APEC Concept Note

Please submit through APEC Secretariat Program Director. Concept notes of more than 3 pages (including title page) or incomplete submissions will not be considered.

Project Title:	Christchurch Smart Energy Grids: Earthquake Recovery Project
Source of funds *(Select one):* ☒ Operational Account ☐ TILF Special Account ☐ APEC Support Fund	
Committee / WG / Sub-fora / Task-force:	Energy Working Group / Joint proposal from the Expert Group on New & Renewable Energy Technologies and Expert Group on Energy Efficiency and Conservation
Proposing APEC economy:	New Zealand
Co-sponsoring economies:	The United States of America, Thailand, Chinese Taipei
Expected start date:	April 2012
Expected completion date:	October 2012
Project summary: **Describe the project in under 150 words. Your summary should include the project topic, planned activities, timing and location:** *(Summary must be no longer than the box provided. Cover sheet must fit on one page)*	Christchurch, New Zealand has been hit by a series of earthquakes in 2010 and 2011. The recovery process offers a unique opportunity for Christchurch to become a leading example of efficient and renewable urban energy systems, and sustainable disaster recovery. As part of the Christchurch recovery, the New Zealand Energy Efficiency and Conservation Authority (EECA) proposes to lead a project to prepare a 'road map' for developing a 'smart electricity grid' that will deliver the maximum social, environmental and economic benefits to the city. Smart grids incorporate a wide range of technologies and practices to make the operation of electric power systems more efficient, facilitate more efficient energy use in buildings and industry, and enable the greater penetration of intermittent renewable power sources. The recovery of Christchurch represents an opportunity to further the APEC Smart Grid Initiative (ASGI) and will provide learning and demonstration value to the APEC Community.
Total cost of proposal: ***(****APEC funding + self-funding [DES study])* ***USD*** 355,000	**Total amount being sought from APEC (USD):** 90,000 ***By category:*** *Travel:* N/A *Labour costs:* 90,000 *Hosting:* *Publication & distribution:* *Other:*

Project Proponent Information and Declaration:
Name: Tim Taylor

Title: Christchurch Recovery Programme Coordinator

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I declare that this submission has been prepared in line with the **Guidebook on APEC Projects**. If approved, I agree to develop the project in line with APEC project requirements.

Name of Project Proponent: Tim Taylor

Date: 15 December 2011

Project Synopsis

1. **Relevance:**

The Fukui Declaration from the Ninth Energy Ministers Meeting (EMM-9) in June 2010, states that "smart grid technologies... can help to integrate intermittent renewable power sources and building control systems that let businesses and consumers use energy more efficiently, and they can also help to enhance the reliability of electricity supply, extend the useful life of power system components, and reduce system operating costs."

As directed through EMM-9, the APEC Energy Working Group has started an APEC Smart Grid Initiative (ASGI) to evaluate the potential of smart grids to support the integration of intermittent renewable energies and energy management approaches in buildings and industry.

Establishing a 'Road Map' for the establishment of smart grid systems as part of the recovery of Christchurch City will be a relevant contribution to Phases 2 ('Smart Grid Roadmap') and 3 ('Smart Grid Test Beds') of the APEC Smart Grid Initiative (ASGI). As such, this project will draw on the findings of the Phase 1 Projects: *Using Smart Grids to Enhance the Use of Energy Efficiency and Renewable Energy Technologies* (EWG 01/2009S) and *Addressing Grid-interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Sources* (EWG 02/2009).

Sitting as they do around the Pacific 'ring of fire', APEC member economies are well acquainted with earthquakes and natural disasters. Christchurch can become a leading example of efficient and renewable energy systems through the recovery process and become a model example of sustainable disaster recovery for the region.

This project also links to the Energy Smart Communities Initiative (ESCI) established under the Energy Working Group in November 2010. 'Smart grids' is one of the four 'pillars' of this initiative.

This smart electricity grid study will accompany the self-funded feasibility study into the viability of establishing a smart heating and cooling District Energy Scheme in Christchurch. This study is already underway, with combined funding of $265,000 USD equivalent, provided by EECA and the Christchurch Agency for Energy. The two initiatives combined will make up the *Christchurch Smart Energy Grids: Earthquake Recovery Project.*

2. **Objectives:**

The objective of this project is to develop a 'road map' for developing a 'smart electricity grid' in Christchurch that will deliver the maximum social, environmental and economic benefits to the city.

The output from this project will be a road map that details practical steps to be taken towards establishing a smart electricity grid in a rebuilt Christchurch City. This road map will identify:

- How microgrids can improve grid reliability, recovery, and restoration
- Technologies recommended to be installed in new buildings to optimise efficiency and renewable generation
- Requirements for systems to be put in place by the electricity distributor and retailing companies
- Regulatory needs and steps to be taken

3. **Alignment:**

This project aligns with the APEC Leaders' Growth Strategy principles of sustainable green growth and innovative growth by promoting investment, trade, and deployment of low-carbon technologies, as reinforced in the 2011 Leaders *Honolulu Declaration*.

The project also responds to the aforementioned statement from APEC Energy Ministers on smart grid technologies under in the 2010 Fukui Declaration on Low Carbon Paths to Energy Security, their instructions to establish the ASGI.

APEC economies face significant risks from natural hazards, and an example of sustainable disaster recovery in Christchurch will be of immense value to the region.

4. **Methodology:**

Method:
The project will be undertaken in the following steps:

- Tender for contractors to undertake the study
- Identify the optimal technical options available based on the *Using Smart Grids to Enhance the Use of Energy Efficiency and Renewable Energy Technologies* (EWG 01/2009S) Project, with a special focus on the need for consistent integration of technologies.
- Establish an evaluation framework that will be used to compare the projected social, environmental and economic benefits of different technology and implementation options.
- Investigate the importance of 'smart buildings' in optimising a smart grid – primarily through the use of effective Building Management Systems; and microgrids as a practice to improve grid reliability, recovery, and restoration.
- Consult and collaborate with key stakeholders, especially the local electricity distributor and retailers, and the commercial building development community.
- Evaluate technology, investment, market development and regulatory options for smart grid development
- Produce recommended action plan as a Christchurch Smart Electricity Grid Road Map

Timeline:
The project will be carried out over 2012 commencing in April. As the rebuild will gather pace in 2012, timing is key and this study will need to produce a practical outcome as quickly as possible to maximise the opportunity for consistent technology integration in the rebuild.

- April – May: Tender Process
- June – August: Conduct study as outlined above
- September: Develop and finalise Road Map.

Stakeholders:
Within APEC economies, stakeholders will be people working on smart grid issues in the public sector (including at the local government level) and the energy sector in APEC economies. APEC stakeholders will be the members of the ESCI Action Network and the Energy Working Group.

EECA is already working closely with a range of local stakeholders in Christchurch, New Zealand through the EECA's Christchurch Recovery Programme. Key stakeholders are the people of Christchurch, the Canterbury Earthquake Recovery Authority, Christchurch City Council, Ngāi Tahu (the local indigenous people) and the Christchurch Agency for Energy.

Important local stakeholders for this project will also be the local electricity distributor 'Orion', Transpower NZ, the Electricity Authority, the Commerce Commission, building developers, local electricity retailers, and international producers of smart grid technology and expertise.

Previous projects/activities:
Phase 1 ASGI Projects will inform this project: *Using Smart Grids to Enhance the Use of Energy Efficiency and Renewable Energy Technologies* and *Addressing Grid-interconnection Issues in Order to Maximize the Utilization of New and Renewable Energy Sources*.

This project also fits well with the EWG 11 2011 project on EV connectivity currently led by EECA, given the close association of electric mobility with smart grid development.

Communication:
The Christchurch Smart Electricity Grid Road Map will be shared through the distribution networks available through the EGNRET, the EWG, the ESCI, and the ASGI, as well as being made available on the APEC website. As the rebuilding of Christchurch progresses, the city would become a model to the international community for the integrated and strategic establishment of smart grid systems.

The Road Map will be used locally to communicate the potential to establish a Smart Grid system in Christchurch, and to facilitate its implementation.