

# Project Justification - Power of Choice - Demand Response Mechanism

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|---------------|---|
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| Owner         | Basile Sepsakos                           |
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## Document Control

### Change History

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| 1.0     | 16 March 2015    | Tony Chenco | Issued                                |
| 2.0     | 17 December 2015 | Tony Chenco | Updated to support EDPR re-submission |

Note: Printed copies of this document are uncontrolled.

## Document Review

This document has been reviewed by the following parties prior to approval:

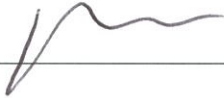
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|-------------|--------------------------|------------|
| Rodney Bray | Network Planning Manager | 15/12/2015 |
|-------------|--------------------------|------------|


## Document Approval

Approval of the Project Justification for the Power of Choice - Demand Response Mechanism project is provided by the signatories shown below.

Changes to this document will be coordinated and approved by the undersigned or their designated representatives via project change management.

The undersigned acknowledge they have reviewed and approved this document.

| Approver Name  | Approver Title / Role                            |
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| ITEF                             | IT Executive Forum    |
| Approved by ITEF - Refer Minutes | Date: December 2015   |

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## 1. Project Description

and to unbundle the provision of ancillary services from the purchase and sale of electricity. The change request is in response to the Power of Choice review by introducing a mechanism for the following:

- Allow the demand side to participate in the wholesale spot market without requiring customers to become wholesale market participants; and
- Introduce a new class of market participants, demand response aggregators (DRAs), who would self-schedule customer's demand response in the wholesale spot market.

On 5 November 2015, the AEMC issue a consultation paper for National Electricity Amendment (Demand Response Mechanism and Ancillary Services Unbundling) Rule 2015. The consultation seeks stakeholder feedback on both:

- Issues that need to be considered in assessing the COAG proposed rule change; and
- AEMO's detailed design proposal published on November 2013<sup>1</sup>.

The Demand Response Mechanism project provides the capabilities to support the planned rule changes, in particular introduction of a market-led demand response mechanism through Demand Response Aggregators (DRAs). The project will include implementation of the necessary market transactions to enable United Energy to be aware of consumers who are engaged in demand response and receive prior notification when demand response occurs on the United Energy network.

COAG considers that this rule will result in more reliable supply to consumers. COAG expects that customers with a demand response capability in the spot market might be more able to participate in network demand response programs, putting downward pressure on network charges.

## 2. Objectives/Purpose

The purpose of the Demand Response Mechanism project is to support the introduction of DRAs as a new class of market participants and enable United Energy to effectively operate its distribution network during a market-led demand management event.

This project will implement processes and system capabilities to support the following:

- Interactions between United Energy and DRAs acting as agent for United Energy customers;
- Identification of customers who are participating in market-led demand response management; and
- Handling of information provided to United Energy prior to and during a demand response event to support its distribution network operations.

This project will leverage the capabilities that will be implemented by PJ26 – Demand Management IT Platform.

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<sup>1</sup> AEMO Demand Response Mechanism and Ancillary Services Unbundling – Detailed Design, 15 November 2013

The AEMO detailed design documentation covers the registration process, MSATS setup, metering, B2B processes, demand response data for settlement, notification of events etc.

### 3. Strategic Alignment

#### 3.1. National Electricity Rules Expenditure Objectives Alignment

This project will be implemented in line with NER Expenditure objectives.

| Capital Expenditure Objectives   | UE Alignment with Objective  |
|--|--|
| Meet or manage demand for SCS  | This project is required to comply with planned changes to National Electricity Rules for the implementation of the demand response mechanism.<br><br>In addition to meeting proposed regulatory rule changes, the project supports our obligations to meet and manage demand on our network by ensuring United Energy remains informed of DRAs activities on our network. |
| Comply with all applicable regulatory obligations or requirements  | This project will enable United Energy to comply with the final rule changes and DRM procedures expected to be finalised on 24 Jan 2017 and 14 Aug 2017 <sup>2</sup> .   |
| Where no applicable regulatory obligations or requirements exist, maintain quality, reliability and security of supply | In addition to compliance, the changes to United Energy systems support its obligations to maintain quality, reliability and security of supply by responding appropriately to load changes initiated by DRAs.   |
| Maintain safety of the distribution system   | Criterion does not apply to this project.  |

The recommended option for delivering this initiative has been assessed against the NER's capital expenditure criteria.

| Capital Expenditure Criteria               | Justification   |
|--|---|
| Efficient cost of achieving the objectives | In determining the proposed solution United Energy considered whether manual solution would be feasible. As it is expected that DRAs will be operating to the AEMO Spot Market Operations Timetable it is considered that automatic messaging will be required to ensure United Energy is kept informed of changes to network load. Estimates are based on extending United Energy's existing messaging infrastructure to support the new function at an incremental cost only. |

<sup>2</sup> AEMO, Power of Choice Program Overview, High level program v2.1, 20 Nov 2015



| Capital Expenditure Criteria   | Justification  |
|--|--|
| Realistic expectation of demand and cost inputs required to achieve the objectives | <p>It is expected that the DRAs will target less than 1% of United Energy's customers. Software and hardware estimates are based on commensurately low transaction rates. Although transaction rates are low, the real time nature of transactions will require a degree of automation.</p> <p>Whilst the rule is focussed on large customer participation initially, small customers may participate in future.</p> |

### 3.2. UE Strategic Themes Alignment

The primary justification for the Demand Response Mechanism project is to meet United Energy's regulatory obligations for the introduction of the Power of Choice reforms. In addition this project:

- Delivers new capabilities to meet changing customer expectations by giving consumers greater control over the way they use electricity and may contribute to a more efficient distribution network investment that results in lower prices for consumers.
- Improves efficiency of asset management through peak reduction and higher asset utilisation which may avoid or defer network augmentation.

## 4. Options

The following options have been considered to implement the Power of Choice – Demand Response Mechanism project:

### 4.1. Option 0: Do Nothing

Adopting the “Do Nothing” option would result in United Energy not changing its systems and processes to meet requirements of the AEMC new rules and procedures. Under this scenario, United Energy would not meet its obligations to participate in the National Electricity Market and would not be aware of the actions of demand response aggregators operating on the United Energy network with implications for network operations.

## 4.2. Option 1: Modify Existing Systems

United Energy's existing customer, market and metering systems were recently implemented and modified to support the requirements of the Victorian AMI roll out. Due to similarity of requirements, these systems could be potentially further modified to support the DRM.

## 4.3. Option 2: Implement New Systems

The new systems options would involve the development of new systems that would need to be integrated with United Energy's customer, market and metering systems. It is envisaged that this project would be significantly larger and more costly than modifying existing systems. Cloud based providers could be considered in this evaluation.

## 5. Economic Evaluation

The Economic Evaluation table below is the result from the "Business Case Output" from the "Financial Evaluation Spreadsheet Version 1.3". This is UE's Capital Project Evaluation tool. The tool comes with standard parameters and these are protected and cannot be altered.

The tool ranks the project based on Least Cost (Net Present Value). The least cost project will have a Project Ranking of 1.

|                          | "Status Quo"<br>Reference Case | Option 1:<br>Modify Existing Systems | Option 2:<br>Implement New Systems |
|--------------------------|--------------------------------|--------------------------------------|------------------------------------|
| Net Capex (\$)           | \$0                            | \$1,790,000                          | \$3,222,000                        |
| Opex (\$)                | \$0                            | \$0                                  | \$2,845,914                        |
| STPIS (\$)               | \$0                            | \$0                                  | \$0                                |
| Loss of F Factor Benefit | \$0                            | \$0                                  | \$0                                |
| Risk*** (\$)             | \$0                            | \$0                                  | \$0                                |
| Least Net Cost (\$) (PV) |                                | \$1,790,000                          | \$6,067,914                        |

|                        |  |   |   |
|------------------------|--|---|---|
| <b>Project Ranking</b> |  | 1 | 2 |
|------------------------|--|---|---|





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## 5.1. Economic Evaluation Recommendation

## 5.2. Benefits Summary

The Demand Response Mechanism project provides a component of the Power of Choice reforms. These reforms are expected to improve the efficiency of network investment that will ultimately result in lower prices for consumers than would otherwise be the case.

## 6. Proposed Solution

It is proposed to select Option 1, Modify Existing Systems, to provide the enabling technology to support the Power of Choice reforms. Option 1 is considered to be the least cost and lowest risk solution that provides the necessary capabilities.

Option 0 was not selected as this option does not meet the requirements and would result in United Energy being unable to fully participate in the National Electricity Market. United Energy is obliged under its licence to adhere to the National Electricity Rules. It is considered that selecting this option may place United Energy's licence at risk. It is also considered that introducing the demand response mechanism without automated solutions may result in inefficient investment decisions and sub optimal network operations. Demand response will require near real time processing of transactions that will be difficult to manage manually. Without implementing capabilities to register a DRA relationship on a NMI United Energy would have no capability to receive notifications that the demand response may be called and the network control room would have no advance notice of load shifting with implications for network quality and reliability.

Option 2 was not selected as this is expected to be a higher cost and higher risk than Option 1. The proposed capabilities required are similar to those implemented for the Victorian AMI program therefore it is expected that existing systems could be modified to support the new capabilities at a lower cost than development and integration of new systems. Cloud solutions are not available to meet the specialised functional and integration requirements.

### 6.1. Requirements

The current status of rule changes for the Demand Response Mechanism is:

- AEMO completed a detailed market design on 18 November 2013 and a detailed design on 17 November 2013;
- COAG Energy Council submitted a rule change request on 30 March 2015;
- AEMC issued a consultation paper on 5 November 2015; and
- Rule change is expected to commence December 2018.

This project is to meet the following requirements:

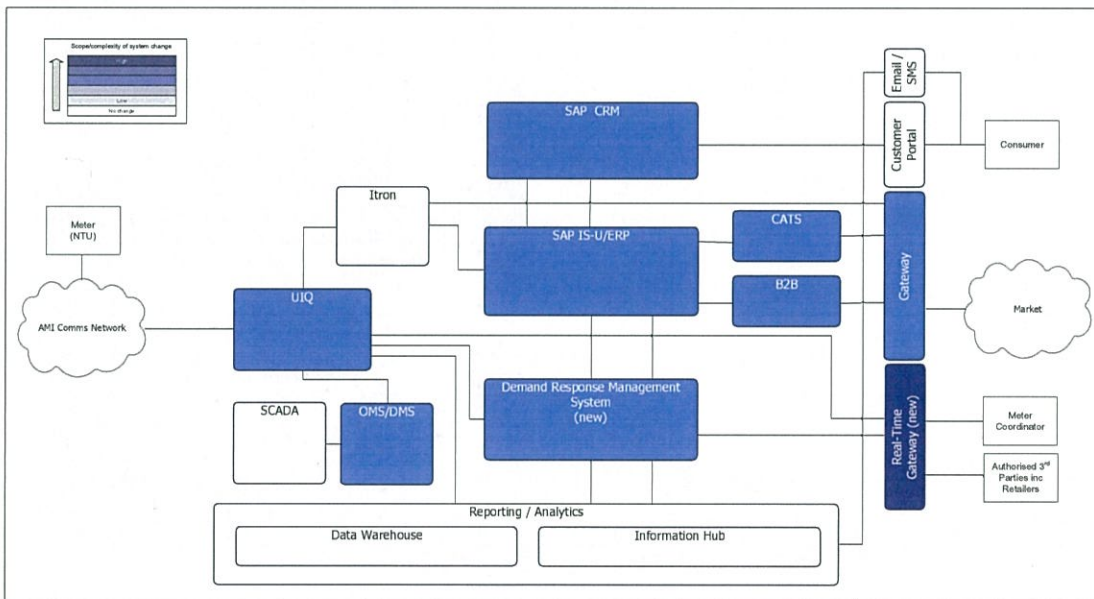
- Support the introduction of Demand Response Aggregator (DRA) role in the NEM.
- Enable consumers (NMIs) who participate in demand-side reduction programs to be associated with a DRA and register the DR mechanism utilised for each NMI (e.g. electricity generation, plant shutdown, demand shifting etc.).
- Establish capability to receive market transactions to create, update and delete associations of NMIs to DRAs.
- Establish a capability to receive notifications of demand response events and record these events and provide them to network operations. Support transactions for DRA load control including appropriate network business approval process.
- Develop processes to assess possible demand response and network impacts and escalation of any concerns.
- Provide reports on demand response activity.

connected to their network are providing demand response.

## 6.2. Solution Overview

The proposed solution leverages United Energy’s existing customer, market and metering systems. The introduction of the new DRA role will require changes to United Energy’s Customer (SAP ISU) and Meter Data (Itron) systems. New market transactions will be implemented using WebMethods A2A and B2B infrastructure and will require changes to SAP (ISU).

Details of demand response events will need to be recorded in the data warehouse and sent to the existing DMS system to inform Network Operations.



## 6.3. Assumptions

The solution proposal assumes the following.

- Detailed requirements which impact United Energy are largely in line with the AEMO detailed design documentation. It has been assumed that, based on currently known requirements, the capabilities for establishing the Demand Response Mechanism can be delivered with existing applications and the implementation of a new Demand Management Platform. Refer to PJ26 for details of this project).



- Initially, DRM will be available to industrial and commercial, but not residential, loads with annual consumption of the order of 100 MWh per year. Volumes of consumers are expected to be initially low but grow substantially during the next EDPR period. United Energy expects that AEMC will amend the NER in a manner that does not preclude any customer from accessing this wholesale demand response mechanism.
- This project justification assumes that United Energy will not be a DRA.

### 6.4. Systems Impacted

The following table identifies the systems impacted.

| System                          | Processes  | Impact  |
|---------------------------------|--|---|
| Customer Engagement             | Handling of consumer information participating in demand management. | Record and maintain information of consumers / connection points that are participating in demand management through DRA - both those in load curtailment and generation.                                 |
| Real-time gateway               | Handling notifications during a market-led event                     | Handling of notifications during a market-led demand response event. This is anticipated to be real or near real time. This information will be one of the inputs for the distribution network operation. |
| Demand Management Platform      | Real-time management of DR and load control                          | Load management during a demand response event.   |
| Distribution Network Management | Network operation  | Use demand response event notifications as input in operating the network.  |
| Connection Point Management     | Connection Point   | Introduction of DRA against the connection point. Handling of transactions from DRAs during an event.   |
| Market Apps                     | Transactions Management  | Handling of transactions to and from DRAs such as DRA churn.  |
| E2E                             | Integration, E2E/ Bilateral testing                                  | Extensive testing required to support DRA introduction and the handling of notifications during demand response events.   |
| Infrastructure                  | N/A  | Implementation and testing of infrastructure to support near or real-time notifications during demand response events.  |

|           |     |     |      |         |
|-----------|-----|-----|------|---------|
| No change | Low | Med | High | V. High |
|-----------|-----|-----|------|---------|

## 6.5. Project Plan

by 14 August 2017. The change is expected to take effect on 13 December 2018.

It is planned that the project delivery will be governed by United Energy's Project Delivery Framework and that integration services will be competitively procured from United Energy's IT Systems Integration panel.

## 7. Outputs

The project will deliver the following:

- Changes to systems and processes that enable United Energy to meet its market obligations in delivering the demand response mechanism for Power of choice reforms.
- Training and process development to support the new Rules.
- Testing of system and process changes with AEMO and other market participants.

## 8. Project Capital Costs

| Cost Category                   | Amount (A\$)   | Source / Explanation  |
|---------------------------------|----------------|---|
| Labour                          | \$ 1.5M        | Labour includes resources required for the full project implementation. It includes resources to carry out the complete system development and requisite Business and IT change management initiatives. |
| Hardware (application specific) | \$ 0.08M       | Assume that minimal additional hardware is required.  |
| Software                        | \$ 0.10M       | Assume existing systems to be modified to meet new requirements – only minimal additional software required   |
| Security                        | \$ 0.01M       | Assume existing security of market systems is adequate – minimal change only  |
| PMO                             | \$ 0.11M       | Program Management Office and IT Capital Overheads  |
| <b>TOTAL</b>                    | <b>\$ 1.8M</b> |   |

Estimates are based on assessment of impacts on systems to be modified to meet the required functionality. Requirements for the estimates are derived from the AEMC Power of Choice review.

## 9. Operating Cost Impact

As this project does not introduce new systems, it is not expected to have a material impact on IT operational cost. It is expected that additional market transactions may result in some additional business cost.

## 10. Risks and Opportunities

| Risk                                   | Cause  | Impact  |
|--|--|---|
| Failure to deliver required capability | <ul style="list-style-type: none"><li>• Requirements not well defined or understood.</li><li>• Project scope not well understood.</li><li>• Poor project delivery methodology</li><li>• Project team skills not appropriate to task.</li></ul> | <ul style="list-style-type: none"><li>• Benefits to consumers not realised.</li><li>• United Energy's reputation diminished.</li><li>• Potential market disruption.</li><li>• Additional cost</li></ul> |



## Appendices

The table below lists the high level requirements for this project.

| Req't ID   | Description  |
|------------|--|
| PJ18-01    | <b>Support the introduction of Demand Response Aggregator (DRA) role in the NEM. UE will interact with these participants in relation to demand management.</b>                    |
| PJ18-01.01 | <ul style="list-style-type: none"> <li>Capture and maintain information of DRAs</li> </ul>   |
| PJ18-01.02 | <ul style="list-style-type: none"> <li>Capture and maintain consumers (NMIs) that are associated with a DRA.</li> </ul>  |
| PJ18-01.03 | <ul style="list-style-type: none"> <li>Capture and maintain the DR mechanism utilised for each NMI (e.g. electricity generation, plant shutdown, demand shifting etc.).</li> </ul> |
| PJ18-02    | <b>Receive and record notifications of a consumer's response to a DR event through a DRA.</b>  |
| PJ18-03    | <b>Provide the relevant meter data to a DRA for a NMI that is associated with the DRA.</b>   |
| PJ18-06    | <b>Produce reports to show the relationship between NMIs and DRAs</b>  |
| PJ18-07    | <b>Support the option of charging DRAs for the provision of meter data (when requests are out of the norm). This can either be per NMI or per request.</b>                         |
| PJ18-08    | <b>Receive and record notification of a DR event through a DRA.</b>  |
| PJ18-09    | <b>Define a process for responding to events initiated by the DRA.</b>   |

## Appendix B – Process Impacts

The following United Energy processes will be impacted by this project.

| ID       | Description  | Notes       |
|----------|--|-------------|
| PJ18-P01 | Define new process using notifications received from DRA for the purpose of Network Operation. | New Process |
| PJ18-P02 | New task to capture and maintain information related to DRA and associated NMI's               | New Process |
| PJ18-P03 | Handling of B2B transactions from DRAs   | New Process |

[Power of choice review – giving consumers options in the way they use electricity](http://www.aemc.gov.au/getattachment/2b566f4a-3c27-4b9d-9ddb-1652a691d469/Final-report.aspx)

<http://www.aemc.gov.au/getattachment/2b566f4a-3c27-4b9d-9ddb-1652a691d469/Final-report.aspx>

Demand Response Mechanism

- Detailed Design
- High Level Market Design
- Baseline Consumption Methodology

<http://www.aemo.com.au/Electricity/Market-Operations/Demand-Response-Mechanism>

Demand Response Mechanism – Rule Change Request - 25-Mar-2015

<http://aemc.gov.au/getattachment/f08117ee-0f76-47b5-a3b1-35a580119095/Demand-Response-Mechanism-rule-change-request.aspx>

Demand Response Mechanism and Ancillary Services Unbundling – Consultation Paper - 5-Nov-2015

<http://aemc.gov.au/getattachment/fd12b92a-42ba-420f-8a5f-2b123ea38901/Consultation-paper.aspx>

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