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Alberta Utilities Commission

Distribution System Plans Guidelines for Submission

February 2026



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Published by the:

Alberta Utilities Commission
Eau Claire Tower
1400, 600 Third Avenue S.W.
Calgary, Alberta T2P 0G5

Telephone: 310-4AUC (310-4282 in Alberta)
1-833-511-4AUC (1-833-511-4282 outside Alberta)

Email: info@auc.ab.ca

Website: www.auc.ab.ca

Contents

1	Guiding perspectives.....	1
2	Expected outcomes.....	1
3	DSP report approach.....	1
4	Distribution optimization	2
5	Connection to performance-based ratemaking (PBR) and rebasing	3
6	DSP submission guidelines	3
6.1	Timing of submission and general content.....	3
6.2	Investment criteria guidelines.....	4
6.2.1	Load forecasting methodology.....	4
6.2.2	Customer growth	5
6.2.2.1	Investment criteria for distribution investments to connect new customers to the distribution system	6
6.2.2.2	Investment criteria for distribution investments to support forecast distribution load growth.....	6
6.2.2.3	Asset rating determinations.....	6
6.2.2.4	Load forecast scenarios and sensitivities, incorporation of load offsets	6
6.2.2.4.1	Violation triggers	7
6.2.2.4.2	Investment prioritization approaches	7
6.2.2.4.3	Investment criteria.....	8
6.2.2.4.4	Future transmission investment areas	8
6.2.3	Reliability	8
6.2.3.1	Investment criteria and risk tolerance	9
6.2.3.2	Investment levels and prioritization	10
6.2.4	Asset replacement	11
6.2.4.1	Investment criteria and risk tolerance	11
6.2.4.2	Investment levels and prioritization	12
6.2.5	Asset design.....	12
6.3	Investment plan	13
6.3.1	Load forecast	13
6.3.2	Investment plan	13
6.4	Metrics.....	14
6.4.1	Asset/system utilization.....	14
6.4.2	Operation efficiency	15
6.4.3	Reliability	15
6.5	Plan to plan comparisons.....	15

Distribution System Plans Guidelines for Submission

1 Guiding perspectives

1. The Alberta Utilities Commission considered the following guiding perspectives as it developed the scope for future distribution system plans (DSP):

- (a) Ensure customers receive reasonable and acceptable distribution reliability;
- (b) Ensure customers receive affordable distribution services;
- (c) Ensure the energy transition is enabled;
- (d) Ensure distribution owners remain financially viable;
- (e) Ensure alignment with government policy direction.

2 Expected outcomes

2. The expected outcomes of the DSP submitted by the distribution facility owners (DFOs) to the Commission is to:

- (a) Enable DFOs to demonstrate, through their DSP, the specific actions undertaken to optimize their distribution networks today and tomorrow, as they meet the changing distribution network needs from customers, including the evolving energy transition;
- (b) Provide confidence, through demonstrated optimization, that the DFOs remain focused on providing affordable distribution services that deliver reasonable and acceptable customer reliability;
- (c) Enable DFOs to share their optimization approaches with their peers, industry, and customers in a consistent format, to drive optimization across the distribution industry.

3 DSP report approach

3. The DSP will be submitted to the Commission as an information-based report. The Commission will review the DSP and engage each DFO in feedback on its DSP to ensure each DSP submitted aligns with the guidelines included within this document. The DFOs can incorporate the Commission's feedback into their respective DSP and submit a final DSP to the Commission. The final DSP needs to be supported by a Chief Executive Officer's letter or the most senior executive delegate accountable for the DSP submission, confirming the content has been diligently developed and any facts provided are accurate. The final DSP will be made public through the Commission's eFiling system and website.

4. The guidelines within this document are not intended to be prescriptive, rather they are intended to guide the DFOs on the important content that should be included to provide a quality DSP submission. The DFOs are not required to answer every question included within this document, as if they are interrogatories. The DFOs can include additional content that they feel will assist in achieving the expected outcomes above. Should DSP submissions require more prescriptive direction in the future to achieve quality submissions, the Commission will proceed as necessary, at that time. There will be no standalone regulatory process associated with the DSP submission.

5. The DSP process is expected to continuously improve as the DFOs, industry and the Commission learn through the experience of each submitted DSP. The continuous improvement principles include:

(a) Ways to improve the DSP content to more effectively deliver on the DSP expected outcomes;

(b) Ways to reduce the time and effort for the DFOs to complete and submit the DSP.

6. An engagement process will occur with industry following each DSP submission cycle, seeking feedback on continuous improvement opportunities to the DSP process. The Commission will enable discussion sessions with key stakeholders (DFOs, AESO, REAs, Consumer Groups, Government) to seek their comments on the DSPs, particularly focused on improvements to the DSP and any feedback on the DSPs content. The objective for these collaborative feedback sessions is continuous improvement in the DSP process and identification of further optimization opportunities within the distribution systems.

7. Equally important, the Commission does not intend to:

(a) Use the DSP to set the same planning or engineering standards across all DFOs, recognizing each DFO has its own unique region, customers and challenges associated with their distribution system and the energy transition;

(b) Approve the DSP or its contents, other than to determine if the DSP submission guidelines have generally been met and a quality DSP has been submitted;

(c) Request detailed project or program level information.

4 Distribution optimization

8. DFOs provide transfer capacity (kilowatts) to/from customer sites that allow customers to consume/produce electricity (kilowatt hours) at their site whenever the customer chooses, up to the level of the customer requested/required transfer capacity. Optimization is the actions taken to increase the cumulative connected customer requested/required transfer capacity to/from customer sites across the distribution network, at a lower overall cost.

9. The Commission is interested in understanding how each DFO is optimizing its distribution system, particularly in relation to the decision making criteria used to: (i) optimize its distribution network expansion, (ii) manage customer reliability, existing assets and other key business risks, (iii) integrate into its network various distributed energy technologies such as

electric vehicles, rooftop solar, energy storage, customer consumption optimization technologies, and (iv) the adoption of grid modernization technologies that bring benefit to its customers.

5 Connection to performance-based ratemaking (PBR) and rebasing

10. DFOs should be focused on optimizing their respective distribution networks, regardless of the method used by the Commission to set DFO revenues in the regulatory process. The DSP is a tool for the DFOs and the Commission to share with industry the demonstrated actions by the DFOs to plan and optimize the distribution network.

11. The Commission will continue to set DFO revenues through a separate, transparent, rate setting process. When the DSP submission year aligns with the rebasing regulatory process, the Commission will require the DFOs to include the DSP within their rebasing submissions. The intent is to ensure only one investment plan is used in the rebasing process and not to have two different investment plans creating confusion in the regulatory process, one submitted through the DSP process and another one through the rebasing process.

6 DSP submission guidelines

12. The DSP is divided into five sections, with each section providing submission guidance:

- Basic
- Investment criteria
- Investment plan description
- Metrics
- Data

6.1 Timing of submission and general content

13. The following are the general guidelines for the DSP:

- (a) An overview of the DFOs service area, its characteristics, customer segmentation, general service area trends and any unique challenges the DFO has within its service area.
- (b) Submitted by June 30 of each submission year.
- (c) Submission years will start with 2026, followed by timing to align with the next expected rebasing year and then every two years thereafter, adjusting as needed to align with future rebasing years.
- (d) Include five years of historical data, Y-1 from submission, per defined data request.

- (e) Include five years of forecast data, starting with submission year, per defined data request.
- (f) Include a 10-year outlook (years 6-10).

14. The 10-year outlook does not have any specific data request. It is intended as a section within the DSP for the DFO to highlight key future trends that are relevant to the DSP and its objectives. Trends associated with the following, should be discussed:

- (a) Regions or areas of customer growth that will require increased investment levels;
- (b) Energy transition trends and implications of distributed energy resource penetrations;
- (c) Potential future investment criteria and risk tolerance changes;
- (d) Technology or process adoption considerations to drive further optimization.

6.2 Investment criteria guidelines

15. Investment criteria are the criteria the DFO uses to trigger the decision to spend money (capital or operating) to deliver affordable, reliable, optimized transfer capacity to its existing and future customers. There is an inherent risk tolerance established through the investment criteria that drives when and how much investment the DFO considers is required to deliver on its obligations to customers. Within this section, the DFO provides the investment criteria used as well as why the investment criteria and associated risk tolerance delivers on the objective of providing customers affordable and acceptable reliable transfer capacity. Investment criteria may blend across the four categories below. The DFO should explain the investment criteria in the category where the criteria is the primary driver of the investment decision making.

16. Investment criteria are grouped into the following four categories:

- Planning for customer growth
- Reliability for existing and future customers
- Managing existing assets
- Determining typical asset capacity design or transfer level

6.2.1 Load forecasting methodology

17. Load forecasts and the methodology to create load forecasts underpin the timing and size of future investment criteria decisions. Within this section, the DFO explains their current load forecasting methodology. The explanation should include the key approaches, assumptions, and parameters used to create the load forecasts used in investment criteria decision areas. The

following identifies the load forecast methodology factors and assumptions that should be explained. Supporting data for specific assumptions should be included.

- (a) High-level description of methodology used: top down, bottom up or both;
- (b) System wide and allocated down or feeder specific forecasts developed bottom up;
- (c) Key parameters used to create forecasts (e.g., Gross Domestic Product, customer growth, population growth);
- (d) Amount of growth based on known new customer contracts including large discrete loads;
- (e) Load transfers between areas and neighboring networks;
- (f) Reliance on trended historical actuals;
- (g) How are electric vehicle (EV), solar photovoltaic (PV), energy storage (ES) and other distributed energy resources (DER) forecast;
- (h) Electrification trends included in forecast such as heat or building electrification;
- (i) Efficiency offsets to growth forecast;
- (j) Customer site sampling used to guide forecast;
- (k) Scenarios developed, sensitivities assessed against scenarios;
- (l) Degree of data analytics utilized;
- (m) Any changes made to load forecast methodology since last DSP;
- (n) Comparison of prior DSP load forecast to historical actuals to assess forecast accuracy;
- (o) Explanation on methodology improvements implemented to improve forecast accuracy;
- (p) Any other key parameters, assumptions, approaches used in the load forecast methodology.

6.2.2 Customer growth

18. Customer growth investment criteria are focused on DFO's decisions to spend money to connect new customers to the distribution system. The criteria cover the following three investment areas:

- (a) Investments to connect new customers to the distribution system;
- (b) Investments in the distribution system to support forecast distribution load growth;
- (c) Investments requested of the AESO to expand the transmission system to support forecast distribution customer growth.

6.2.2.1 Investment criteria for distribution investments to connect new customers to the distribution system

19. The DFO has a legislated obligation to serve. Accordingly, there are no specific criteria expected that would guide the DFO to invest in connecting new customers, subject to the approved maximum investment level (MIL) policies. The DFO can summarize its approach to new customer connections in this section.

6.2.2.2 Investment criteria for distribution investments to support forecast distribution load growth

20. Investments are typically triggered in this area when forecast load or generation exceeds asset ratings or system capabilities resulting in the need to make investments to supply the future forecast load or generation growth. The risk tolerance applied to the investment criteria is an important driver determining if, when and how large an investment to make to address forecast growth.

21. There are several key factors the DFO should explain within this section that are key to investment criteria decision making. The key factors include, but should not be limited to:

- (a) Asset rating determinations (summer, winter, other);
- (b) Load forecast scenarios and sensitivities, incorporation of load offsets;
- (c) Violation triggers and any optimization/deferral approaches;
- (d) Investment prioritization approaches;
- (e) Investment criteria;
- (f) Future transmission investment areas.

6.2.2.3 Asset rating determinations

22. How the DFO establishes asset ratings should be explained thoroughly in this section. Asset ratings are impacted by asset cooling conditions, such as ambient temperature, wind speeds and soil conditions for underground cables. These conditions can change through the seasons, months and days. The DFO should explain if it has one asset rating for the entire year or if asset ratings change by season (winter/summer), by month, or dynamically by monitoring key cooling factors like ambient temperature and wind speed. Key assumptions used to set asset ratings should be explained, for overhead and underground assets. The explanation should include the DFOs views on how conservative or aggressive their key assumptions are from a risk tolerance perspective on the asset ratings, for both static and any emergency asset ratings.

6.2.2.4 Load forecast scenarios and sensitivities, incorporation of load offsets

23. Load forecasts have a degree of uncertainty. The DFO should explain the approaches used to incorporate scenarios and sensitivities into the load forecasts and corresponding studies

used in investment decision making in planning for customer growth. Key factors that should be explained include:

- (a) How/are scenarios created (e.g., summer/winter peak)?
- (b) How/are sensitivities created for each scenario (e.g., high, expected, low)?
- (c) How/are load duration curves used to incorporate probabilities into the analysis of reaching the peak (e.g., a flat load duration curve has a higher probability of exceeding ratings more often through the period than a sharp load duration curve)?
- (d) How/are any type of probability or statistical analysis used to assess N-0 conditions exceeding ratings (e.g., python scripts used to run 365 load flow studies for daily load duration curves)?
- (e) How/are load offsets and DER incorporated into the analysis (e.g., is any feeder generation incorporated, do load duration curves use actual data that incorporates load offsets like PV, ES, etc.)?
- (f) How/are any other approaches used to incorporate uncertainty and risk tolerance into studies?

6.2.2.4.1 Violation triggers

24. The DFO should explain in this section the criteria used to determine what type of violation triggers an investment decision for planning for customer growth. Basic information, such as the following, should be considered within the explanation on triggering an investment:

- (a) Which scenario or scenarios are used and how are sensitivities considered?
- (b) How far into the future does the forecast violation need to occur to trigger an investment (e.g., within five years, within 10 years)?
- (c) What probability of occurrence of the forecast violation is needed (e.g., one hour in the year)?
- (d) What optimization and deferral options (wires and non-wires solutions) are utilized in the analysis to defer investment and how far into the future do these options typically defer the investment trigger?

6.2.2.4.2 Investment prioritization approaches

25. Several factors determine prioritization, pace, timing and urgency of investment decisions. These factors include available revenue and capital investment levels, the risk associated with delaying an investment, the probability of the investment trigger occurring, corporate investment priorities, and other factors. The DFO should explain how they prioritize their investments for planning for customer growth. Basic information, such as the following, should be considered within the explanation on investment prioritization:

- (a) Any prioritization methodology utilized, including how the probability of the investment trigger and the option of delaying the investment are incorporated into the methodology.

- (b) How timing, pace and urgency of investments are determined.

6.2.2.4.3 Investment criteria

26. The key investment decision making criteria used to sanction or commit investments should be described in this section. The basic two questions the criteria should address:

- (a) What criteria does the DFO use to determine that a future investment is needed?
- (b) What criteria does the DFO use to determine the timing of these future investments?

27. The key investments of interest include:

- (a) An increase in transfer capacity from the transmission system, either through a new substation or an additional transformer;
- (b) A new three phase feeder;
- (c) A new one phase feeder.

6.2.2.4.4 Future transmission investment areas

28. To assist in coordinated planning between the DFOs and the AESO, the DFO should provide early awareness of potential future transmission investment needs. This section should include a brief description, by planning region, for any identified potential future transmission developments that may be needed by the DFO. Each potential development should have a description explaining:

- (a) What is driving the potential need (load growth, generation growth, reliability, other)?
- (b) What preliminary analysis results determined the potential need?
- (c) When in the future is the infrastructure forecast to be required?
- (d) What infrastructure is generally required (transformer, substation, line)?

6.2.3 Reliability

29. Reasonable and acceptable reliability performance for customers is important. DFOs, as a proxy for their customers, are challenged with striking the balance between the costs to deliver a certain level of reliability performance and the perceived reliability level customers need or want. Customers will desire higher levels of reliability, when cost is not in the discussion. The DFOs should consider the following two questions as they seek to strike this balance:

- (a) What range of reliability is acceptable to its customers?
- (b) How much are its customers prepared to pay for incremental reliability improvements?

30. It is the reliability investment criteria, including the risk tolerance, that determines where the balance is set by the DFO between reliability and cost, on behalf of its customers.

31. Reliability investment criteria are focused on decisions to spend money to sustain or improve reliability to existing customers on the distribution system. There may be some overlap between Reliability and Customer Growth. However, the primary focus in this section is investments to address the impact of outages to existing customers, not load growth.

32. The criteria cover the following investment areas:

- (a) Investments to address backup capability;
- (b) Investments to address deteriorating or below average reliability performance;
- (c) Investments to address resiliency and other key business risks.

6.2.3.1 Investment criteria and risk tolerance

33. The DFO should explain its reliability investment criteria in this section. Risk tolerance is a key factor in determining investments in this category. Probabilistic/statistical analysis should underpin reliability investments, to assess the probability and the consequence of outages impacting reliability performance.

34. The explanation should consider the following:

- (a) How is direct customer feedback on reliability performance collected and what is the qualitative and quantitative results of that feedback?
- (b) What is the transmission supply backup criteria and what is the basis of the criteria (e.g., 100 per cent of peak demand 100 per cent of the year)?
- (c) What is the feeder (three phase, single phase) backup criteria and what is the basis of the criteria (e.g., 100 per cent of peak demand 100 per cent of the year from one adjacent feeder)?
- (d) Are the backup criteria for transmission different than for distribution? If so, why?
- (e) Are there different backup criteria for N-1 conditions versus N-1-1 or N-2? If so, what are they and why are they different?
- (f) What probability range will trigger an investment decision for N-1 conditions?
 - (i) Are load duration curves considered?
 - (ii) Are asset failure rates considered?
 - (iii) Are different load forecast scenarios or sensitivities used in determining the probability of an investment trigger?
- (g) How is the consequence of an outage incorporated into the investment decision?
 - (i) Does the number of customers, type of customer or size of load potentially impacted factor into the decision? If so, how?
 - (ii) What are the maximum outage duration limits/targets?

- (iii) What are the maximum outage demand or energy limits/targets?
- (iv) Is loss of load valued in some manner? If so, how?
- (h) Are there any reliability metric targets/ranges that trigger investments? If so, what are they and why are they set at these target/range levels?
- (i) Are the worst performing feeders, points of delivery (POD) and asset types targeted with investments? If so, how are these prioritized for investment and how is the investment cutoff limit determined?
- (j) Are there reliability investments in PODs/feeders that are better than the system averages? If so, why?
- (k) Are there reliability investments in any areas to address power quality issues? Why?
- (l) Are cost/improvement metrics and analysis considered when making a reliability investment? If so, what are they? If not, why not?
- (m) Are there any resiliency investment criteria? If so, what are they? If no, are there any resiliency investments? If yes, describe the basis for supporting these investments.
- (n) What are the investment criteria used to manage other key business risks such as safety, security (physical, cyber), wildfires, and any other key risks?
- (o) What are the investment criteria used to determine investments in grid modernization? How is the benefit/cost ratio determined to support these grid modernization investments?
- (p) What optimization and deferral approaches are used?
 - (i) Is do nothing an option (i.e., accept the risk)? If not, why not?
 - (ii) Is DER incorporated from a reliability perspective? If yes, how. If not, why not?
 - (iii) What non-wires solutions have been adopted to defer investments?
 - (iv) Are mobile temporary supply solutions considered as a restoration option until permanent repairs can be completed?

6.2.3.2 Investment levels and prioritization

35. In this section, explain the methodology the DFO uses to determine the overall level of investment in reliability improvements.

- (a) How does the DFO determine the investment level for reliability improvements?
- (b) Is there a typical percentage of investment allocated to reliability improvements?
- (c) What are the primary reliability improvement programs and what percentage of total reliability improvement investments are each allocated? Why?

- (d) What would drive the DFO to lower or raise the current reliability investment level?
 - (e) What optimization techniques are used to reduce or defer investments?
36. Describe the criteria used to determine if new facilities are required to address reliability performance:
- (a) A new transmission point of delivery
 - (b) An additional transformation at an existing transmission point of delivery
 - (c) A new three phase feeder
 - (d) A new one phase feeder
37. Explain the methodology utilized to prioritize the various reliability improvement programs.
- (a) How is urgency, pace and timing of investments determined?
 - (b) Is there a prioritization methodology used? What are the factors and weightings considered in the methodology?
 - (c) How is risk, probability and consequence, factored into prioritization?

6.2.4 Asset replacement

38. Investment is needed to manage the performance of existing assets, particularly as those assets experience wear and tear over time, including exposure to harsh environmental conditions. At some point in an asset's life, an investment decision is made to replace the asset completely as the asset is no longer capable of performing its initial function, has become obsolete, or its performance is expected to degrade to a point of near-term failure.

6.2.4.1 Investment criteria and risk tolerance

39. The DFO should explain its asset replacement investment criteria in this section. Risk tolerance is a key factor in determining investments in this category. Probability of asset failure due to asset condition, age, historical asset type failure rates **and** consequence of asset failure (reliability, safety, environmental, compliance, etc.) should be key considerations in assessing the need to invest in asset replacement. Obsolescence resulting in the inability to replace parts or obtain services can be a key consideration as well.

40. The explanation of investment criteria and risk tolerance in this section should include the following considerations:
- (a) What are the primary drivers for replacement (e.g., asset age only, current condition only, other)?
 - (b) Is run-to-failure an acceptable option for any asset? Which assets?
 - (c) What life extension options are available and are they cost-effective?

- (d) Is this asset still needed or can it be decommissioned?
- (e) Is reconfiguration a worthwhile option?
- (f) Is there an opportunity to optimize the network? Is the AESO aware of the need for replacement?
- (g) How is the trade-off decision between replace or life extend or maintain or defer investment made? What criteria drive the decision?
- (h) How is the decision made to replace like-for-like versus upgrade? What criteria drive the decision?

6.2.4.2 Investment levels and prioritization

41. In this section, explain the methodology the DFO uses to determine the overall level of investment in asset replacements.

- (a) How does the DFO determine the investment level for asset replacements?
- (b) Is there a typical percentage of investment allocated to asset replacements?
- (c) What are the primary asset replacements programs and what percentage of total asset replacement investments are each allocated? Why?
- (d) What would drive the DFO to lower or raise the current asset replacement investment level?
- (e) What optimization techniques are used to reduce or defer investments?

42. Explain the methodology utilized to prioritize the various asset replacement programs.

- (a) How is urgency, pace and timing of investments determined?
- (b) Is there a prioritization methodology used? What are the factors and weightings considered in the methodology?
- (c) How is risk, probability and consequence, factored into the prioritization?

6.2.5 Asset design

43. Providing transfer capacity to customers on the distribution system requires decisions on standard transfer capacity levels. Transfer capacity levels apply to these typical assets:

- (a) Transmission transformers
- (b) Three phase feeders
- (c) Single phase feeders

(d) Distribution transformers

(e) Customer sites

44. In this section, explain the methodology or criteria the DFO uses to select:

(a) The standard capacity levels for each of the asset categories and why these levels?

(b) What optimization techniques are used to reduce costs for each of these standard levels?

(c) Would there be benefits to less levels? More levels?

45. Asset design can also contribute to reliability performance and asset resilience. In this section, explain:

(a) Typical low voltage bus configurations required at transmission substations for reliability performance considerations;

(b) Any asset resilience criteria used within asset designs, such as withstand rates (e.g., one in 100-year event);

(c) Any other material reliability or resilience factors incorporated into asset designs.

6.3 Investment plan

46. In this section, two key data sets are to be provided, as described in the Load Forecast Data and Investment Plan Data sheets in the attached DSP workbook.

6.3.1 Load forecast

47. Briefly describe any key load forecast trends that drive the resulting load forecast and any changes to historical trends.

6.3.2 Investment plan

48. Briefly describe the overall investment plan developed through the application of the various investment criteria described above. The investment plan should extend out for at least five years. The description should be sufficient to understand the investment levels, the key drivers, the current investment trends and the general drivers for any changes to historical trends.

49. Describe the investment plan in the following categories:

1) Customer growth

- New customer connections
- System Modifications for Growth
- Distribution to Transmission Contributions

2) Sustaining

- Reliability, Environment, Safety
- Rebuilds, Replacements, Life Extensions
- Forestry Protection
- Metering
- Other

3) Other

- Z Factor
- Externally Driven System Modifications
- General Support (including all Corporate)
- Generation Stations (ATCO Specific)
- System Purchases (REAs, Annexation)

6.4 Metrics

50. There are three key metric categories that assist in understanding the long-term trends of optimization within the distribution system while ensuring reliability does not deteriorate. The data requested is in the DSP workbook. The metric categories include:

- (a) Asset/system utilization
- (b) Operation efficiency
- (c) Reliability

6.4.1 Asset/system utilization

51. Asset/system utilization focuses on distribution feeder utilization trends as these are a key indicator of optimization, particularly optimizing transfer capacity. The last five years of historical results should be provided in the attached Utilization Data sheet in the DSP workbook. The Utilization Data sheet describes each of the data elements that should be included. At a minimum, the top 15 percent of the feeder's should be included, based on the peak demand/planning capability ratio. Since the planning capability may change for summer and winter asset ratings, both summer and winter metrics should be included.

6.4.2 Operation efficiency

52. Operation efficiency focuses on trends in revenue/cost per unit delivered. Optimization should enable improving trends in these metrics. In this section, trends are focused on three areas, delineated by rate class, to assess effectiveness across the various customer groups:

- (a) Investment levels required to sustain existing assets and the existing transfer capacity to existing customers;
- (b) Investment levels required to supply new customers with transfer capacity and the revenue provided by these new customers;
- (c) Overall revenue per delivered energy, demand, and transfer capacity.

53. The last five years of historical results should be provided in the attached Efficiency & Reliability Data sheet in the DSP workbook. The Efficiency & Reliability Data sheet describes each of the data elements that should be included.

6.4.3 Reliability

54. Optimization should not result in material deterioration of reliability performance to customers. The last five years of historical results should be provided in the attached Efficiency & Reliability Data sheet in the DSP workbook. The Efficiency & Reliability Data sheet describes each of the data elements that should be included.

6.5 Plan to plan comparisons

55. Starting with the submission of the second DSP, each DFO should provide the following explanations when comparing between plans:

- (a) Key differences between load forecasts, the key drivers for these differences and the actions implemented to improve the load forecasting process going forward;
- (b) Key differences between investment plans, the key drivers for these differences and the actions implemented to improve execution of investments per plans;
- (c) Key changes in metrics, the key drivers for these changes and the actions implemented to address deteriorating metrics.