Investor Survey: How can ERAA better reflect real investment behaviour?

Overview

ENTSO-E is currently preparing to propose amendments to the ERAA methodology, drawing on the recommendations from the Commission, ACER, as well its experience in conducting the previous four editions of the ERAA. One key aspect under review is the **Economic Viability Assessment (EVA)**, the step within ERAA that aims to assess the likelihood and conditions under which generation, storage, or demand-side resources may exit or enter the market over a 10-year horizon. The latest EVA results from the ERAA 2024 edition were released on 7 April 2025, and can be found on ENTSO-E's website (**ERAA 2024** *<https://www.entsoe.eu/eraa/2024/#Economic%20Viability%20Assessment%20Findings>*). In its report, the Commission highlighted that some stakeholders have raised concerns that the EVA may be too optimistic on investment behaviour, and special attention should be given to the conditions for investment decision-making process by rational investors.

Thus, the purpose of this survey to gather insights from **investors, utilities, advisory firms, and financial institutions** actively involved in investment and retirement decisions for electricity assets. Your input will directly inform ENTSO-E's upcoming proposal to amend the ERAA methodology and help improve how real-world investor decision-making is captured — particularly under uncertainty and changing market conditions.

Note that this is an **informal survey**, separate from both the public consultation on the ERAA 2024 (open until 16 May 2025 via the link **here** *</system-development/european-resource-adequacy-assessment-2024-report/>*), and the formal public consultation ENTSO-E will conduct on its proposed revisions to the ERAA methodology, foreseen for June/July 2025. Many questions are optional, and respondents can choose to answer the questions most relevant for them. However, input received already at this early stage will support ENTSO-E to improve the robustness of the ERAA methodology in light of future adequacy assessments.

This survey is primarily aimed at:

- Utilities and developers managing or considering investments in technologies such as gas-fired generation and other conventional generation technologies, renewable energy sources (RES), battery storage, and demand-side response (DSR);
- Market consultancies, advisory firms, and financial institutions involved in project assessment, due diligence, or financing.

The survey questions focus on the following key areas:

- future scenarios and investment under uncertainty
- relevant revenues, investment criteria and risk aversion for different technologies
- additional barriers for market exit and entry
- more detailed questions on electricity price forecasting for economic viability assessments

Note: Several questions in this survey (e.g., Q14, Q25, Q27, and Q31) allow for technology-specific responses, enabling investors with diverse portfolios to provide relevant input. These detailed responses should be submitted via a single Excel file, using the provided template (**link** *<https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/sdc-documents/ERAA/ERAA_2025/ERAA%20Investor%20Survey%20-%20response%20workbook%201.xlsx>*). Respondents are only expected to complete the sections that apply to the technologies relevant to their portfolio.

The survey is expected to take between 20 and 40 minutes to complete, depending on your company profile and asset portfolio. You can save your progress at any time, and come back to your answers later.

About you

1 What is your First Name?

First Name *(Required)*

2 What is your Last Name?

Last Name *(Required)*

3 What is your e-mail address?

Email *(Required)*

4 What is your organisation?

Organisation *(Required)*

What type of entity do you (best) represent? *(Required)*

Please select only one item

- ◯ Large utility (> 2 GW installed generation capacity)
- ◯ Medium utility (200 MW to 2 GW installed generation capacity)
- ◯ Smaller utility or project developer (< 200 MW installed generation capacity)
- ◯ Large consumer (> 10 MW grid connection)
- ◯ Smaller consumer (< 10 MW grid connection)
- ◯ Retailer
- ◯ Aggregator
- ◯ Industry Association
- ◯ Electricity Market Consultancy / Advisory Firm
- ◯ Commercial bank or other debt provider
- ◯ Investment bank or other equity provider
- ◯ Other [Please provide below]

If other, please specify here

5 Please indicate which of the following technologies are either in your existing portfolio of assets or under consideration for new investment. (N.b. 'utility-scale' means connected to the transmission or high-voltage grid; behind-the-meter installations are not considered in this survey)

(Required)

Please select all that apply

- ☐ Combined Cycle Gas Turbine (CCGT)
- ☐ Open Cycle Gas Turbine (OCGT) or Gas Engines
- ☐ Utility-scale batteries
- ☐ Utility scale PV
- ☐ Onshore wind
- ☐ Offshore wind
- ☐ Demand-side response (DSR)
- ☐ Hydro (reservoir or run-of-river)
- ☐ Hydro (pumped storage)
- ☐ Nuclear
- ☐ Coal / Lignite
- ☐ Oil
- ☐ Hydrogen
- ☐ None of the above
- ☐ Other [Please provide below]

If other, please specify here

6 In which countries/regions do you have active capacities? (i.e. also considering new investments)

(Required)

Please select all that apply

- [ ] Albania
- [ ] Austria
- [ ] Belgium
- [ ] Bosnia and Herzegovina
- [ ] Bulgaria
- [ ] Croatia
- [ ] Cyprus
- [ ] Czech Republic
- [ ] Denmark
- [ ] Estonia
- [ ] Finland
- [ ] France
- [ ] Germany
- [ ] Greece
- [ ] Hungary
- [ ] Ireland
- [ ] Italy
- [ ] Latvia
- [ ] Lithuania
- [ ] Luxembourg
- [ ] Montenegro
- [ ] The Netherlands
- [ ] North-Macedonia
- [ ] Northern Ireland
- [ ] Norway
- [ ] Moldova
- [ ] Poland
- [ ] Portugal
- [ ] Romania
- [ ] Serbia
- [ ] Slovenia
- [ ] Slovakia
- [ ] Spain
- [ ] Sweden
- [ ] Switzerland
- [ ] Turkey
- [ ] Ukraine
- [ ] United Kingdom
- [ ] I prefer not to say (confidential)
- [ ] Other [Please provide below]

If other, please specify here

7 How familiar are you (or your organization) with the ERAA product?

(Required)

Please select only one item

- ◯ Very familiar (e.g. it is shared and discussed internally each year)
- ◯ Quite familiar (e.g. main outcomes are understood, but not how it actually works)
- ◯ Limited awareness (e.g. heard the name, but not what it does)
- ◯ Never heard of it

8 I agree to ENTSO-E's Consultation Hub privacy policy

You can find ENTSO-E's Consultation Hub privacy policy **here** </privacy_policy> .

- ☐ I consent to ENTSO-E's Consultation Hub privacy policy *(Required)*
- ☐ I consent to ENTSO-E publishing my responses in anonymised and/or aggregated form. *(Required)*

Familiarity with the ERAA and the Economic Viability Assessment (EVA)

As you indicated you are familiar with the ERAA, we'd like to ask a few additional questions on what you use it for, and in particular your views on the Economic Viability Assessment (EVA) step. The current EVA attempts to model investment decisions — including retirement, mothballing and de-mothballing, life extension, and new investments in generation capacity — in a coordinated manner across Europe, under the assumption of perfect foresight of future developments over the next 10 years. If you are not familiar with the ERAA at all, or unable to answer the following questions, you can simply skip these questions and continue with the next section.

9 If you are familiar with the ERAA, what are its main uses within your organisation?

Please select all that apply

- ☐ Scenario data for internal modelling/forecasts (e.g. installed capacities, load profiles)
- ☐ To identify business opportunities for new investments (e.g. in terms of technology / geographical location)
- ☐ Methodological inspiration for internal modelling
- ☐ Reference for own research, economic and other studies
- ☐ Other [please specify below]

If other or in case you want to give additional explanations, please specify here

10 In your view, to what extent does the EVA step reflect real-world decisions in retirement, (de-)mothballing, life extension and investment in new capacity, for the technologies relevant for you?

Please select only one item

- ◯ Very well
- ◯ Fairly well
- ◯ Neutral
- ◯ Not well
- ◯ Not well at all

If you answered "not well" or "not well at all" to Question 10, please provide some further feedback to ENTSO-E by answering the additional questions below.

Please explain which types of investor decisions modelled in the EVA (for specific technologies) do not fully reflect real-word investor behaviour in your view, and why?

To what extent do you believe these decisions be modelled more realistically? Do you have any concrete suggestions?

Future scenarios and investment under uncertainty

This section explores how investors account for uncertainty in future market conditions when making investment or retirement decisions. For example, investors may consider one or more visions or 'scenarios' - quantitative descriptions of plausible futures – to explore how key drivers such as electricity demand, installed generation capacity, fuel and carbon prices, and grid development may evolve, leading to different electricity price outcomes. These scenarios may be developed in-house or sourced from external providers.

In addition to these structural uncertainties about the electricity market, investors may also consider weather-related uncertainty by testing each scenario against multiple 'climate years'. A climate year in this case typically represents one full year of hourly weather-driven inputs — such as wind and solar generation, hydro inflows, and temperature-sensitive electricity demand — used to assess how varying weather conditions could affect revenues.

11 How many scenarios of the future power system do you typically consider in your long-term investment planning?

Please select only one item

- ◯ 1 scenario (e.g. most likely future)
- ◯ 2 scenarios (e.g. most likely, and worst case)
- ◯ 3 to 5 scenarios
- ◯ More than 5 scenarios

12 What are the key uncertainties (i.e. main drivers) used to define your scenario(s)?

Please select all that apply

- [ ] Fuel and carbon price developments
- [ ] Installed capacities of power plants
- [ ] Electricity demand
- [ ] Policy uncertainties (e.g. regulation changes, market design)
- [ ] Technology costs (e.g. CAPEX, OPEX)
- [ ] Weighted Average Cost of Capital (WACC)
- [ ] Other [please specify below]

If other, please specify here

13 Which time horizons do you consider in your scenarios?

Please select only one item

- ◯ Up to 2030
- ◯ Up to 2035
- ◯ Up to 2040
- ◯ Up to 2050
- ◯ Beyond 2050
- ◯ Other [please specify below]

If other, or you consider different horizons for different decisions (e.g. (de)mothball, retirement), please specify here

14 Do you consider weather and climate-related uncertainty in your decisions to retire, (de-)mothball, extend or invest in new capacity? (e.g. by using multiple climate years)

Please select only one item

- ◯ Yes
- ◯ No, or don't know

Consideration of weather and climate-related uncertainty

As you indicated you consider weather and climate-related uncertainty in Q14, we'd like to ask a few additional questions to better understand your approach.

15 How many potential climate years do you consider?

Please select only one item

- ◯ 1
- ◯ 2 to 5
- ◯ 6 to 10
- ◯ 11 to 20
- ◯ >20
- ◯ Other [please specify below]

If other, please specify here

16 What type of data are these climate years based on?

Please select only one item

- ◯ Historical data
- ◯ Simulations of the future climate
- ◯ Synthetic representative climate years, built by combining data from multiple climate years
- ◯ All of the above
- ◯ Other [please explain below]

If other, please specify here

17 If you consider multiple (representative) climate years, on what basis do you select them, and how do you weight them in your evaluations for new investments?

18 Do you consider more extreme weather scenarios (e.g. extended cold snaps, heat waves, extended periods with low generation from solar and wind), which may not be represented adequately by typical historical weather data or projections generated by climate models? If so, how are they incorporated into your assessments?

Relevant revenues, investment criteria and risk aversion for different technologies

This section aims to gather insights into how investors assess investment opportunities and retirement decisions across different technologies. It covers the key revenue and cost streams considered in business case evaluations for market exit and entry decisions, as well as how investors account for uncertainty, risk aversion, and market volatility. Particular attention is given to how investors consider potential price spikes and scarcity revenues: income earned during periods of exceptional system tightness, when market conditions cause electricity prices to rise significantly — potentially reaching the market price cap — due to limited available supply relative to demand. Understanding these considerations is essential to ensure that the ERAA and its Economic Viability Assessment (EVA) module reflect real-world investment behaviour under uncertainty.

Please download this workbook <*https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/sdc-documents/ERAA/ERAA_2025/ERAA%20Investor%20Survey%20-%20response%20workbook%201.xlsx*> **as an annex to ENTSO-E's market survey on the future of the ERAA. In order to make the main online survey more digestible, you are invited to collect generation technology-specific information in this workbook and then submit at the end of the online questionnaire.**

19 To what extent are different revenue streams relevant for assessing the economic viability of technologies in your current asset portfolio and potential new investments?

Please provide your answers to this question in the Q19 sheet in the accompanying excel workbook (downloadable from the top of the page).

You will be asked to upload it at the end of this survey.

20 Are there any additional types of revenue (value) streams you consider when making business decisions for a particular technology, which were not included in Question 19?

If so, please outline shortly below.

21 Are there any additional types of fixed or variable costs you consider when making business decisions which are not included in the list below?

Variable costs:

- Fuel costs
- CO_2 emission costs
- Other variable OPEX costs (e.g. consumables, by-product handing)
- Taxes and levies related to variable production
- Minimum activation price (for DSR resources only)

Fixed costs:

- Capital investment costs (annualised)
- Annual fixed costs, including:
    - labour costs,
    - fixed maintenance and repair costs
    - insurance and asset management costs
    - taxes and levies
    - transaction and control costs
    - fuel supply service contracts
    - fixed electricity transmission and distribution charges
    - other annual costs including environmental compensation costs, local resident compensation costs etc.

If so, please outline shortly below.

22 Which direct and indirect profitability metrics or investment criteria do you apply when considering investments to prolong existing or develop new capacity?

Please select all that apply

- [ ] Net Present Value (NPV)
- [ ] Internal Rate of Return (IRR)
- [ ] (Discounted) Payback Period
- [ ] Debt Service Coverage Ratio (DSCR)
- [ ] Expected equivalent annual full-load operating hours (FLH)
- [ ] Other [please specify below]

If other, please specify here

23 Which approach(es) do you typically use to adjust for price and revenue risk in the investment criteria above when considering entry and exit decisions?

Please select all that apply

- [ ] None
- [ ] Hurdle rates (i.e. WACC + hurdle premium)
- [ ] Value at Risk (VaR)
- [ ] Conditional Value at Risk (CVaR)
- [ ] Other [please specify below]

If other, please specify here

24 Can you provide any typical values applied for the investment criteria and thresholds for the technologies in your current and prospective portfolio (where relevant)?

Please provide your answers to this question in the Q24 sheet in the accompanying excel workbook (downloadable from the top of the page).

You will be asked to upload it at the end of this survey.

25 When evaluating investments in supply-side (generation) assets, how do you account for the potential occurrence of scarcity prices and associated revenues?

Please select only one item

- ◯ We consider them fully based on their expected probability of occurrence (e.g. implicitly in the indicators and criteria mentioned earlier)
- ◯ We consider them partially [please elaborate below]
- ◯ We don't consider them at all [please elaborate below]

Please elaborate why you do not consider scarcity prices, or how you only consider them partially

26 When evaluating investments in demand-side (DSR) assets, how do you account for the potential occurrence of scarcity prices and associated costs?

Please select only one item

- ◯ We consider them fully based on their expected probability of occurrence (e.g. implicitly in the indicators and criteria mentioned earlier)
- ◯ We consider them partially [please elaborate below]
- ◯ We don't consider them at all [please elaborate below]

Please elaborate why you do not consider scarcity prices, or how you only consider them partially

27 How important are the following market-based measures (excluding regulated support such as CfDs, capacity mechanisms, and feed-in tariffs) for managing price and revenue risk for different technologies?

Market-based measures:

Hedging via futures/forwards, Market-based PPAs, Tolling Agreements, Financial Options, Revenue Insurance, Portfolio diversification, Other

Please provide your answers to this question in the Q27 sheet in the accompanying excel workbook (downloadable from the top of the page).

You will be asked to upload it at the end of this survey.

28 How do these mitigation options interact with the risk adjustment approaches mentioned in Q23?

29 What is the typical range of return on equity you would expect for the following investment types?

Please provide your answers to this question in the Q29 sheet in the accompanying excel workbook (downloadable from the top of the page).

You will be asked to upload it at the end of this survey.

30 Are the approaches for accounting for price and revenue risk mentioned in Q23 sufficient to capture all investment risks?

Please select only one item

- ◯ Yes
- ◯ No [please clarify below]

If not, please indicate which risks are not accounted for.

31 When considering potential decisions in new capacity, are the results of quantitative (risk-adjusted) modelling of business case assessments sufficient to make a final investment decision?

Please select only one item

- ◯ Yes
- ◯ No [please clarify below]

If not, what other factors are considered?

Market entry and exit barriers

The following questions aim to gather insights into how long it takes to bring new capacity onto the market, potential barriers to market entry, as well as market exit of existing capacity which may not be fully captured in the ERAA. These barriers may be country and/or time frame specific. If so, please give your answers based on expectations in your key market(s), over the coming 10 years.

Please download this workbook *<https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/sdc-documents/ERAA/ERAA_2025/ERAA%20Investor%20Survey%20-%20response%20workbook%201.xlsx>* **(*same as previous section*) as an annex to ENTSO-E's market survey on the future of the ERAA. In order to make the main online survey more digestible, you are invited to collect generation technology-specific information in this workbook and then submit at the end of the online questionnaire.**

32 When considering bringing new capacity on the market, how long do you expect the full process to take from start to finish?

Where possible, please estimate the duration (in years) for each of the following steps:

- Feasibility studies (i.e. grid & site studies, technology type and size selection)
- Development (i.e. technical design studies, grid connection, permitting)
- Contracting (i.e. equipment tendering and contract negotiations, financing, FID)
- Construction (including commissioning)

Please provide your answers to this question in the Q32 sheet in the accompanying excel workbook (downloadable from the top of the page).

You will be asked to upload it at the end of this survey.

33 Are there any other financial or non-financial (e.g. legal, practical, administrative) barriers to market exit which should be considered in the ERAA?

34 Are there any financial or non-financial (e.g. legal, practical, administrative) barriers to market entry which should be considered in the ERAA?

35 What are the main factors you consider when deciding whether to take capacity off the market temporarily (mothball), or permanently?

Additional questions on specific modelling approaches for electricity price forecasting and economic viability assessment

The following questions aim to better understand specific details on how investors, advisory firms and/or financial institutions develop wholesale electricity price forecasts for the future power system, and perform economic viability assessments for existing and potential new-build assets. These questions are all optional, but would be useful for ENTSO-E to understand the level of detail typically applied by industry players.

36 Which type(s) of modelling does your organisation perform when developing price forecast and assessing the future economic viability of existing and potential new-build assets?

Please select all that apply

- [ ] Statistical approaches
- [ ] Fundamental market modelling (i.e. unit commitment and economic dispatch)
- [ ] Investment modelling (i.e. endogenous modelling of future retirements and investments)
- [ ] We don't perform modelling ourselves
- [ ] Other [please explain below]

If other, please explain here

37 Which geographical scope do you consider when modelling prices and assessing potential future business cases?

Please select only one item

- ◯ National model (i.e. only the country of the investment)
- ◯ Regional model
- ◯ Pan-EU model
- ◯ Other [please specify explain]

If other, please specify here

38 How do you consider transmission capacities between bidding zones for regions/countries where flow-based market coupling is (expected to be) applied in reality (e.g. CORE)?

Please select only one item

- ◯ Net-Transfer Capacity only
- ◯ Flow-based market coupling
- ◯ Other [please explain below]

If other, please explain here

39 To what extent do you consider the day-ahead market price cap, when modelling future evolution of electricity prices and potential revenues?

Please select only one item

- ◯ It is not considered
- ◯ We assume the current price cap stays the same
- ◯ We model/assume future developments in the price cap over time
- ◯ Other [please specify below]

If other, or you use a different value than the price cap, please briefly explain here

40 To what extent do you consider the intraday market price cap, when modelling future evolution of electricity prices and potential revenues?

Please select only one item

- ◯ It is not considered
- ◯ We assume the current price cap stays the same
- ◯ We model/assume future developments in the price cap over time
- ◯ Other [please specify below]

If other, or you use a different value than the price cap, please briefly explain here

41 Do you estimate and account for future ancillary service requirements from TSOs (e.g. balancing reserve), as a driver for your investment decisions?

Please select only one item

- ◯ Yes
- ◯ No
- ◯ Other [please specify below]

If other, please specify here

Closing questions

42 Do you have any other comments or feedback for ENTSO-E regarding investor behaviour?

43 Would you be willing to participate in a follow-up discussion or workshop with ENTSO-E regarding investor behavior?

(Required)

Please select only one item

- ◯ Yes
- ◯ No

44 Are you willing to provide detailed responses to questions 19, 24, 27, 29 and 32 in the excel workbook?

(Required)

Please select only one item

- ◯ Yes
- ◯ No

If yes, you will be asked to upload it in the next page.

File upload

45 Please upload the completed accompanying workbook with your responses.

Please attach a copy of any documents you wish to include to this printout.

(Required)