally shared across customers, supporting proactive capacity planning. Italy, Poland and Ireland provide targeted or pilot incentives linked to strategic planning and cost-benefit analysis, promoting network expansion, resilience, and the integration of future renewable generation, although formal mechanisms remain limited. By contrast, Finland and Spain face challenges: anticipatory investment incentives are weak or absent, remuneration may be delayed or capped, and planning processes can be fragmented, limiting the motivation for forward-looking network investments.

III. Sufficient Cashflow & Financing Mechanism(s)

Revenue regulation must ensure that DSOs have enough cash flow to manage the investment peaks that come with electrification and changing network needs. Reliable funding enables operators to build new infrastructure, roll out digital upgrades, and maintain high service quality, while a shortfall in cash flow can limit their ability to respond to unexpected events or extreme weather. Building on the principle outlined in the 2024 GEODE paper, this approach emphasizes the additional importance of financing mechanisms. Such mechanisms, designed to accelerate returns or accommodate temporary operational cost spikes, are essential for sustaining liquidity, reducing borrowing, and enabling efficient grid expansion, thereby supporting a resilient and future-ready electricity system.

Austria

- As already described in the section Anticipatory Investments, planned CAPEX is now taken into account for new investments, eliminating the t-2 delay and thus having a positive effect on cash flow.
- Investment subsidies and grants reduce RAB, lowering Earnings Before Interest & Taxes (EBIT) and diminishing incentives for innovative financing, such as European Investment Bank (EIB) loans, which currently provide only limited benefits to DSOs.
- The absence of a stable WACC across regulatory periods undermines the long-term protection of network asset value.
- DSO investments in renewable integration and climate-target measures receive no additional advantages.
- The NRA does not include Working Capital (WC) in the RAB, which negatively affects DSOs' cash flow position.

Finland	• Finland's frozen asset valuation approach, where replacement values are fixed without inflation adjustment, restricts cash flow and limits DSOs' ability to finance energy-transition investments. • Regulatory caps on efficiency gains reduce the financial benefits DSOs can retain, weakening incentives to invest. • The framework undermines long-term predictability and erodes the investment base, creating uncertainty around returns. • Overall, insufficient cash flow and restrictive mechanisms discourage DSOs from investing in a rapidly evolving energy system.
Ireland	• The proposed 2026 – 2030 price review (PR6) marks the distribution networks' largest capital programme ever, requiring rapid access to finance at scale. The final regulatory decision is expected in December 2025. • The July 2025 draft package raised financeability concerns, particularly regarding the design of incentives and penalties, as they have the potential to constrain cashflows and heighten financing risks. • Working capital needs have risen sharply, with stock levels doubling to sustain delivery pace and manage supply chain and storm risks; DSOs are seeking explicit recognition of this challenge within the regulatory framework. • All financeability issues are currently being addressed through constructive engagement with the Irish regulator ahead of the December decision.
Italy	• Italy's capitalisation rate, which draws on historical and projected OPEX and CAPEX, ensures DSOs have sufficient cash flow to manage investment peaks. • Targeted investment incentives, including those for anticipatory investments, further support proper investment decisions to meet energy-transition requirements.
Poland	• Returns are determined using a RAB-based method. • RAB calculated as at beginning of tariff year. • The Effective Transformation Card for Distribution in Poland establishes a guaranteed fixed WACC for 2023-2028, potentially extendable to 2030, providing a guaranteed minimum return. Additional premium for reinvestments feasible but negotiated each year with the Regulator. • Returns based on RAB and WACC also reflect the impact of quality regulation (for year t-2). • Gaps between actual and recognised OPEX and grid losses costs (not part of OPEX in PL) reduce available cash flow and create an OPEX shortfall.
Spain	• The Electricity Sector Act sets debt limits but grants exemptions to small DSOs with fewer than 100,000 customers, allowing them to exceed standard debt ratio thresholds. • The existing uncertainty regarding the remuneration methodology and WACC weakens investor confidence and may restrict the required funds. • Delays in approving investment plans from previous years could adversely affect cash-flow availability. • A substantial reduction in recognised OPEX is foreseen for the upcoming regulatory period.

Sweden

- Sweden's revenue regulation has historically ensured stable cash flow through capital cost remuneration.
- In fast-growing networks, deferred revenues and low connection charges can strain cash flow, though this mainly reflects structural conditions.
- The Swedish NRA's proposal to introduce a TOTEX-based model from 2028 may heighten long-term cash-flow uncertainty. Additionally, the planned revision of the WACC methodology is expected to significantly affect DSOs' ability to secure capital, obtain loans, and attract investors.

Across the countries reviewed, Italy provides the most supportive framework for DSOs, with capitalisation-based returns and targeted investment incentives that help manage peaks and advance energy transition objectives. Austria and Poland offer a reasonable degree of predictability through planed CAPEX, fixed WACC and RAB-based returns, though occasional gaps can limit cash flow. Sweden has historically ensured stable cash flows, but upcoming shift to a Total Expenditure (TOTEX) model and WACC changes may introduce uncertainty. Ireland faces its largest-ever capital programme, yet financeability concerns (linked to incentives, penalties, and rising working-capital needs) pose challenges. By contrast, Finland and Spain face structural constraints, including frozen asset valuations, OPEX shortfalls, and uncertain remuneration frameworks, which limit cash flow, reduce regulatory predictability, and risk discouraging investment at a time of accelerating energy-transition requirements.

IV. Competitive WACC (equity interest rate vs debt interest rate) & RAB Concerns (book values vs replacement values)

Building on the principle outlined in the 2024 GEODE paper, this analysis emphasizes the importance of both a competitive weighted average cost of capital and appropriate regulatory asset base valuation, offering a more complete view of a DSO's ability to attract investment. A competitive WACC is critical for DSOs to earn fair returns while managing investment risks. Despite their status as regulated entities, DSOs effectively compete for funding, skilled personnel, and resources, making attractive returns essential for long-term viability. Declining WACC levels coupled with rising operational risks increasingly challenge grid financing and expansion. By aligning the RAB with fair book or replacement values and ensuring a competitive WACC, regulators can maintain investor confidence and support sustainable network development. Striking the right balance helps secure the financial stability of DSOs while promoting efficient, long-term electricity distribution.

Table 3: Overview of Key WACC and RAB Parameters by Country:

	Regulatory Period	WACC	WACC methodology (nominal/real, etc.)	RAB valuation approach	RAB components	RAB adjustments
Austria	2024-2028	For the RAB until 2023: 4.16% For new investments made in 2024: 6.33%	Nominal WACC pre-taxes (equity share 40%, debt share 60%, Capital Asset Pricing Model is used to determine the cost of capital)	Historical cost approach	Intangible and fixed assets, book values	Yearly RAB developments during a RP are considered, lead to changes of the regulated cost base
Finland	2024–2027 and 2028–2031	Year 2025: 7.20%	Nominal, pre-tax	The RAB is calculated from the network replacement value by applying network component-specific average age and lifetime selection	Fixed assets, working capital, leased assets	The valuation of investments made before 2024 and the determination of the frozen replacement value will be based on the network components actually in operation at the end of 2023, which will be revalued using the 2022 market prices. For investments made from 2024 onwards, the replacement value is determined according to the unit prices determined for the 2024-2027 and 2028-2031 regulatory period.
Ireland	2026-2030	3.85% (2026-2030 draft determination from July 2025). This is subject to final determination decision in December 2025.	Pre-tax real	Historical cost approach	Fixed assets, assets under construction	Regulatory framework includes an annual update through the Irish Harmonised Index of Consumer Prices
Italy	2022-2027 (mid-term update for the 2025-27 sub-period and a potential yearly revision mechanism)	5.6% (2025-2027 subperiod)	Pre-tax, real.	Historical cost approach. The RAB is revalued for inflation and is net of depreciation and grants.	Fixed assets, working capital, assets under construction.	New investments, depreciation, grants. For standard costs, changes in the driver. Regulatory framework calls for an annual revaluation of the RAB through the Italian Harmonised Index of Consumer Prices for Italy (HICP Italy, general index)
Poland*	2025	Guaranteed WACC 8.478% + individual premium for reinvestments	Nominal, pre-tax	RAB from year t-1 + (CAPEX – depreciation – payments for connection – subsidies) for year t-1 + delta CAPEX from t-2 No RAB revaluation since 2008	Fixed assets + assets under construction	Yearly as in position RAB valuation approach
Spain	2021-2025 (the 2026-2031 period is still under discussion)	5.58%	Nominal, pre-tax	Replacement cost, average of audited costs and investment reference values or audited costs with some limitations.	Fixed assets (no working capital, no assets under construction).	Assets built year n-2 are added year n.
Sweden	2024-2027	4,53%	Real, pre-tax Capital Asset Pricing Model and WACC based on a combination of history and scenario prognosis.	Normative pricing lists indexed by construction cost development	Fixed assets in operation.	Investments added to RAB when operational during the regulatory period, assets deducted when disconnected.

* In Poland from 2021 yearly regulatory periods

Austria	• Since the start of the fifth regulatory period, Austria applies a dual WACC: 4.16% nominal pre-tax for the existing asset base and 6.33% nominal pre-tax for new investments in 2024, with the latter automatically updated each year. • The WACC is adjusted for efficiency, varying around the median depending on each DSO's benchmarking score; a balancing mechanism ensures sector-wide neutrality. • Finance costs are calculated by multiplying the regulatory asset base (book values) by the applicable WACC, with average depreciation periods of 20–25 years. • The framework provides transparent, market-reflective parameters – 60/40 debt/equity, 5% risk premium, 24% tax rate – but reliance on book values rather than replacement costs may gradually erode asset competitiveness over time. In addition, debt costs are calculated using a BBB-rated index, which overestimates the creditworthiness of smaller DSOs, reducing the effective WACC.
Finland	• Finland's RAB is frozen and does not reflect current market values, leading to gradual erosion of asset value and reduced returns. • Deferred taxes are treated as non-interest-bearing debt and deducted from the RAB, further shrinking the financial base for returns. • Abrupt regulatory changes, implemented with minimal consultation and impact assessment, increase financing costs not captured in the WACC. • Overall, the regulatory framework undermines long-term predictability and the competitiveness of the WACC.
Ireland	• Ireland's pre-tax WACC incorporates both the cost of equity determined via Capital Asset Pricing Model (CAPM) and the cost of debt, reflecting risk-free returns and sector specific risk. • The pre-tax real WACC is set for a period of 5 years in the Price Review. • The current and draft WACC for the forthcoming period is 3.85%, currently under discussion with the Irish regulator ahead of the December 2025 decision. • The RAB is indexed to real inflation, ensuring stability even under volatile macroeconomic conditions.
Italy	• Italy's real pre-tax WACC incorporates both cost of equity, determined via CAPM and reflecting risk free returns and sector specific risk, and cost of debt, based on historical and current non-financial corporate bond spot yields. • The WACC framework includes a potential annual revision ("trigger") to account for macroeconomic changes. • The RAB is revalued annually using Italy's general index for consumer prices (HICP), as required by the regulatory framework.

Poland	• The NRA introduced a guaranteed fixed WACC for 2023-2028, with potential extension to 2030 under the Effective Transformation Card for Distribution in Poland (KET). • This WACC, currently 8.48% including the reinvestment premium, provides a stable and predictable minimal return on capital to support investment needs. • Such approach limit volatility in tariffs and returns (any changes depend on RAB values), stabilize DSOs revenues and balance customers' and DSOs' interests. • RAB calculated and updated annually to reflect agreed investments, depreciation, subsidies, connection fees, and differences between planned and actual / executed values from year t-2. • Non-refundable subsidies, grants reduce RAB to prevent double financing. Depreciation on investments financed by such subsidies, grants in 100% recognised in the tariff.
Spain	• The rate of return is calculated as a nominal pre-tax WACC combining the cost of debt and equity, with new investments added to the RAB two years after commissioning. • The current WACC of 5.58% is considered insufficient to incentivise investment, and the proposed 2026–2031 level of 6.58% remains below international benchmarks, potentially reducing investors' interest. • Unitary values used in the current methodology for efficiency assessments are outdated (from 2011) and fail to reflect current price trends above RPI, disconnecting remuneration from actual costs. Pending regulatory proposals would remove adjustments for unit values and electrification investments in capacity-building, while work-in-progress remains uncompensated. • CAPEX and OPEX remuneration parameters are fixed for the whole period and based on historical benchmarks, excluding inflation or new obligations/services to be supplied by DSOs.
Sweden	• Sweden currently uses a forward-looking WACC methodology, resulting in a 4.53% real WACC without a regulatory risk premium. • The model accounts for the long-term horizon of grid investments and has been upheld in multiple court cases, providing a solid legal and theoretical foundation. • Under the proposed new methodology for the next regulatory period, WACC could drop from 4.53% to around 1.7% (from 2028), the lowest in the EU. • The suggested WACC relies on historical inflation and risk-free rates, disregarding actual sector risks or opportunity costs, and falls below the central bank policy rate, potentially threatening future grid investments.

Among the countries examined, Italy exhibits the strongest alignment with best practices in WACC and RAB management. Its regulatory framework combines a market-reflective WACC with annual RAB updates indexed to real inflation, creating a stable and predictable investment environment. Poland supports long-term predictability through a fixed WACC complemented by annual RAB adjustments. Ireland shares many of Italy's features, with a market-reflective WACC set for five-year periods and RAB additions indexed to real inflation, although these measures are not yet fully implemented. Austria also performs comparatively well, balancing dual WACCs for existing and new assets alongside efficiency-

adjusted benchmarking to ensure both flexibility and stability. In contrast, Finland, Spain, and Sweden face notable challenges: low or frozen WACCs, reliance on book-value or outdated RAB calculations, and regulatory changes that weaken investment incentives and long-term asset competitiveness.

V. Balanced Incentives between CAPEX and OPEX & Reinvestment vs New Investments

Revenue regulation must strike the right balance between capital expenditures (CAPEX) and operational expenditures (OPEX), recognizing that both traditional investments and emerging technologies are essential for efficient electricity delivery, and thereby rewarding the most efficient solutions. This principle has been expanded from the referenced 2024 GEODE paper because such efficiencies should consider not only CAPEX-based vs OPEX-based solutions but also solutions of reinvestment vs new investments, in the end optimising the mix considering all four. Innovative solutions (such as battery storage or flexible connections) can reduce the need for new capacity, but they may increase operational costs, which should be fairly reflected in revenue frameworks. By allowing all technical solutions and business models to compete on a level playing field, regulation enables DSOs to make the best decisions between reinvesting in assets, expanding capacity, or procuring flexibility services. This approach supports a cost-efficient, innovative, and resilient electricity grid.

Austria	• Austria's regulatory framework allows DSOs to adjust significantly between CAPEX and OPEX within the regulatory period. • This flexibility supports the adoption of the most economically efficient procurement strategies, avoiding rigid constraints on cost categories. • DSOs can report CAPEX-OPEX shifts to the regulator, which reviews and approves them if they meet the set criteria.
Finland	• In Finland, CAPEX is regulated via a rate-of-return model with some incentives but significant constraints. Asset values are frozen at the end of the regulatory period, with no adjustments for inflation or revaluation, gradually reducing the asset base. • Regulatory depreciation is based on fixed lifetimes and frozen values, limiting flexibility in cost recovery. Capital efficiency incentives are capped, and deferred taxes reduce the reasonable return. • OPEX is regulated using a benchmarking model, comparing each DSO's controllable costs against an efficiency frontier derived from peers, adjusted annually for inflation and input/output changes. • While this model incentivizes continuous improvement, it may penalise DSOs with structural differences or legacy inefficiencies. Capitalised demolition costs are treated as OPEX, rather than being classified as investment costs as before, and costs incurred prior to 2024 are amortised over eight years.

Ireland	• Ireland's regulator acknowledges the scale of investments required under PR6 compared to PR5. The PR6 Draft Determination proposes baseline CAPEX allowances 90% higher than previous levels, and high-case allowances approximately 160% higher. OPEX allowances are also expected to increase proportionally for 2026–2030. • To access funding beyond the baseline allowances (for both OPEX and CAPEX), the regulator has proposed an Agile Investment Framework (AIF), designed to allow an identified additional required investment to be accessed.
Italy	• Italy's ROSS regulation divides DSO TOTEX into Slow Money and Fast Money, using a capitalisation rate set in advance by the NRA to encourage the most efficient solutions. • This structure prevents a CAPEX bias, discouraging unnecessarily capital-intensive projects.
Poland	• No distinction in remuneration between existing assets and new investments (incl. modernisation). • From 2026, DSOs may agree on priority investments (e.g. smart meters, digitalisation and automation, Medium Voltage/ Low Voltage (MV/LV) cabling) eligible for an additional investment premium / return on capital; premium for such investments not defined yet. • Priority investments will be verified during financial audits, and own funds used alongside non-repayable grants receive separate remuneration.
Spain	• Only CAPEX is capitalised and included in the RAB, while OPEX evolves according to predefined drivers, including additional investments, customer numbers and a 3% annual efficiency factor. • OPEX-based solutions, such as flexibility mechanisms, are currently not recognised in the framework, limiting viable alternatives to traditional CAPEX. • Rising network demands and new DSO responsibilities under the energy transition are not adequately reflected in remuneration. Strong pressure to reduce OPEX has led to the rejection of justified costs. • The proposed regulatory methodology introduces adjustment factors that risk underestimating the funds required to meet electrification targets and may create regional inconsistencies. Notwithstanding, the introduction of regulatory sandboxes marks a positive step towards testing flexibility-based remuneration.
Sweden	• Current regulation has a CAPEX bias, as efficiency requirements apply only to controllable OPEX, making CAPEX investments more financially attractive and potentially discouraging investment in new smart solutions, such as flexibility • Swedish NRA has proposed a transition to a TOTEX-based regulatory model from 2028, impacting DSOs' strategic planning and grid development. With an adequate TOTEX-model, OPEX and CAPEX will be treated more equally, but this requires careful, gradual implementation to ensure rational investment decisions. • The current overhaul of the revenue framework introduces many moving parts, reducing predictability. • Overall, implementing TOTEX is positive if structured with a bonus/malus system, based on established models, and introduced gradually over multiple years.

Across Europe, some regulatory frameworks exemplify best practices by promoting flexibility and efficiency in DSO spending. Austria allows dynamic adjustments between CAPEX and OPEX, while Ireland's Agile Investment Framework enables access to additional funding beyond baseline allowances, and Italy's ROSS model incentivises efficient solutions while avoiding CAPEX bias. Finland's benchmarking and Sweden's TOTEX approaches encourage continuous improvement but requiring careful implementation to avoid penalising DSOs with structural or legacy constraints. Conversely, countries such as Spain and Poland face more challenging environments: rigid CAPEX-focused rules, limited recognition of OPEX-based solutions, and unclear incentives can restrict investment in innovative solutions and fail to fully accommodate rising network demands.

VI. Efficient Operations & Safeguarding Consumer Interests

As regulated entities, DSOs depend on revenue regulation to deliver fair and transparent efficiency incentives while recognising effective cost management. Efficiency targets should account for factors such as geography or existing high performance, ensuring that operators are not unfairly disadvantaged. At the same time, regulation must support investments that both improve customer satisfaction and deliver societal benefits, including digitalisation, security of supply, and protection against physical or cyber risks. Efficiency incentives should be balanced so that that they do not prevent needed strategic improvements. In other words, DSOs need regulation that encourages cost-effective operations without compromising service quality, reliability, or resilience.

Austria

- Austria's regulatory framework promotes efficiency through an annual general productivity factor (xgen) and an annual individual productivity factor (xind).
- After four full regulatory periods these productivity factors often become unrealistically high, making them unattainable for many DSOs.
- Xind is determined via benchmarking using OPEX and CAPEX as inputs, and peak load, customer numbers, and transformed network connection density (trfNAD) as outputs.
- While the approach is generally effective, including cybersecurity costs (e.g., NIS guideline implementation) may disadvantage DSOs that have made substantial cybersecurity investments.
- The NRA is currently discussing the introduction of a regulation covering commercial service quality.

Finland	• Finland's regulatory regime includes efficiency and quality incentives, though their design presents challenges. • Efficiency incentives benchmark controllable OPEX using the Stochastic Non-smooth Envelopment of Data method (StoNED) method, with targets set at 0% for 2024–2027 and -1% for 2028–2031, potentially penalizing DSOs facing rising costs or expanded responsibilities due to the energy transition. • Efficiency rewards are capped at 20% of the reasonable return, limiting potential benefits for high-performing DSOs. • Quality incentives compare actual outage costs to reference levels, capped at 15% of the reasonable return, offering limited upside for DSOs with historically few outages while still imposing future penalties.
Ireland	• Ireland's current incentive mechanisms focus on system performance and customer satisfaction. These measures are generally based on attaining specific targets across the package. • Some measures use a balanced scorecard methodology. These have proven to be more challenging to implement across the price review period. • The next price review approach aims to continue incentivizing improvements in efficiency and network performance, ensuring symmetry between rewards and penalties and setting realistic, achievable targets. The draft determination proposes up to 18 measures.
Italy	• Italy sets stringent service quality targets for SAIDI, SAIFI, and MAIFI (System Average Interruption Duration Index, System Average Interruption Frequency Index, Momentary Average Interruption Frequency Index) metrics based on historical benchmarks, requiring percentage improvements in the worst-performing network areas. DSOs receive proportional rewards or penalties based on performance and the number of affected customers. • DSOs must refund customers for any individual interruption exceeding eight hours. • The NRA also sets specific targets for commercial operations, such as site inspections, quotations, and connections, with penalties in the form of customer reimbursements for missing specific tasks and delays. • Regulation should continue to incentivize DSOs to improve efficiency and network performance, ensuring symmetry between rewards and penalties and setting realistic, feasible targets. • ROSS regulation provides efficiency mechanisms on OPEX, operating both as a reward when actual spending is below the baseline, and a penalty when it exceeds it.
Poland	• Controllable operational costs, such as wages and external services, are based on year t-2 execution and indexed by cumulative Consumer Price Index (CPI); OPEX gap in place since wages typically grow/change faster than CPI. • OPEX (controllable and non-controllable) reviewed by the Regulator yearly • Grid losses costs separated from OPEX and recognised in tariff under different regime. • Quality regulation (SAIDI, SAIFI and time for LV customers connection) is in place since 2015. Quality regulation execution is reflected in tariff/regulatory revenues via the return on RAB.

Spain	• DSOs are remunerated for regulated activities such as metering, billing, customer service, grid planning and overheads. Revenues are based on reference values per client category, with efficiency gains retained if costs are below benchmarks. • The framework provides clear and transparent rules that support efficiency and service improvement. • Some indicators, including quality of supply, are highly demanding but offer limited reward, while others are less ambitious and fail to recognize top-performing DSOs. • The regulator's current proposal, still pending approval, would tighten efficiency parameters for both CAPEX and OPEX, risking excessive penalties even for DSOs achieving cost reductions.
Sweden	• Sweden's current and upcoming revenue regulation uses a Data Envelopment Analysis (DEA) model, assigning efficiency targets based on DSOs' relative performance. • Benchmarking is complicated by exogenous factors, such as unique network characteristics. • Small peer groups in some DSO categories raise concerns about the reliability of comparisons. • Three separate incentives—outages, grid losses, and utilisation rate—are included, although the utilization rate metric may conflict with renewable connections, introducing uncertainty regarding overall efficiency requirements.

Across the countries reviewed, Ireland's forthcoming model is expected to maintain balanced incentives, ensuring symmetry between rewards and penalties while setting targets that are both realistic and attainable. Italy likewise appears well positioned to continue linking efficiency incentives with service quality and customer compensation, helping to align operational performance with consumer outcomes. Austria and Spain also show comparatively strong performance: Austria combines flexibility with structured cost adjustments, though increasingly high productivity requirements are becoming difficult for DSOs to meet, while Spain offers transparent efficiency rules but provides limited upside for the best-performing operators. In contrast, Finland, Sweden, and Poland continue to grapple with restrictive incentive designs, complex benchmarking processes, and cost-indexing methods that may impede efficient operations and weaken protections for consumers.

VII. Incentivise Innovation & Incentivised Sustainable Solutions

Revenue regulation should encourage DSOs to invest in research, development, and innovation, facilitating the adoption of new technologies and smart solutions that enhance grid performance, sustainability, and efficiency. Building on the principle highlighted in the 2024 GEODE paper, the analysis emphasizes that well-designed revenue frameworks should particularly promote solutions with strong sustainability benefits. Traditional low-tariff models can hinder innovation by penalising pilot projects and Research and Development (R&D), restricting DSOs' ability to act as neutral market facilitators. In contrast, mechanisms that allow DSOs to recover dedicated innovation costs or generate revenue for R&D encourage the exploration of new technologies, the development of flexibility solutions, the integration of advanced systems, and the strengthening of grid resilience. These approaches ultimately deliver tangible benefits to customers while supporting the broader energy transition.

Austria	• Austria's NRA provides an annual research and innovation budget for all DSOs. • Each DSO receives an allocation equivalent to 0.6% of its controllable OPEX per year. • The budget is designed to stimulate innovation in areas such as security of supply, optimization of existing grid assets, expansion of connection capacity, energy system decarbonization, and digitalization. • To ensure efficient implementation, research projects may be carried out either by network operators themselves or within project consortia. • A core feature of the scheme is that any unused funds at the end of the regulatory period are treated as cost savings and returned to network users through lower tariffs.
Finland	• Finland's National Energy Authority promotes innovation and flexibility through targeted incentives, though both are passthrough mechanisms without allowing a reasonable return. • The innovation incentive lets DSOs recover eligible R&D costs via tariffs, subjects to a cap of 0.5% of annual sales. • The flexibility incentive supports pilot projects for flexibility solutions, with a cap between 1%-2% of sales depending on the regulatory period. • These mechanisms aim to shift network development toward service-based flexibility, enabling faster and more cost-effective responses to customer needs.
Ireland	• Ongoing digitalisation and automation initiatives support the adoption of smart, non-wires solutions to optimise network performance and defer new infrastructure needs. • The forthcoming price determination is expected to include substantial additional support for these initiatives.
Italy	• Italy's regulatory framework supports innovation, notably through the 2nd-generation smart meters regulation, which applied a CAPEX-based system of penalties and rewards. • Innovative solutions have been incentivised and adopted to strengthen network resilience (ref. principle 2).

Poland	• The regulatory framework does not include specific incentives for research and development projects.
Spain	• Until recently, DSOs had little incentive to invest in network digitalisation, as such expenditures were often excluded from remuneration. Smart meter deployment was a notable exception, with costs recovered through meter rental charges. • Since Circular 6/2019, DSOs are permitted to invest in a wide range of digitalisation projects and allocate part of their budgets to pilot innovation projects. • The Government's proposal to raise the investment ceiling for 2026-2030 includes a dedicated budget line for digitalisation and automation, strengthening long-term incentives. • Nevertheless, accessing European Recovery and Resilience Facility funds has proven difficult due to challenges in cost recovery and documentation requirements. Despite covering up to 50% of costs, the administrative complexity has limited effective uptake.
Sweden	• Sweden's current revenue regulation does not include a dedicated innovation component, meaning that innovation costs are treated as controllable costs and subject to efficiency requirements. • This arrangement discourages DSOs from investing in high-risk innovation projects. • The framework also lacks incentives to reward sustainability-related actions. • Moreover, a high level of renewable sources (e.g. wind and solar) on the grids may reduce a DSO's income cap due to low utilisation of the grid.

Across the reviewed countries, several best practices emerge, notably Austria's dedicated R&I budget, Finland's targeted incentives for innovation and flexibility, and Italy's structured reward–penalty mechanisms that successfully accelerated smart meter deployment and resilience measures. Ireland also demonstrates encouraging momentum, although further regulatory measures are still under development. Spain presents a more mixed picture: recent reforms and higher proposed investment limits enhance digitalisation incentives, yet complex administrative requirements continue to constrain the effective use of EU funding. In contrast, Poland and Sweden face the greatest challenges: Poland lacks specific incentives for R&D, while Sweden's efficiency-focused framework treats innovation as a controllable cost and provides no mechanisms to reward sustainability, discouraging DSOs from undertaking higher-risk or long-term innovation efforts.

Policy Recommendations

Building on the country cases reviewed in this paper, each of the seven principles for efficient revenue regulations is accompanied by one specific recommendation that reflects the regulatory issues identified in practice. The following recommendations outline common principles for stable, investment-ready regulation across Europe, illustrated with examples from national frameworks that show both good practice and areas where further alignment is needed.

PRINCIPLE 1. LONG-TERM PREDICTABILITY

Embed stability with structured flexibility

Multi-year regulatory periods with predefined mid-term adjustments, as used in Austria and Italy, combine long-term predictability with adaptability to external shocks. This approach builds investor confidence while allowing regulators to respond to material economic or policy changes. In contrast, frequent revisions or delayed approvals, as seen in Finland and Spain, have created uncertainty that weakens planning and financing capacity.

In Finland, the mid-period revision of key parameters in 2022 significantly undermined regulatory predictability and resulted in legal proceedings, illustrating the impact of abrupt rule changes on investor confidence. Spain's continued delays in approving DSO investment plans have constrained planning and capital recovery and they expose DSOs to regulatory uncertainty. As Sweden prepares for its 2028 reform, clearly defined transition arrangements will be essential to preserve regulatory continuity and avoid investment slowdowns.

Experience in Italy also shows that transparent consultation and published decision pathways help reinforce predictability, suggesting that structured stakeholder participation can meaningfully support this principle.

PRINCIPLE 2. ANTICIPATORY INVESTMENTS

Strengthen strategic anticipatory planning and alignment

Network Development Plans (NDPs) should serve as holistic, forward-looking frameworks guiding investment priorities, not as binding project lists. Clear and transparent criteria for anticipatory investment approval – such as Austria's plan-actual reconciliation or Ireland's renewable-hub pilots – can encourage timely capacity build-out while managing risk. Aligning NDP cycles and tariff reviews, as in Italy and Poland, reinforces coherence between planning and financing decisions.

Austria's ex-ante recognition of capital costs provides investment certainty and eliminates recovery delays, setting a clear example for other Member States. In contrast, Spain's reference to anticipatory investments in the forthcoming remuneration scheme remains undefined, leaving DSOs without clarity on recovery conditions. Finland's frozen RAB discourages proactive network expansion aligned with future demand.

Recognising digitalisation as a strategic enabler for anticipatory investment would further strengthen this principle, as digital tools are essential for forecasting, hosting capacity management and system flexibility.

PRINCIPLE 3. SUFFICIENT CASHFLOW & FINANCING MECHANISM(S)

Keep asset valuation and depreciation aligned with reality

Periodic revaluation of the Regulatory Asset Base (RAB) and depreciation linked to actual technical lifetimes maintain regulatory credibility and protect returns. Italy's and Ireland's inflation-indexed RAB offers a balanced model, whereas frozen or outdated valuations in Finland and Spain have eroded cash flows. Regular, transparent adjustments help ensure intergenerational fairness and financial resilience.

Revenue regulation should also enable EU grants to function as genuine investment incentives: excluding grant-financed assets from the RAB or taxing grants diverts public support away from infrastructure and discourages DSOs from engaging in EU-funded projects. When such grants are not properly recognised within the RAB, their contribution to infrastructure delivery is effectively reduced, weakening the coherence between public funding instruments and regulatory objectives. Allowing regulatory depreciation for such assets and exempting grants from taxation would make EU funding more effective and aligned with its policy objectives.

In Finland, the decision to freeze the pre-2024 asset base at 2022 market price level, without inflation indexation, is already eroding returns in real terms and discouraging reinvestment. In Spain, continued reliance on asset values based on 2011 data disconnects regulated returns from current replacement costs, weakening both financial credibility and investor confidence.

The assessment also highlights that cybersecurity obligations, particularly in Austria and under forthcoming Second Network and Information Security Directive (NIS2) requirements, constitute essential system costs. Explicit recognition of these expenditures in regulatory models would reinforce cashflow adequacy and reflect the operational realities observed across Member States.

PRINCIPLE 4. COMPETITIVE WACC (EQUITY INTEREST RATE VS DEBT INTEREST RATE) & RAB CONCERNS (BOOK VALUES VS REPLACEMENT VALUES)

Ensure a predictable and risk-reflective WACC

Transparent, forward-looking methodologies should reflect real financing conditions and sector-specific risk while maintaining national flexibility. Italy's approach links WACC to market parameters through defined update cycles, while Poland's multi-year stability period illustrates how predictability supports investment. Where WACC levels are set below risk-adjusted requirements, as in Spain and Sweden, financeability and investor appetite are undermined.

In Spain, the proposed 2026–2031 WACC, although higher than the current level, remains below risk-adjusted benchmarks and continues to jeopardise attraction of the capital for the necessary level of investment. Sweden's current WACC is set below the central bank's policy rate, leaving DSOs with allowed returns lower than risk-free government bonds and insufficient to reflect the sector's long-term investment and risk profile.

In the case of Finland, its RAB is frozen, leading to gradual erosion of asset value and reduced returns. Combined with deferred taxes being deducted from the RAB, there is a shrinking financial base for returns, seriously undermining investment.The country cases also show that different categories of investment carry different levels of risk, with anticipatory, digital and innovative projects exposed to greater uncertainty. Allowing differentiated WACC parameters for such investments, as already partially seen in Austria, would better reflect risk levels and improve the bankability of these interventions.

PRINCIPLE 5. BALANCED INCENTIVES BETWEEN CAPEX AND OPEX & REINVESTMENT VS NEW INVESTMENTS

Ensure neutrality between CAPEX and OPEX

Regulatory frameworks should enable DSOs to choose the most efficient technical and operational solutions without bias toward capital investment. Italy's ROSS[14] model and Austria's flexible adjustments allow such neutrality, while Spain's rigid cost categorisation and Finland's capped incentives limit flexibility. A balanced CAPEX & OPEX approach supports innovation, digitalisation and demand-side flexibility.

Sweden's proposed transition to a TOTEX-based model could support a more neutral treatment of costs, provided implementation remains transparent and gradual. In Ireland, the Agile Investment Framework is intended to unlock additional investment above baselines; its implementation will need to ensure that boundaries between CAPEX and OPEX are sufficiently clear to avoid delays to reinforcement projects and unnecessary administrative complexity.

PRINCIPLE 6. EFFICIENT OPERATIONS & SAFEGUARDING CONSUMER INTERESTS

Guarantee timely and predictable regulatory approvals

Revenue regulation promoting service quality is important, as are predictable processes and clear timelines. The latter are essential to keep delivery on track during investment peaks. Mechanisms such as automatic approvals after defined deadlines or standing frameworks for recurrent investment categories would improve certainty. Lessons from Spain's delayed approvals and Ireland's focus on ensuring that its expanded baseline allowances and Agile Investment Framework translate into clear and timely access to funding show that procedural clarity directly affects delivery efficiency and costs to consumers.

Spain's backlog of unapproved investment plans since 2023 has created persistent uncertainty for DSOs and delayed critical grid reinforcements. Sweden's upcoming framework revision should include clear implementation timelines and transitional rules to avoid similar uncertainty.

PRINCIPLE 7. INCENTIVISE INNOVATION & INCENTIVISED SUSTAINABLE SOLUTIONS

Promote transparency, innovation and accountability while safeguarding liquidity and cash-flow adequacy

One fundamental way to promote innovation is to incentivise it. Transparent processes and dedicated innovation mechanisms strengthen trust and enable future-ready networks. Italy's open consultations and Austria's earmarked innovation budget illustrate how predictability and experimentation can coexist. Sweden and Poland's absence of such incentives highlight the value of introducing targeted, time-bound support while improving public reporting on performance and returns.

Austria's annual innovation allowance of 0.6% of controllable OPEX provides predictable support for R&D and pilot projects. In Finland, the pass-through design of the innovation incentive allows cost recovery but offers no return, limiting participation. In Spain, DSOs' experience under Circular 6/2019 shows that clear digitalisation incentives can be effective despite complex administrative procedures.

Strengthening transparency in regulatory processes through structured consultations and clearer communication of methodologies would further support accountability and improve regulatory certainty, as evidenced by practices in Italy.

While incentivising sustainable solutions that contribute to the mandated energy transition is important, considering a broader approach to the principle than just that contained in section VII above entails examining whether there are the stable funding mechanisms are needed to manage short-term financing pressures from large-scale investment.

Working-capital allowances and timely cost true-ups, as used in Poland and Italy, can mitigate cash-flow risk and maintain access to finance.

In Finland, the combination of frozen asset values and capped efficiency gains has reduced available cashflow at a time when network modernisation needs are accelerating. Spain's rule reducing 90% of prior-period OPEX margin weakens DSO liquidity and limits reinvestment capacity. Austria's absence of a long-term WACC mechanism makes it harder to maintain the value of investments over successive regulatory periods.

Conclusion

Europe's distribution networks will not deliver the energy transition if well-considered predictability remains the exception rather than the rule. The comparison across revenue regulation in seven EU countries, Austria, Finland, Ireland, Italy, Poland, Spain and Sweden, shows two paths: where regulators pair multi-year stability with structured mid-period adjustments, risk-reflective WACC and market-valued asset bases, investment proceeds at pace and at lower cost to consumers. Where parameters shift abruptly, asset base valuations are frozen, approvals drift and returns fall below risk, financeability weakens and projects stall.

A clear course is available. Anchor regimes in multi-year cycles with pre-announced checkpoints and transparent methodologies. Keep the asset base aligned with current prices and technical lives. Set the WACC from forward looking market evidence that sustains at least a solid investment grade profile. Strengthen anticipatory planning within network development frameworks, providing clarity on approval and cost recovery while allowing proportionate flexibility in delivery. Move gradually toward a more balanced treatment of capital and operating solutions, ensuring regulatory neutrality without adding complexity. Protect liquidity through timely cost recovery and revenue adjustments that reflect real financing needs, avoiding long delays in compensation or settlements. Incentivize sustainable innovation that delivers results.

If national authorities and EU policymakers act on this agenda, the outcome is practical and immediate. Grid connections would be delivered more quickly, network upgrades planned more efficiently, tariffs kept more stable, and investment sustained at the scale required. Italy and Austria show that stability with flexibility is attainable. Poland, Spain, Finland and Sweden highlight where course corrections matter most. A credible, consistent framework is now the single most effective lever to turn plans into assets in the ground and value for European consumers.

Abbreviations

AIF	Agile Investment Framework
ARERA	Italian Regulatory Authority for Energy, Networks and Environment
CAPEX	Capital expenditure
CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
DEA	Data Envelopment Analysis
DSO	Distribution System Operator
E.DSO	European Distribution System Operators (Trade Association)
EC	European Commission
EIB	European Investment Bank
EBIT	Earnings before interest and taxes
ERO	Energy Regulatory Office (Polish regulator)
EU	European Union
EV	Electric vehicle
GDP	Gross Domestic Product
GEODE	European Association for Local Energy Distributors
HICP	Harmonised Index of Consumer Prices
KET	Effective Transformation Card for Distribution in Poland (Karta Efektywnej Transformacji)
LV	Low voltage
MAIFI	Momentary Average Interruption Frequency Index
MV	Medium voltage
NDP	Network Development Plan
NIS	Network and Information Security Directive
NIS2	Second Network and Information Security Directive
NRA	National Regulatory Authority
OPEX	Operational expenditure
PNIEC	National Integrated Energy and Climate Plan
PR5	Price Review 5
PR6	Price Review 6
RAB	Regulatory Asset Base
R&D	Research and development
ROSS	Output-based regulatory framework for Italian DSO
RP	Regulatory period
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
StoNED	Stochastic Non-smooth Envelopment of Data method (efficiency benchmarking method)
TOTEX	Total expenditure
trfNAD	transformed network connection density
WACC	Weighted Average Cost of Capital
WC	Working capital
xgen	general productivity factor
xind	annual individual productivity factor

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