NEMMCO

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National Transmission Planner – issues paper

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Executive Summary

The Council of Australian Governments (COAG) has agreed to establish a National Energy Market Operator now referred to as the Australian Energy Market Operator (AEMO) for both electricity and gas, encompassing a new national transmission planning function. The creation of the National Transmission Planner (NTP) within AEMO will significantly alter the existing transmission planning process. This paper provides an overview of the key issues that should be considered in developing and implementing the new transmission planning process.

The COAG has agreed that the Australian Energy Markets Commission (AEMC) will develop a detailed implementation plan for the establishment of a national transmission planning function within the AEMO (via consultation with NEMMCO and other stakeholders). This paper has been developed as a reference document for further discussions with the AEMC and other interested parties. It identifies issues which should be considered in developing the implementation plan for the NTP within AEMO. Options that could address these issues are discussed to help illustrate the particular issues.

To better understand the issues the paper also provides a high level overview of the existing transmission planning process.

Existing Process

The existing planning process incorporates:

- annual reviews by Transmission Network Service Providers (TNSP) to identify emerging issues that must be addressed to deliver their mandated obligations[1]. The TNSP Annual Planning Reports (APRs) record the results of the annual review. The APR informs interested parties of the emerging issues focussing on those which may require project commitment over the next 1 to 2 years;

- annual review of national transmission flow path augmentation opportunities by NEMMCO to identify conceptual augmentations that may deliver sufficient market benefits to warrant further investigation by TNSPs. This process is documented in the Annual National Transmission Statement (ANTS), which is published as part of the Statement of Opportunities (SOO).;

- TNSP consultation with interested parties on emerging needs on a case-by–case basis to identify potential solutions;

- TNSP evaluation of potential solutions in accordance with the regulatory test;

[1] Mandated obligations include all mandatory obligations placed on a TNSP through legislation, licence conditions, and the Rules. These are sometimes called 'reliability obligations' because they tend to focus on meeting forecast demand under specific contingency situations. These obligations currently differ between jurisdictions, although the COAG has recommended the Reliability Panel be charged with harmonising these mandated obligations or reliability standards across jurisdictions.

- TNSP publication of appropriate documentation detailing the evaluation process and the solution the TNSP intends to implement;

- The Inter-Regional Planning Committee (IRPC) assists the technical coordination of inter-network transmission augmentations[2], and coordinates improvements to power system modelling, electricity market simulation, inter-network testing and load forecasting; and

- Review and approval by the Australian Energy Regulator (AER) of the future revenue for each TNSP.

The current process has the following shortcomings:

- A number of decentralised planning processes that do not deliver a national transmission plan;

- the TNSPs being focussed on ensuring mandated obligations are met via pursuit of augmentations (or non-network projects). Projects which deliver market benefits are being viewed as discretionary;

- the value of the ANTS being limited by the reliance on conceptual augmentation proposals put forward by TNSPs. They are derived separately, and may not form an optimal package when combined with the augmentations being progressed to deliver mandated obligations within in each jurisdiction;

- uncoordinated and inconsistent consultations on emerging needs which increase the complexity of developing non-network options.

Key Design Issues for Implementation of the NTP

Specifically addressing the following issues should help formulate effective national transmission planning arrangements which deliver the outcomes required by the COAG:

- **Role of TNSP and NTP**

  While the COAG communiqué provides a high level overview of the roles of the TNSP and the NTP further clarity regarding the allocation of planning activities between these parties is required. Addressing the following questions should help provide the necessary clarity:

  - How should the following planning activities be allocated between TNSP and NTP?

    - planning of connection assets;

    - planning of asset replacement and refurbishment;

    - easement acquisition and planning; and

    - planning augmentations to the main transmission grid.

[2] An augmentation that has a material impact on more than one transmission network in an inter-network transmission augmentation.

- Should the role of the NTP be broader than just collating and disseminating information regarding transmission development? Should the NTP be involved in the consultation process used to identify potential solutions to emerging transmission issues and the project justification process?

- Should the NTP decide which projects are included in the NTNDP and to what extent should those projects be limited to projects developed by TNSPs?

- How will the technical coordination activities currently performed by the IRPC, be incorporated into the new arrangements?

- Is it appropriate for the Jurisdiction Planning Bodies (JPB)[3] to continue to produce the jurisdictional demand forecasts?

- How would non-network options be accounted for in the new arrangements?

- When would the revised regulatory test[4] be applied and by which party?

- When developing the NTNDP, should the NTP consider all augmentations with the potential to impact the delivery of market benefits?

- **Role of the National Transmission Network Development Plan (NTNDP).**

  The COAG has endorsed that the NTP should produce an annual NTNDP, however further work is required to clarify the content and role of the NTNDP. Clearly defining the role of the NTNDP and the extent of influence the NTNDP has on investment decisions by TNSPs and reviews of TNSP revenue requests by the AER will allow the:

  - process used to produce the NTNDP to be developed;

  - essential content for the NTNDP to be defined;

  - resourcing requirements for the NTP to be defined;

  - appropriate publication date for the annual NTNDP to be selected; and

  - relationship between the SOO, NTNDP and APRs to be defined.

- **Transitional arrangements**

  A smooth transition to the new transmission planning arrangements will require considering the following issues:

[3] The JPB is the organisation nominated by the jurisdiction as having transmission planning responsibility and a representative of this organisation is a member of the IRPC. The JPBs for the NEM are Powerlink, TransGrid, VENCorp, ESIPC and Transend.

[4] The COAG has agreed that the AEMC should consider replacing the existing regulatory test with a revised test which amalgamates the reliability and market benefits limbs and broadens the market benefits to include national market benefits.

- The role of the NTP in AEMO is greater than the transmission planning role currently performed by NEMMCO and it may be difficult to secure sufficient additional resources to fully implement the new arrangements from June 2009.

- Transitional arrangements should allow existing processes for the planning and development of the transmission network to continue while the new arrangements are established.

- When should the first NTNDP be published?

- What level of industry consultation should be allowed in developing the first NTNDP and what supporting documents would be required?

- Should the first NTNDP have a reduced scope compared to subsequent versions of the document? and

- Is it appropriate to publish a SOO, ANTS and APRs in 2009, and how should these documents relate to the first NTNDP?

1 Introduction

The COAG has agreed to establish AEMO covering both electricity and gas market operations and encompassing a new national transmission planning function. The creation of the NTP within AEMO will significantly alter the existing transmission planning processes.

The AEMC will be required to develop a detailed implementation plan for the establishment of a national transmission planning function within the AEMO (via consultation with NEMMCO and other stakeholders). This paper has been developed as a reference document for further discussions with the AEMC and other interested parties. It identifies issues which should be considered in developing the implementation plan for the NTP within AEMO. Options that could address these issues are discussed to help illustrate the particular issues.

The paper is structured as follows:

- Section 2 describes the existing transmission planning process;
- Section 3 discusses key issues which need to be addressed to formulate effective national transmission planning process which deliver the outcomes required by the COAG; and
- Section 4 describes options that could address the identified issues.
- Section 5 discusses the next steps to progressing development of the new process

2 Existing transmission planning process

To understand the issues with implementing a new national transmission planning process, it is useful to start from an appreciation of the current transmission planning process.

In broad terms transmission network planning includes the following activities:

- asset management related planning;
- connection point planning;
- main grid planning;
- easement acquisition.

Figure 1 describes each activity while Figure 2 shows the relationship between activities performed by the TNSPs and NEMMCO.

Planning Activity	Sub-class	Types of works
Asset Management (existing assets)	Refurbishment	Asset Maintenance activities (opex), eg: insulator replacements, circuit breaker replacements, substation IT.
	Asset replacement	Replacement of entire assets (capex) typically driven by age, condition, failure risk or obsolescence
Connection Point Planning	Non-regulated connections	Planning, designing and negotiating connections for: • Generators • Transmission-connected consumers
	Regulated connections	Coordinating planning of TNSP/DNSP interface – typically triggered by general load growth and load movements. Works usually include transformer upgrades and connection point equipment.
Main Grid Planning (includes supporting sub-networks)	'Reliability Augmentations' (investments to meet Jurisdictional standards)	Driven by inability to meet mandatory (non-discretionary) standards. Most of the transmission investment in the NEM happens here.
	Market Benefits Augmentations including interconnectors	These are purely discretionary investments for any TNSP with last resort planning power exercised by AEMC. The driver is an expectation of delivering positive net market benefits.
	Strategic Planning	Planning designed to give optimum solution addressing all emerging needs.
Easements		Easements acquisition is strategic and may be done many years ahead of augmentation. Easement availability limits network options.

Figure 1 – Asset Categories

Aside from the preparation of the ANTS and the technical roles performed by the IRPC, all of the planning activities are currently performed by the TNSPs. The ANTS draws upon information provided by TNSPs regarding conceptual augmentations. Electricity market simulations performed by NEMMCO are used to identify those conceptual augmentations that may deliver sufficient benefits to warrant further investigation by the TNSPs. The ANTS is published annually as part of the SOO. As electricity market and system operator, NEMMCO, is able to draw on knowledge of the existing network capability, and market and system operations to ensure high quality information and analysis is presented in these documents.

The conceptual augmentations studied in the ANTS are intended to deliver market benefits by addressing network congestion. To deliver a meaningful result the conceptual augmentations studied should complement the augmentations required to deliver mandated obligations. Conceptual augmentations that are not well coordinated with the augmentation required to deliver mandated obligations or developed to an inconsistent standard across the NEM limit the value of the ANTS.

The IRPC is convened by NEMMCO and includes a representative from each JPB. Having a technical focus the activities performed by the IRPC include:

- assisting to coordinate inter-network augmentations by maintaining criteria for assessing whether an augmentation has a material impact on other networks;
- developing guidelines describing when an inter-network test may be required;
- assisting NEMMCO to develop inputs for the ANTS market simulations and coordinating provision of data from JPBs including conceptual augmentations and load forecasts; and
- coordinating activities to improve power system modelling, electricity market simulation, inter-network testing and load forecasting.

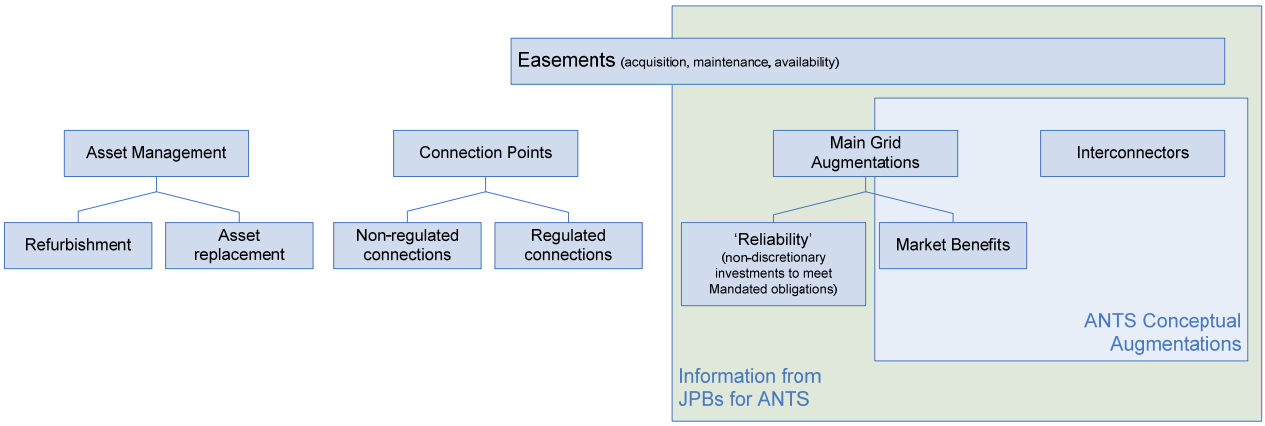

Figure 2 – Current allocation between NEMMCO and TNSP

Figure 3 illustrates the current process used to justify augmentations to the main transmission grid. While the specific arrangements in each region differ, there are general characteristics which are similar. This diagram draws on knowledge of existing TNSP processes. The top of the diagram shows the annual investigations

which trigger a project-specific study, typically at the last moment allowing for approval and construction lead times ("just in time planning"). The process for these project-specific studies is shown in the shaded box at the bottom of the diagram.

Starting at the top are the Annual Grid Plans for each State. These have different names in different organisations, but we use this name here to refer to the annual investigation of emerging augmentation needs on the main grid. They may include consideration of:

- mandated obligations;
- analysis of periods of binding network constraints;
- asset refurbishment and replacement programs;
- connection point developments (including future generation proposals);
- existence of easements and their condition;
- community issues; and
- strategic development issues (such as introduction of new voltage levels).

The State Annual Grid Plans may consider multiple scenarios reflecting different levels of load growth and future generation development culminating in multiple lists of projects to meet the emerging needs.

The results of these investigations are generally not made public. However, they inform the APR and future project approvals.

The APR is the public statement made by each TNSP of emerging network issues, their impact and potential solutions. The APR is the primary instrument through which the market is informed of these issues with any time to react.

The APRs also inform the ANTS.

More detailed investigation is then triggered on a project-specific basis. These investigations are sometimes called 'Regulatory Test evaluations' because of the Rules requirement to apply the AER's Regulatory Test.

These investigations are much more rigorous than those conducted for the high-level Annual Grid Plans and involve many more people within the organisation. It may also involve the distribution network service providers if the project has an interface to the distribution networks.

Public consultation forms a significant component of these investigations through:

- a Request for Information (which outlines the network needs and seeks non-network options);
- an Application Notice (which sets out the network needs, presents the network and non-network options and applies the Regulatory Test to find the preferred option);

- a Final Decision (which considers issues that arose from the Application Notice consultation); and

- dispute periods.

- The options outlined in the Application Notice may differ from those considered in the Annual Grid Plan because of:

    - information learnt from the Request for Information; and

    - the more rigorous analysis (including obtaining full engineering scopes and more accurate quotations – the level of rigour differs among TNSPs).

Although not part of the process for planning individual augmentations, the review of revenue for each TNSP by the AER establishes the regulated revenue the TNSP is able to receive for the reset period. The reset period is five years and the AER carries out the reviews sequentially.

The existing transmission planning process has the following shortcomings:

- A number of decentralised planning processes that do not deliver a national transmission plan;

- the TNSPs being focussed on ensuring mandated obligations are met via pursuit of augmentations (or non-network projects). Projects which deliver market benefits are being viewed as discretionary;

- the value of the ANTS being limited by the reliance on conceptual augmentation proposals put forward by TNSPs. They are derived separately, and may not form an optimal package when combined with the augmentations being progressed to deliver mandated obligations within in each jurisdiction;

- uncoordinated and inconsistent consultations on emerging needs which increase the complexity of developing non-network options.

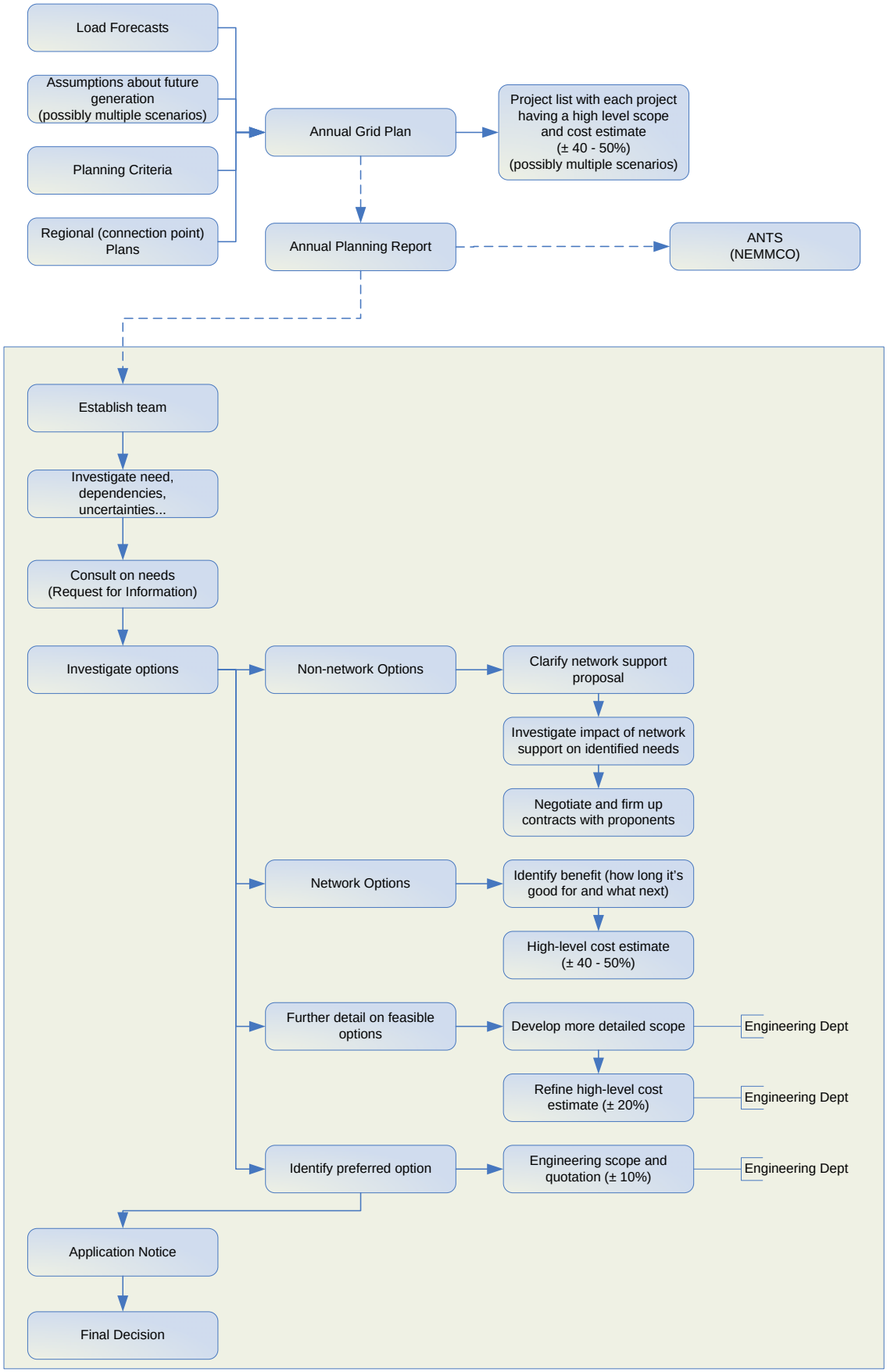

Figure 3 – Current planning process

3 Key issues

The COAG communiqué provides high level guidance regarding the new national transmission planning arrangements and the outcomes they are expected to deliver. The COAG communiqué identifies that the AEMC should develop the detailed implementation arrangements through consultation with stakeholders. NEMMCO believes that the following issues must be addressed to deliver a workable transition to a new national transmission planning framework that achieves the outcomes articulated in the COAG communiqué:

- The role of the TNSPs, NTP and the coordination process should be appropriate and clearly defined;
- The scope of the NTNDP should be appropriate and clearly defined; and
- Workable transition arrangement should be defined.

Role of TNSP and NTP

TNSPs should continue to have a significant role in the new transmission planning arrangement, however some activities may need to be transferred to the NTP (possibly over-time) to deliver the outcomes required by the COAG. For example the TNSPs should continue to be responsible for delivering mandated obligations, while the NTP should develop a NTNDP which describes the planned development of the transmission system. The appropriate allocation of functions between the NTP and the TNSP should allow the responsibilities of each party to be carried out efficiently.

Addressing the following questions should help articulate the appropriate boundaries between the activities performed by the NTP and the TNSPs:

- How should the following planning activities be allocated between TNSP and NTP?
    - planning of connection assets;
    - planning of asset replacement and refurbishment;
    - easement acquisition and planning; and
    - planning augmentations to the main transmission grid, which may be required for a combination of delivering mandated obligations and delivering market benefits.
- Should the role of the NTP be broader than just collating and disseminating information regarding transmission development? Should.the NTP be involved in the consultation process used to identify potential solutions to emerging transmission issues and the project justification process?
- Should the NTP decide which projects are included in the NTNDP and to what extent should those projects be limited to projects developed by TNSPs?

- How will the technical coordination activities currently performed by the IRPC, be incorporated into the new arrangements?

- Is it appropriate for the Jurisdiction Planning Bodies to continue to produce the jurisdictional load forecasts?

- How would non-network options be identified and accounted for in the new planning arrangements?

- When would the revised regulatory test be applied and by which party? How will the two stage assessment process discussed in the Energy Reform Implementation Group report work in practice? Is a two stage process necessary?

- When developing the NTNDP, should the NTP consider all augmentations with the potential to impact the delivery of market benefits? Considering all augmentation of this type may require the NTNDP to consider augmentations to sub-transmission networks which impact the capability of the main transmission grid. An alternative would be to restrict the scope of the NTNDP to only include main transmission grid augmentations. However this would exclude sub-trans augmentations having a significant impact on market benefits from the NTNDP.

Role of the National Transmission Network Development Plan (NTNDP).

The COAG has endorsed that the NTP should produce an annual NTNDP, however further work is required to clarify the content and role of the NTNDP. Clearly defining the role of the NTNDP and the extent of influence the NTNDP has on investment decisions by TNSPs and reviews of TNSP revenue requests by the AER will allow the:

- process used to produce the NTNDP to be developed;

- essential content and outlook period for the NTNDP to be defined;

- resourcing requirements for the NTP to be defined;

- appropriate publication date for the annual NTNDP selected; and

- relationship between the SOO, NTNDP and APRs defined.

Defining the process used to produce the NTNDP should include definition of the scope and purpose of any consultation processes and the allocation of functions between TNSPs, the NTP and other parties to produce the NTNDP. This will help establish an appropriate publication date and resourcing requirements for the NTP.

The primary purpose of the NTNDP is to support the national transmission planning process. The content of the NTNDP that directly supports the national transmission planning process should be viewed as essential, distinguishing it from other optional content. Classifying content in this manner may be useful as it would allow obligations for producing the essential content to be assigned through Rules while a less prescriptive approach could be adopted for optional

content. This would allow optional content to evolve over time in response to submissions received via the annual consultation on the NTNDP.

The COAG communiqué indicates that the NTNDP should provide at least a ten year outlook. Extending the outlook to beyond ten years should be considered as this may assist strategic investment decisions such as decisions to introduce a higher transmission voltage, secure easements or proceed with transmission development in support of remotely connected generation.

Defining the role and content of the NTNDP will allow the relationship between the NTNDP and other planning documents such are the SOO and APRs to be examined. By considering the extent to which information currently published in the SOO and APRs is required to be published in the NTNDP, decisions could be made regarding:

- whether it is necessary to continue to publish the SOO and APRs once the NTNDP is an established document
- if so, the appropriate content and publication date for all three document types and
- whether over-time there would be benefit in combining some of these documents?

Transitional arrangements

A smooth transition to the new transmission planning arrangements will require considering the following issues:

- The role of the NTP in AEMO is greater than the transmission planning role currently performed by NEMMCO and it may be difficult to secure sufficient additional resources to fully implement the new process from June 2009;
- Transitional arrangements should allow the existing arrangements for planning and development of the transmission network to continue while the new arrangements are established;
- When should the first NTNDP be published;
- What level of industry consultation should be allowed in developing the first NTNDP and what supporting documents would be required; and
- Should the first NTNDP have a reduced scope compared to subsequent versions of the document? The first ANTS was published by NEMMCO in 2004, with the scope and content determined through preliminary consultation with stakeholders. This document was produced ahead of the establishment of Code obligations requiring the publication of the ANTS. It was essentially a demonstration document developed to provide a basis for future consultation on the scope and content of the ANTS. Would a similar approach be appropriate for the NTNDP;
- Is it appropriate to publish a SOO, ANTS and APRs in 2009, and how should these documents relate to the first NTNDP?

4 Potential transmission planning process

This section presents some initial options for a planning process that could address the issues identified in section 3. The purpose of providing these options is to help illustrate the particular issues by considering potential solutions.

Figure 4 provides an outline of a potential national transmission planning process. This process integrates into the development of the NTNDP the identification of projects (both network and non-network projects) which maximise market benefits while delivering mandated obligations. The NTNDP is developed by the NTP utilising internal resource and technical advice provided by the TNSPs and information on non-network options uncovered via consultation.

The TNSPs retain the role of deciding which projects proceed, and can therefore ensure the mandated obligations are met. The TNSPs are encouraged to proceed with projects included in the NTNDP as these face a simplified approvals process which recognises the justification steps taken by the NTP when deciding to include the project in the NTNDP. A more detailed approval process is required for projects not included in the NTNDP.

The resulting NTNDP considers a variety of generation development scenarios and for each identifies an optimum list of projects (including both network and non-network projects) that maximise market benefits while allowing mandated obligations to be delivered.

The process allows for consultations to identify potential solutions to emerging needs to be consolidated into a standardised national process administered by the NTP.

It also assumes that the jurisdictional planning bodies retain responsibility for production of regional demand and energy projections.

While not shown in Figure 4 the technical coordination activities currently performed by the IRPC would need to continue. This could be achieved by transferring the obligations for this work to the AEMO. This would achieve the COAG objective of having the new process replace the IRPC while ensuring continuation of these valuable tasks.

Variations to this proposal could be developed by considering whether:

- the NTP should produce the regional demand forecasts?
- the content of the NTNDP and APRs is sufficiently aligned to allow publication of a single consolidated document or it is necessary to continue to publish the APRs and the NTNDP?
- consolidating the existing adhoc consultations used to identify potential solutions to emerging needs is appropriate?
- the inclusion of projects in the NTNDP should allow a simplified justification process by the TNSPs?
- the scope of projects included in the NTNDP should consider all projects that impact market benefits or should they be limited to a particular voltage level?

- the same level of project assessment should apply to all years covered by the NTNDP or should a more approximate assessment method apply to the later years.

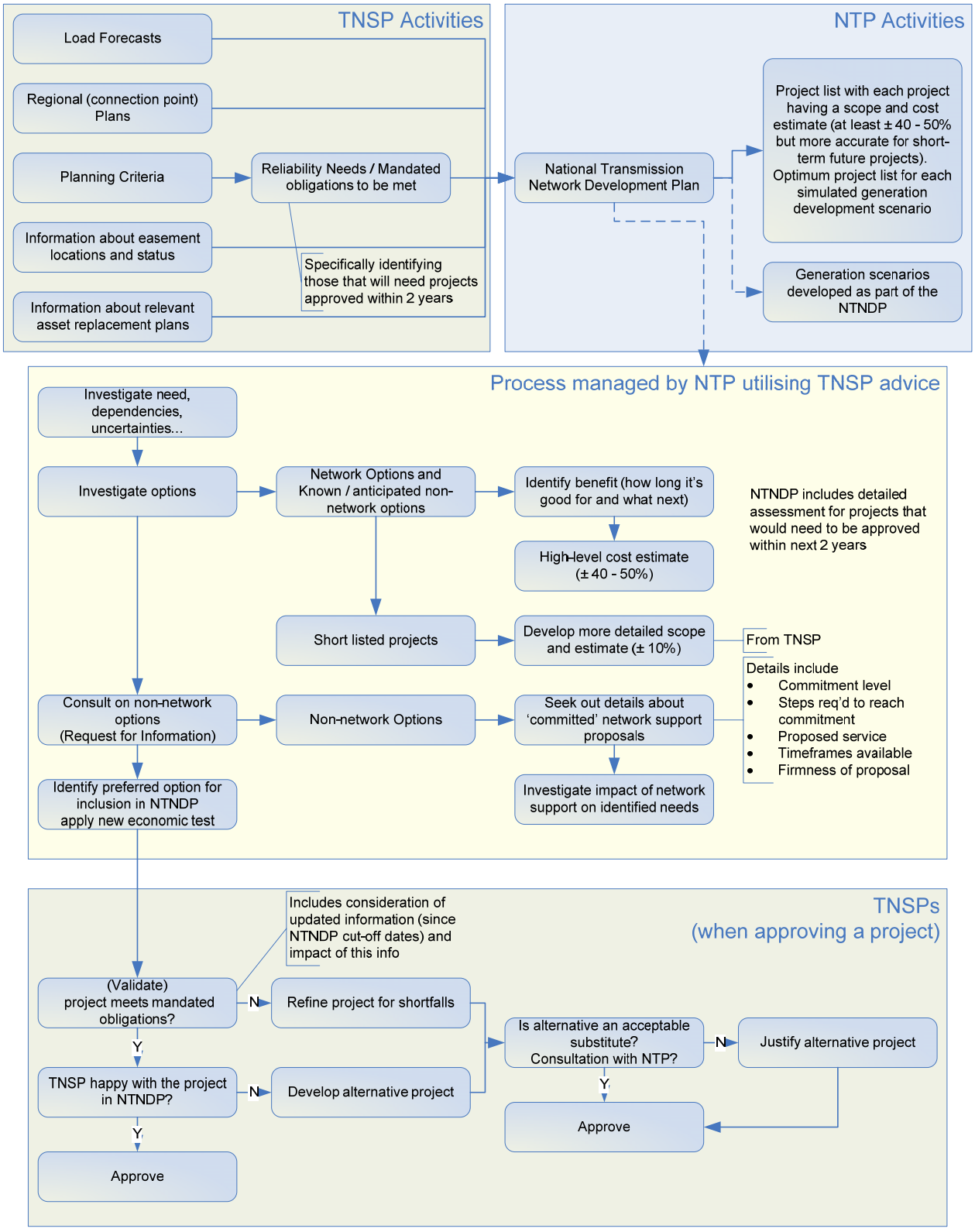

Figure 4 – Potential national planning process