Electronic Dispatch Facility Enhancement Project

Service Enhancement Consultation Information

October 2016

TRANSPOWER

IMPORTANT

Disclaimer

The information in this document is provided in good-faith and represents the opinion of Transpower New Zealand Limited, as the System Operator, at the date of publication. Transpower New Zealand Limited does not make any representations, warranties or undertakings either express or implied, about the accuracy or the completeness of the information provided. The act of making the information available does not constitute any representation, warranty or undertaking, either express or implied. This document does not, and is not intended to; create any legal obligation or duty on Transpower New Zealand Limited. To the extent permitted by law, no liability (whether in negligence or other tort, by contract, under statute or in equity) is accepted by Transpower New Zealand Limited by reason of, or in connection with, any statement made in this document or by any actual or purported reliance on it by any party. Transpower New Zealand Limited reserves all rights, in its absolute discretion, to alter any of the information provided in this document.

Copyright

The concepts and information contained in this document are the property of Transpower New Zealand Limited. Reproduction of this document in whole or in part without the written permission of Transpower New Zealand is prohibited.

Contact Details

Address: Transpower New Zealand Ltd
96 The Terrace
PO Box 1021
Wellington
New Zealand

Telephone: +64 4 495 7000

Fax: +64 4 498 2671

Email: system.operator@transpower.co.nz

Website: https://www.transpower.co.nz

CONTENTS

GLOSSARY OF ABBREVIATIONS AND TERMS

CRE	Competition Reliability Efficiency
EA	Electricity Authority
EDF	Electronic Dispatch Facility
ESB	Enterprise Service Bus
ICCP	Inter-Control Centre Communications Protocol
ISD	SCADA InterSite Protocol
MDB	Market System Database
MFK	Multiple Frequency Keeper
MOI	Market Operator Interface
NCC	National Coordination Centre
SAD	Stand Alone Dispatch
SO	System Operator
SOSPA	SO Service Provider Agreement
TTSE	Testing Training Simulator Environment

1. EXECUTIVE SUMMARY

1.1 SUMMARY

The Electronic Dispatch Facility (EDF) is the component of the Market System that sends dispatch instructions to, and receives receipt acknowledgements from, generators and ancillary service providers. Industry participants are currently required to use the GENCO software as their 'Information System' to receive and acknowledge dispatch instructions.

Industry participants have requested Transpower to enhance the dispatch solution to utilise up-to-date electronic communications protocols (EDF Enhancement project) to enhance flexibility and lower complexity and cost. Furthermore, a redesigned dispatch solution would enable new functionality which would be required for some proposed elements of the Authority's Dispatch Based Pricing proposal.

Transpower has investigated upgrade options and recommends the implementation of both ICCP and Web Services as alternate communications protocols to manage the acknowledgement of dispatch instructions.

Delivery of the implementation of alternate communications protocols is expected to have a duration of 20 months. The estimated additional SOSPA fee sought through the appropriations process is $4.994M over a 5-year period.

(all values in $M)	18/19	19/20	20/21	21/22	22/23	23/24	Total
Estimated Capex revenue per year.	0.333	0.999	0.999	0.999	0.999	0.666	4.994

Transpower and the Authority estimate the net benefit (NPV) considering project costs and a subset of efficiencies to be an indicative net cost of $1.4M over 15 years. The NPV does not include any quantified long term end benefits as these are difficult to credibly estimate. These benefits are dependent on the rate of uptake in this fast-changing market environment. However, the Authority expects implementing the EDF enhancement project would provide productive effiency gains that exceed the estimated cost of the investment.

While the long term end benefits are not included in the NPV, Transpower expects once these are included the total benefits will be greater than the cost of the investment. Transpower suggests this investment will provide long term end benefits to the New Zealand consumer.

The long term benefits expected through this investment include reduced barriers to entry, increased market competition, leading to market innovation, and a comprehensive system operator dispatch service offering by effective implementation of dispatch functionality in future while maintaining dispatch security.

1.2 THE NEED FOR INVESTMENT

Industry participants have issues with using GENCO to receive and acknowledge dispatch instructions and have requested Transpower modernise its dispatch systems to manage its risks and become an enabler for the development of new dispatch products and functionality.

As the New Zealand electricity industry is changing with emerging business models, increasing uptake of new technologies and evolving market arrangements, an updated dispatch system would support the Electricity Authority's statutory objective to promote competition, reliability and efficiency.

While Transpower does not require altered dispatch functionality to maintain the current system operator service, the existing solution presents barriers to implementing a comprehensive dispatch management solution to support the changing market environment. This case proposes a solution based upon industry identified needs which supports future growth and is flexible and scalable to adapt to the increasing challenges this changing environment will bring with it. Transpower is unable to mitigate industry concerns with the current system. The effectiveness of the current EDF is limited by the way the current dispatch management system is set up. The EDF uses a proprietary communications protocol called ISD (SCADA InterSite Protocol), which requires the use of GENCO. The impact of restricting dispatch to ISD and GENCO includes:

- Dispatch system set-up is inflexible and not scalable to introduce new functionality/dispatch products and increasing participation, limiting the type of information that can be transmitted;
- Introducing changes requires involvement of all participants, who use GENCO, for upgrades;
- Support for GENCO is limited to a single third party provider; and
- The ageing GENCO software results in increasing issues that impact dispatch reliability.

The proposed solution would mitigate the above impacts and also provides redundant communications pathways for participants who currently rely on phone dispatch for backup. Furthermore, the implementation of alternate communications protocols will also enable the introduction of new dispatch functionality more efficiently and effectively.

1.3 ALIGNMENT WITH STATUTORY OBJECTIVE

While industry benefit is the main driver for the project, the investment is aligned to Transpower's strategy for the performance of the system operator service and to Transpower's IST policies and principles.

The investment promotes the Electricity Authority's statutory objective of competition, reliability and efficiency (CRE), to ensure a reliable supply and efficient operation of the electricity market for the long term benefit of consumers as described below:

Competition	Reliability	Efficiency
Reducing the technical barriers to entry enables increased competition and innovation	Increasing the reliability of dispatch management in impacted situations through implementing dual network routes	Enabling implementation of dispatch enhancements leading increased efficiency of dispatch; enables efficient integration of new industry features (e.g. emerging technologies) to the ultimate benefit of consumers; reduce industry support cost

1.4 WHAT WE PROPOSE TO DO

The proposed solution is based upon business needs and requirements developed through consultation with the Industry[1]. This proposed solution, will provide:

- Alternate communications protocols, both ICCP and Web Services, to enable current dispatch participants who use ICCP to consolidate their communications, and to enable smaller participants, for whom ICCP is not cost-effective, to be able to participate fully in the market;
- Dispatch configuration changes, which will enable a more comprehensive dispatch service through enabling new dispatch products and/or functionality; and
- Dual network redundancy.

1.5 TRANSITION

Benefits of this project may not be realised if participants do not take up the new dispatch solution. While a number of participants have requested the proposed changes, no participants have yet committed to a transition timeframe. To mitigate this risk, and in light of GENCO running out of support in 2020, December 2020 is recommended to be the end date for supporting GENCO for dispatch.

[1] Industry stakeholder requirements elicitation took place on 7th April 2016, after which the stakeholder requirements document was developed, reviewed and endorsed by the participants who were part of the engagement group. Attendees involved were from Contact, EA, Enernoc, Genesis, Meridian, MRP, Norske Skog, Northpower, and Trustpower.

2. INTRODUCTION AND BACKGROUND

2.1 CURRENT SITUATION

The EDF is the component of the Market System that sends dispatch instructions to, and receives receipt acknowledgements from, generators and ancillary service providers.

Industry participants have highlighted difficulties they experience with the current solution and have requested a new solution so that they can manage their risks. In addition, the electricity market environment in New Zealand is changing with emerging business models, increasing uptake of new technologies and evolving market arrangements. Also, the EA's statutory objective seeks to promote competition, reliability and efficiency. In this context, industry participants and Transpower have observed a growing need to refresh dispatch systems and enable new dispatch products and functionality.

While Transpower does not require altered dispatch functionality to maintain the current system operator service, the existing solution presents barriers to implementing a comprehensive dispatch management solution to support the changing market environment. In addition, participants have advised that an improved dispatch system would reduce the cost and risk associated with the current technology.

The effectiveness of the current Electronic Dispatch Facility (EDF) is limited by the way the current dispatch management system is set up. The EDF uses a proprietary communications protocol called ISD (SCADA InterSite Protocol), which requires the use of GENCO. The Code currently stipulates the use of GENCO as the information system to send and receive dispatch instructions. The impact of restricting dispatch to ISD and GENCO includes:

- Dispatch system set-up is inflexible and not scalable to introduce new functionality/dispatch products and increasing participation, limiting the type of information that can be transmitted;
- Introducing changes requires involvement of all participants, who use GENCO, for upgrades;
- Support for GENCO is limited to a single third party provider; and
- The ageing GENCO software results in increasing issues that impact dispatch reliability.

Transpower investigated potential solutions and arrived at the proposal described in this document to mitigate the above impacts and provide the necessary foundation for participants to move off the ISD/GENCO platform.

Also, only a limited number of dispatch participants have the ability to connect (via NZX IPV) to both Transpower's data-centres. Dispatch participants connected to the One Office IPV and Transpower's legacy network do not have this capability. In a Disaster Recovery (DR) scenario (and one of the data centres is not available), this means that a number of dispatch participants would not be able to be dispatched by the EDF, which can lead to a risk to security of supply. The proposal also includes a provision to provide redundant communications channel for participants who currently rely on phone dispatch for redundancy.

Should the current architecture and functionality be maintained at this time, future changes to the EDF solution will be required from time to time to support other market

initiatives such as real time pricing. In addition to the risk that changes to EDF functionality associated with future projects may add time and expense to those projects, modifications may be incremental and fail to provide an optimal dispatch system.

2.2 POTENTIAL ENHANCEMENT PROJECT

Under the SOSPA agreed in 2016, Transpower has agreed to provide capital investments to maintain the System Operator Service for an agreed fee. Previously, Transpower recovered funding on a 'time and materials' basis for capital projects presented in its Capital Plan, regardless if the projects were required to maintain the service or provided enhancements.

Under the new SOSPA[2], potential enhancement projects are subject to approval by the Authority subsequent to consultation with industry. Enhancements are projects that change, enhance or introduce new services, market system tools and / or interfaces that are directly available to participants.

2.3 WHAT WE WANT TO ACHIEVE

Transpower proposes to initiate this project with the investment objective to enhance dispatch functionality to enable industry change to support competition, reliability, and efficiency as well as reduce complexity and cost for participants. It removes barriers to industry development consistent with EA statutory objectives and Transpower strategic objectives whilst it also improves the reliability of the dispatch function.

The investment objective is achieved by providing:

- Alternate communications protocols, both ICCP and Web Services, to enable current dispatch participants who use ICCP to consolidate their communications, and to enable smaller participants, for whom ICCP is not cost-effective, to be able to participate fully in the market and use a protocol that that best fits their dispatch operation and their level of investment.
- Dispatch configuration changes, which will enable a more comprehensive dispatch service through enabling new dispatch products and/or functionality to be implemented effectively and related dispatch information to be shared to inform decision-making.
- Dual network redundancy, which will reduce the impact on dispatch management operation maintaining reliable and secure dispatch.

[2] Refer to the SOSPA agreement for further information via the following link: *https://www.ea.govt.nz/dmsdocument/20547*

Minor Regulatory change required

A key enabler to this investment is regulatory change. Transpower seeks to collaborate with the EA and the industry reviewing the regulatory framework to allow the use of other communications protocols other than GENCO, and which meets their regulatory requirements to manage dispatch. These changes will enable the flexibility and scalability required to facilitate innovation and efficiencies in the market environment.

Refer to Section 9 for further information on suggested changes to Part 13 of the Code.

Proposal to end support for GENCO

10

Benefits of this project may not be realised if participants do not take up the new dispatch solution. While a number of participants have requested the proposed changes, no participants have yet committed to a transition timeframe. To mitigate this risk, and in light of GENCO running out of support in 2020, December 2020 is recommended to be the end date for supporting GENCO for dispatch.

2.4 THE INDUSTRY NEED

This investment will address current issues dispatch participants are experiencing, including:

- Participants reporting the current dispatch management system has reliability issues which limits effective dispatch operation;
- The current ISD protocol and GENCO software inhibiting innovation and efficiencies to the market in light of a changing market environment;
- The current protocol being a barrier to entry for new dispatch participants to fully participate in the market, which limits market competition; and
- The current dispatch management system not being flexible and scalable for effective implementation of changes to dispatch.

The key enabler for addressing the needs and enabling change is a amendment to the regulatory framework. For further information on the suggested changes, refer to Section 9.

Further to the issues highlighted by dispatch participants above, this investment will also enhance reliability by:

- Improving reliability of dispatch management as current GENCO related issues lead to increased levels of operational downtime (i.e. phone dispatch); and
- Providing dual redundancy for participants that currently are on a single network connection. This impacts reliable dispatch to these dispatch participants during an impacted situation i.e. Disaster Recovery event).

Q1. Do you agree that a transition away from GENCO to a new dispatch facility is merited?

Q2. Is a transition away from GENCO by December 2020 feasible? If you do not agree, what would be a feasible timeframe to transition away from GENCO?

Q3. If you operate a GENCO, would you commit to transition away from GENCO if that were a requirement for this investment to proceed?

3. ELECTRICITY AUTHORITY'S STATUTORY OBJECTIVE

This investment contributes to the Electricity Authority's statutory objective as follows:

Competition	Reliability	Efficiency
Reducing the technical barriers to entry enables increased competition and innovation	Increasing the reliability of dispatch management in impacted situations through implementing dual network routes	Enabling implementation of dispatch enhancements leading increased efficiency of dispatch; enables efficient integration of new industry features (e.g. emerging technologies) to the ultimate benefit of consumers; reduce industry support cost

In addition, this investment aligns with Transpower's organisational strategic drivers as per the SO Service Strategic Plan to:

- **"Deliver competition with security"** by running an effective electricity market through enabling participants to use software of their choice through other alternate communications protocols, both ICCP and Web Services, to allow more effective and efficient dispatch management.
- **"Strengthen relationships"** through engagement with the Authority and market participants to enhance the system operator service to the industry.
- **"Demonstrating Value for Money"** by evolving the Transpower System Operator Service to the Industry and seek opportunities to add value to market participants through this investment.
- **"Planning for Tomorrow"** by reducing barriers to market entry, and through understanding the needs of market participants, implementing opportunities, which will enable Transpower to respond to an ever-evolving environment to ensure the continual delivery of an optimum level of service.

The investment is in the interest of our customers and consumers because it promotes competition through reduced technical barriers to entry for market participation, which will ultimately benefit the end consumer. It also benefits customers as the investment ensures the electricity network in New Zealand is operated securely and reliably with supported systems which can be efficiently managed and maintained and are adaptable to future changes in light of an ever-evolving market environment (e.g. increased uptake of emerging technologies).

4. THE OPTIONS AND IMPACTS

4.1 OPTION A: STATUS QUO

The "Status Quo" option means the current dispatch management solution will be maintained. While this option will maintain Transpower's existing service and support Code obligations, the Status Quo option is not sustainable in the longer term because:

- Status quo is not seen as fit-for-purpose in the context of participant expectations;
- Status quo is a barrier to entry and will inhibit innovation and market competition and does not enable comprehensive dispatch management and allow the industry to adapt to a changing market environment;
- Status quo will not address the current challenges around the level of dispatch management reliability, due to GENCO software issues, which are currently managed through people and process; and
- Participant risk: The lack of dual network redundancy for participants on a single network domain remains.
- Participant risk: A compliance risk remains for participants as they do not have control over their own GENCO software.

4.2 OPTION B: REFRESH

The "Refresh" option would include an upgrade of the EDF to allow the use of ICCP to manage dispatch. Current dispatch participants, who already use ICCP as a communications protocol, will be able to consolidate their dispatch management through ICCP.

However, the refresh option has limitations. Implementing ICCP as the **only** communications protocol will:

- Limit lowering the barrier to entry for smaller participants who wish to participate in dispatch as ICCP will be cost-ineffective for smaller participants;
- Not meet all the industry needs, e.g. the need to be able to receive dispatch related information (e.g. notices); and
- Not fully meet the EA's statutory objective and would not fully meet the long term end benefits which are intended by the project.

4.3 OPTION C: MARKET ENTRY

The "Market Entry" option would introduce both ICCP and Web Services as alternate communications protocols to manage dispatch. Furthermore, it would introduce a Web Services Testing Facility that participants can use to undertake integration testing prior to them transitioning across to the new protocol. Providing both communications protocols will:

- Promote CRE through lowering the barriers to entry for smaller participants to participate fully in the market, which will increase market entry and will enable efficiencies in the market; and
- Providing the Web Services Testing Facility will allow for early integration testing, which will reduce the risk of issues arising during the transition period.

4.4 OPTION D: ENABLEMENT

Further to the provision of both alternate communications protocols, and a Web Services Testing facility, the "Enablement" option would introduce dispatch configuration changes in the Market System, which will provide the flexibility and scalability to enhance the dispatch service offering in line with future industry developments and enable these changes to be implemented more effectively.

It will allow the industry to adapt to the changing market environment more effectively, introducing innovation and further market competition.

4.5 OPTION E: REDUNDANCY

The "Redundancy" option is the investment Transpower is proposing through the EA's appropriation consultation.

This option will reduce the risk that participants will lose connection to Transpower and need to rely on phone dispatch. This option will provide for alternate communications protocols, a Web Services testing facility, and configuration changes. Also, it will provide network redundancy to dispatch participants who are currently on a single network connection. This will improve the reliability of continuing electronic dispatch during impacted situations (disaster recovery events), which will support maintaining dispatch security and reliability.

4.6 OPTIONS COST OVERVIEW

Figure 1 below shows the appropriation cost indication for each option.

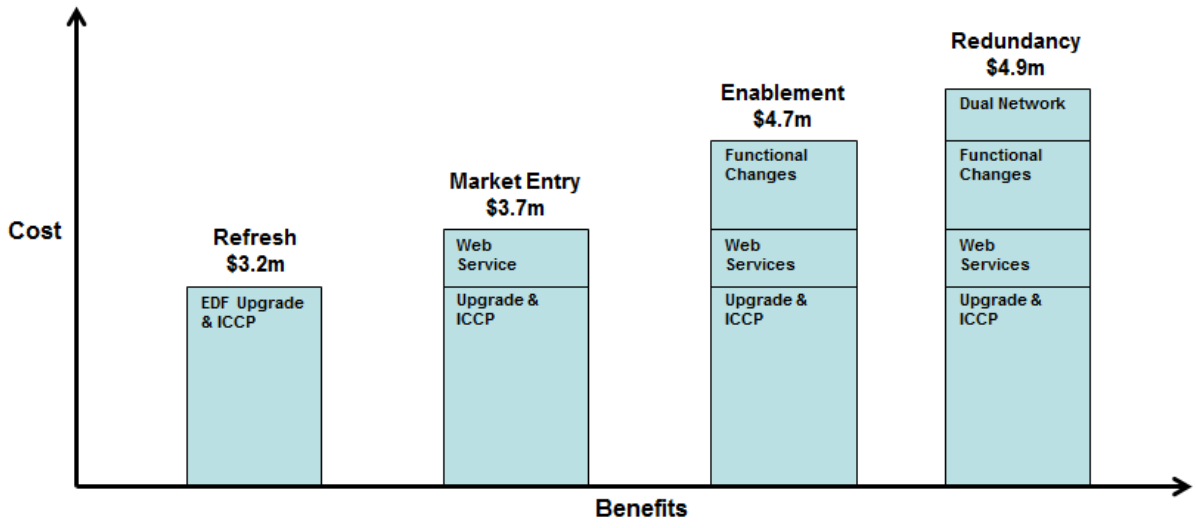


Figure 1 – Appropriation cost indication

This investment proposal recommends the "Redundancy" option to be implemented as it will enable the delivery of all the intended long term end benefits as referred to in Section 5.

4.7 WHOLE OF LIFE COST ASSUMPTIONS

Operating costs have not been explicitly modelled at this point. Modifications are being made to existing System Operator and Market Systems tools only and hence there will be minimal increased ongoing operational costs.

Q4. Provided a new dispatch facility is being implemented, do you agree that the 'Redundancy Option' is an appropriate approach? If not, which alternate approach do you consider is appropriate, and why?

5. COST BENEFIT ASSESSMENT

This investment will deliver long term end benefits to both Transpower and market participants. Refer to Appendix 1 and 2 for a visual overview of how the investment relates to enabling the long term end benefits.

5.1 LONG TERM END BENEFITS

This investment will **enable** the realisation of long term end benefits to New Zealand through the operation of the industry and Transpower (both as a provider of the system operator service and a dispatch participant). The long term end benefits are enabled through:

- Implementing alternate communications protocols, i.e. ICCP and Web Services, which will *reduce the technical barrier to entry*, and will enable current dispatch participants and new participants to use a protocol that best fits their dispatch operation, and which will enable increasing market participation ultimately leading to *increased market competition*.
- Making dispatch configuration changes, which will enable a more comprehensive dispatch service through *enabling new dispatch products and/or functionality to be implemented effectively*, for those dispatch participants ready to benefit from the change, and related dispatch information to be shared to inform decision-making, which will enable innovation and market efficiencies to support and enhanced dispatch service offering and greater market competition.
- Providing dual network redundancy, which means operational staff can continue to manage electronic dispatch instructions to participants in impacted situations (i.e. Disaster Recovery), will deliver direct benefits of reduced risk to the ability to provide *a comprehensive and effective dispatch management service*, and reduced time on phone dispatch, thereby contributing to *maintaining dispatch efficiency, reliability and security.* Effective dispatch is key to the alignment between modelled optimal market outcomes and the actual implementation of the efficient market solution.

A key enabler for realising the long term end benefits is amending the regulatory framework. This will allow participants to move off GENCO and to manage dispatch in a way that best fits their dispatch operation and meets their regulatory requirements.

5.2 NET PRESENT VALUE

The proposed investment requires an appropriation of $4.994M over a 5-year period.

(all values in $M)	18/19	19/20	20/21	21/22	22/23	23/24	Total
Estimated Capex revenue per year.	0.333	0.999	0.999	0.999	0.999	0.666	4.994

The indicative net cost over a 15-year period, based on costs and identified efficiencies is estimated at $1.4M. This NPV accounts for a real pre-tax discount rate of 7.00% and depreciation of the benefits over 15 years. The NPV includes current dispatch system avoidable cost savings and savings that can be made implementing new functionality in future as a flow on effect of this investment.

This NPV excludes quantified long term end benefits in the electricity market, as these long term end benefits are difficult to estimate, and are dependent on the rate of transition to the proposed alternate communications protocols by current dispatch participants, the rate of uptake by new dispatch participants, and the rate if innovation in dispatch, e.g. the introduction of new dispatch functionality and/or products in the electricity market.

Some of the benefits relate to the avoidance of a GENCO upgrade in 2020. Should the retirement of GENCO occur beyond 2020, these costs may not be avoided. These benefits are likely to be offset by costs incurred by participants to upgrade their GENCO.

Although the long term end benefits above are not included in the NPV, Transpower expects that the combined quantified and unquantified benefits will be greater than the cost of the investment. Transpower supports the investment on the basis that it will provide long term end benefits to the New Zealand consumer.

Furthermore, the Authority has calculated that the shortfall of $1.4m requires productive efficiency gains that create an annual saving of $155K in wholesale market costs. This could be achieved with only a 0.007% reduction in the total annual value of energy traded in the spot market (assuming $2.5B is traded per annum). The average spot price would only need to decrease by about half a cent (assuming an average spot price around $70/MWh) from productive efficiency gains for the investment to have a long term net benefit. The Authority expects the project would provide unquantified benefits, including production efficiency gains, in excess of these amounts/values.

Q.5 Do you agree that the long term end benefits outweigh the investment cost and merit the proposed investment?

5.3 OTHER BENEFITS

As a result of the project there are several benefits that can be achieved directly by implementing this project. In turn, these benefits will contribute to the realisation of the long term end benefits as shown in Appendix 1 and 2.

5.3.1 TIME ON PHONE DISPATCH

Changes delivered to enable participants to move off the GENCO will reduce the time Transpower spends on phone dispatch. Currently, Transpower system coordinators spend on average 23 days (546 hours) per year on phone dispatch[3]. It is envisaged that

[3] Analysis was completed on the basis of GENCO/EDF related events logged in the Transpower Market Operations Log (MOL) between Mid-2012 to Mid-2016). The total event time was taken as the difference between the 'Event Date' and the 'Completion Date' i.e. it is assumed that the event was marked as completed as soon as was resolved.

the average number of hours on phone dispatch per year can be reduced by at least 50% once all current participants have moved to an alternate communications protocol.

5.3.2 TIME AND COST TO IMPLEMENT FUTURE FUNCTIONALITY

The implementation of more robust and flexible communications protocols will enable Transpower to deliver new dispatch functionality more efficiently and effectively resulting in a reduction in delivery time and cost implementing dispatch changes.

5.3.3 TRANSITION PROCESS

Providing alternate communications protocols requires a clear process documenting roles and responsibilities and what is required to be able to transition from the legacy protocol (i.e. GENCO) to an alternate communications protocol or to be able to connect as a new participant. The Transition Process will ensure Transpower is able to transition current participants (who use GENCO) off GENCO effectively and ensures an effective on-boarding process for new participants who want to enter the market.

Q.6 Are there any other quantifiable of qualitative benefits that we have not discussed?

6. PROJECT APPROACH AND SCOPE

6.1 PROJECT APPROACH

The project will take a two-stage approach. During the first stage, Initiation, Transpower will collaborate with the industry participants to determine the solution requirements and will work through a proof of concept of several Market System components to refine the estimates, scope and technical risk. Once confirmed and the project has been re-validated the second stage, Delivery, will implement the change in production.

For more detail on the scope included during both stages of the project, refer to section 6.2 Project Scope.

6.2 PROJECT SCOPE

On the basis that the proposed solution will be implemented, the scope will include:

- Build, test, and deployment of alternate network routes to dispatch participants, who currently have a single network route connection
- Industry engagement and communications
- Build, test, and deployment of dispatch configuration changes in the Market System tools to allow participants to use ICCP and Web Services as their dispatch communications protocol and to enable efficient and effective changes to dispatch in the future.
- Provision of an integration guide for alternate communications protocols
- Provision of a transition guide to enable effective transitioning of dispatch participants to an alternate communications protocol
- Provision of a Web Services testing facility
- Develop and conduct training for system operator system coordinators
- Conduct changes to business processes and operational documentation
- Deploy changes to the System Operator TTSE
- Conduct a post project review and undertake formal project closure

The above in scope items for implementation during the Delivery stage will be validated during the Initiate stage.

6.2.1 SCOPE EXCLUSIONS

The following items are considered **out of scope** for implementation during the project:

- Decommissioning of any dispatch infrastructure (e.g. the EDF, ISD and GENCO). The legacy dispatch system will be maintained until all current participants have been transitioned to an alternate communications protocol by the end of an agreed transition period. Once all current participants have migrated off the legacy GENCOs, decommissioning the Transpower legacy system components is estimated to cost $100k. The estimated decommissioning cost will need to be validated during the Initiate stage.
- Migration of current dispatch participants to alternate communications protocols or connecting to potential new participants. While the transition period is to be determined during the project, actual transitioning of participants will occur after the project is completed.

- Implementation of new dispatch functionality to current and potential new dispatch participants.
- Review of the regulatory framework (e.g. the Code, the Policy Statement, Procurement Plan and other incorporated documents) in light of the dispatch information changes. This review will be undertaken in parallel to the implementation of the project.

6.3 PROJECT ASSUMPTIONS AND CONSTRAINTS

The main project assumptions and constraints identified include:

- Amendments to the Information System Definition Document are required.
- Review and amendment of Part 13 of the Code in relation to dispatch information and dispatch instructions occurs in alignment with project timeframes.
- There will be no significant changes to the stakeholder requirements document.
- It is expected there are no significant changes required to the existing dispatch process itself (e.g. schedules), and existing interfaces to downstream systems should remain unchanged (i.e. NZX/XGW/GSS dispatch publication).
- The project will continue the engagement with market participants through the development of e.g. the solution requirements during the Initiation stage, and the project team will develop a communications plan for on-going engagement.
- A Proof of Concept will validate the transition process, which will be documented in the transition process guide.

7. PROJECT FUNDING AND TIMELINES

7.1 PROJECT FUNDING

The EDF Enhancement Project is a Transpower initiated project, and is included in the System Operator Capex Plan. The Project is categorised as a service enhancement project under the SO Service Provider Agreement (SOSPA). For a service enhancement project, Transpower seeks investment funding through the Authority's appropriation consultation process.

Funding will be met under the SOSPA service enhancement project fee following commissioning. The recovery fee is estimated at $4.994M over a period of 5 years after commissioning.

The capital revenue per year[4] is estimated as follows:

(all values in $M)	18/19	19/20	20/21	21/22	22/23	23/24	Total
Estimated Capex revenue per year.	0.333	0.999	0.999	0.999	0.999	0.666	**4.994**

7.2 PROJECT TIMELINES

On the basis that this investment gains appropriation funding approval, it is expected the project to commence in business year 2017/18.

The solution requirements and high level design approval are expected to be completed 4 months and 8 months respectively after project commencement. For more details on the expected timelines refer to the table below:

Milestone	Timeline expected to be achieved
Appropriation Approval to Proceed	May 2017
Commence Detailed Investigation (Initiation stage)	Business Year 2017/18
Solution Requirements approved	4 months from project start
High level Design Approved	8 months from project start
Delivery Business Case approved	9 months from project start
Estimated commissioning completed	Business Year 2018/19
Estimated project completed	Business Year 2018/19

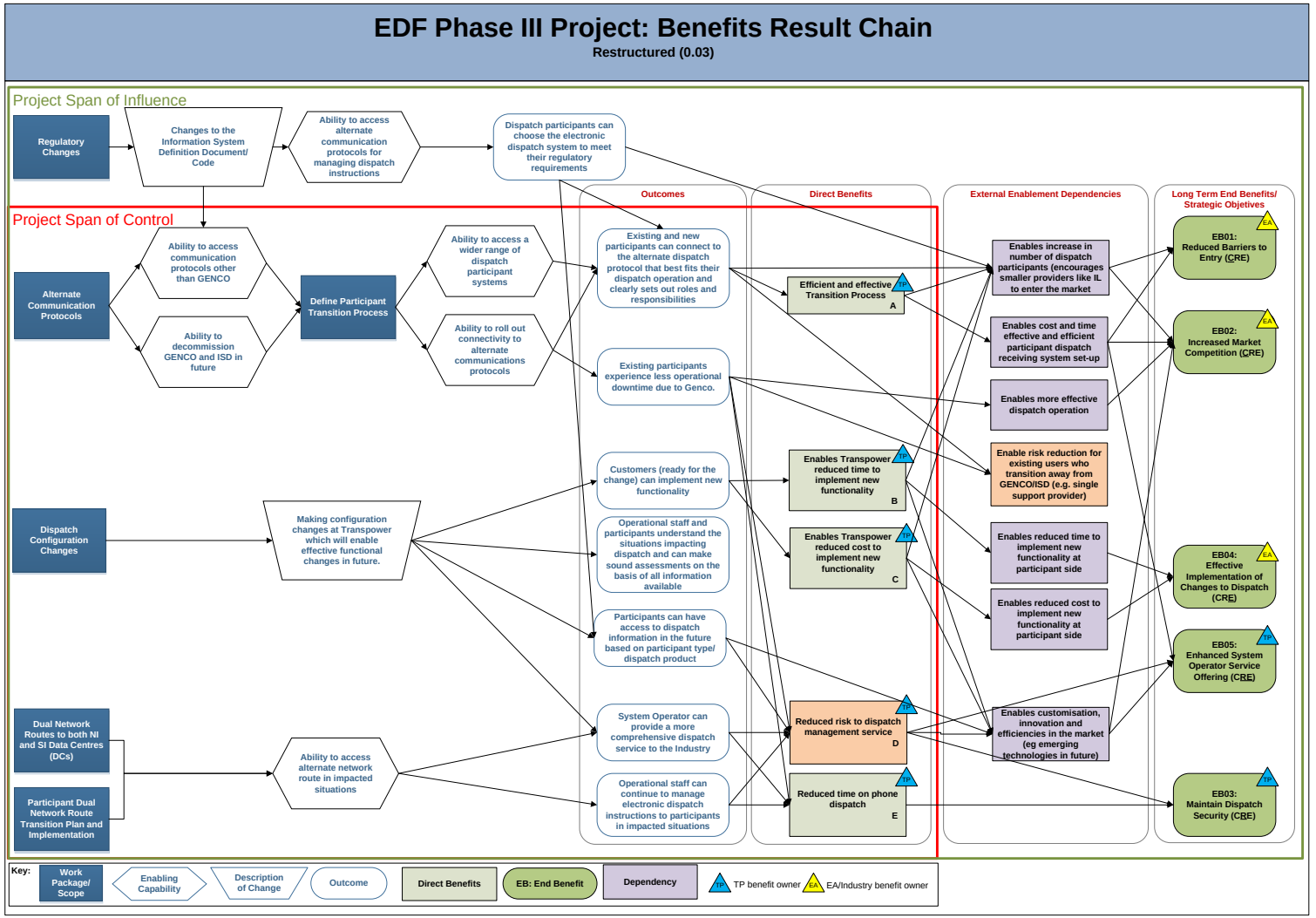
[4] It is noted this is an estimate only, and the capital revenue will be incurred on the basis of the actual cost of implementation at the time of commissioning.

8. REGULATORY FRAMEWORK

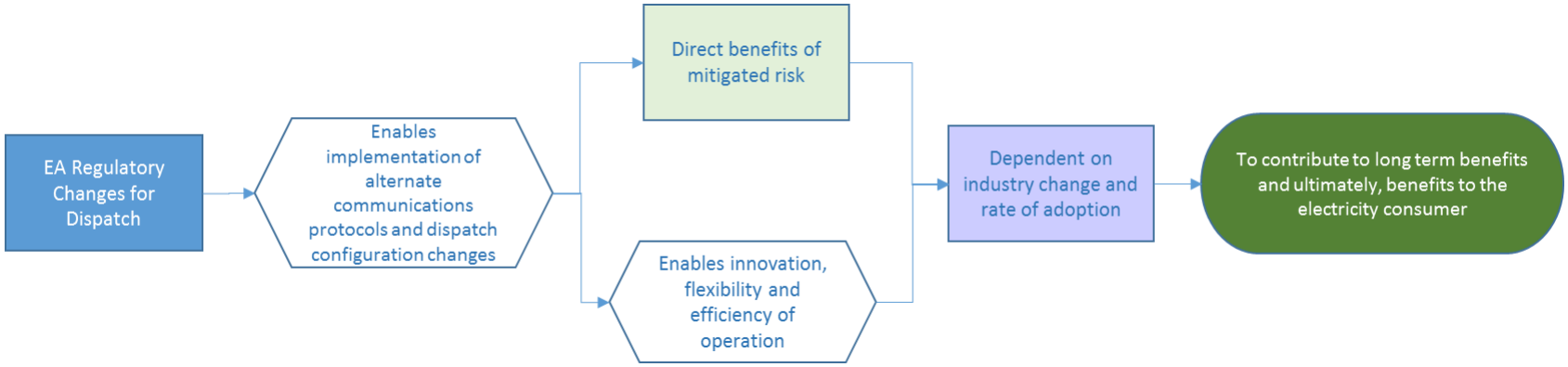
8.1 PROPOSED REGULATORY CHANGES

To enable the implementation of the EDF Enhancement Project, changes are required to the Regulatory framework. The changes proposed include a number of changes to the dispatch process, with the objectives of enabling new dispatch participants and products, delivered using new communications protocols. Refer to Appendix 3 for more information on the proposed changes to the Regulatory framework.

APPENDIX 1 – BENEFITS RESULT CHAIN



APPENDIX 2 – HIGH LEVEL BENEFITS MODEL



APPENDIX 3 – PROPOSED REGULATORY FRAMEWORK CHANGES

The dispatch process is regulated in Part 13 subpart 2 of the Code, with reference to the Information System Definition.

The regulations as they exist today predate the modern communications technologies the EDF Enhancement Project hopes to leverage. The regulations were developed around the prevailing technology of the era which has been superseded by development of the internet and other communications protocols such as ICCP. Advances in this field allow for communications and control systems to cost-effectively utilise more information and at a more granular scale than previously anticipated. Consequently, in order to capitalise on these developments and allow for greater participation in the wholesale electricity market, it is proposed to amend the Code.

The principles governing this proposal are:

- Removing technological barriers to participation in the dispatch process, thereby reducing the cost to participants
- Anticipating a wider range of dispatch participants (beyond generators and ancillary service providers)
- Anticipating an increase in the amount and diversity of information the dispatch process could provide.

The dispatch process in regulation

Figure 2 below describes the functional dispatch process with references to the relevant Code clauses and incorporated documents. With respect to implementation of the changes proposed by this project, the colour coding indicates the extent of proposed amendments; green shows little to no amendment required, orange shows review required, and red shows thorough review required.

The changes could be described in four phases as follows:

- **Information System Definition** – defines the information system to be used where the Code refers to 'publish', 'notify' and other information-transfer imperatives. In places where "GENCO" has been used, this would be updated to reflect a diversity of communications protocols and a retirement date for using GENCO.
- **Update Acknowledgement Rules (cl 13.79)** – current rules stipulate that generators must acknowledge receipt of instructions within four minutes (and endeavour to do so within three minutes). Some generators directly incorporate dispatch instructions received by GENCO into their generator control systems. In this case, automatic (system) acknowledgement is sufficient without having to observe the manual (process) acknowledgement rules. However, if we are to rely on automatic acknowledgement then connectivity to the participant must be ensured. Regulating that dispatch systems must, for example, have equivalent technical requirements as those currently specified in Part 8, Technical Code C for indications systems would ensure the dispatch process functions correctly. This may not be an onerous requirement if ICCP is developed as a dispatch communications protocol, which a number of participants already utilise.

With the introduction of new dispatch participants and products, it might be expected that acknowledgement is not required for some dispatch instructions. The Code might therefore be amended to reflect acknowledgement is required at the discretion of the system operator.

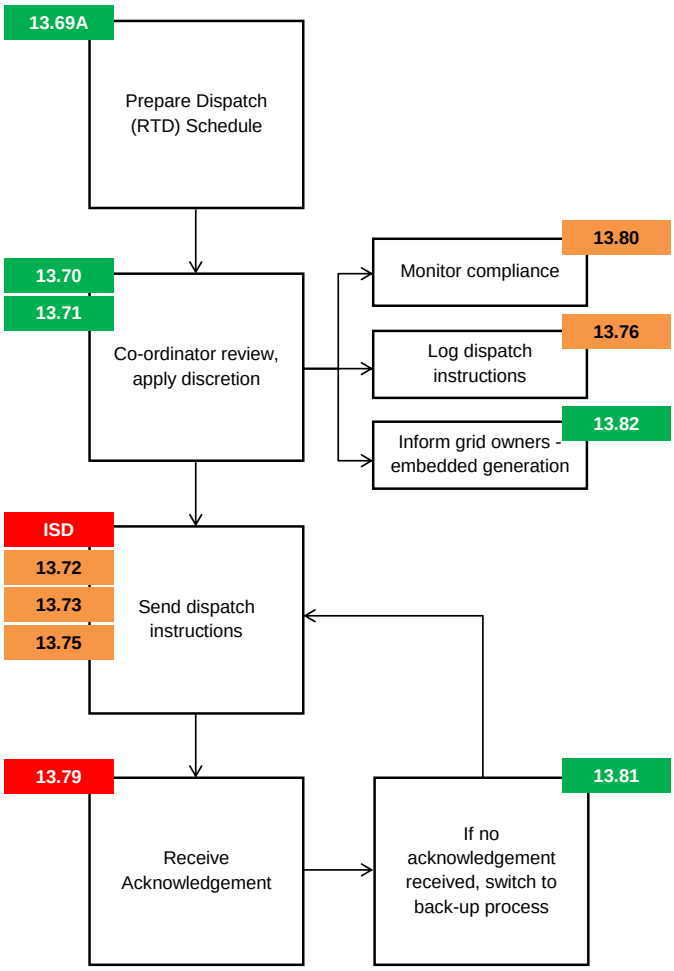


Figure 2 – Representation of dispatch process with guiding Code clauses and incorporated documents

- **Rationalise other Code clauses (orange boxes)** – the clauses describing the form, content and other qualities of dispatch instructions should be updated to reflect the potential for new dispatch products and participants. As an example, a dispatch product not currently defined in the Code but might be expected to result from the EDF Enhancement Project is an instruction to distributor to shed or restore load.
- **Review incorporated documents and procedures** – It is expected that the Policy Statement, Procurement Plan and other incorporated documents would require review in light of these changes, as well as internal system operator procedures. This would be especially important if the system operator was granted discretion to determine acknowledgement requirements on the basis of dispatch product or by stipulating dispatch requirements based on types of participants. Some if not all of this work could be captured by existing regulation review processes.