

Inner Melbourne Action Plan
Progress Report
Action 9.4 Green Demonstration Projects

Purpose

1. To update the Committee on the progress of new Action 9.4 Green Demonstration projects (Distributed Energy Project).

Background

2. Action 9.4 consists of 3 parts:
 - a) Water Sensitive Cities
 - b) Green Roof Project
 - c) Distributed Energy project

The Distributed Energy Project is being led by the City of Melbourne. Work has been undertaken with the CSIRO to develop an Inner Melbourne 'Energy Map' project.

3. The project will identify opportunities for:
 - a. Distributed generation, including district energy systems, renewable and low-carbon energy generation, and
 - b. Energy efficiency initiatives and demand management initiatives.
 - c. Economics will also be considered to assess the costs and benefits of distributed generation and energy efficiency initiatives compared to up-stream purchase of renewable energy through the grid.
4. The study will require data input from the four councils. This may include rates data, planning scheme information and statistical data. Work has commenced to ascertain the availability and commonality of data for the purposes of the study.

Discussion

Funding

5. Funding through IMAP has been budgetted as follows:

2010/11	\$45K from accumulated IMAP funds [\$11K per Council – already paid]
2011/12	\$55K from the IMAP Councils [\$13.75K per Council – already paid]
2012/13	\$80K from the IMAP Councils [\$20K per Council]
6. An application for State Government funds through the Local Government Sustainability Accord was unsuccessful.
7. CSIRO have indicated that the overall budget for the project will be in the order of \$1.1M - \$1.3M however CSIRO are prepared to make a substantial in-kind contribution through the National Research Flagships initiative. CSIRO will seek additional funding to support the project through other channels, including the Federal Government and private research partnerships.
8. Aspects of the project contingent on additional funding include economic modelling and studying the impacts (positive and negative) of distributed generation and energy efficiency on the electricity networks.

Project Timing

9. A final project scope is being finalised with CSIRO. A draft has been attached for reference. **(Refer Attachment)**

10. It is proposed that elements of the findings will be available before the end of 11/12FY. Specifically these include energy demand modelling and identification of energy efficiency opportunities.
11. Progress is dependent upon successful transfer of data from councils to CSIRO for analysis. Data transfer agreements and issues are yet to be resolved. .

Recommendation

12. That the IMAP Implementation Committee resolves to **note** the progress comments provided on Action 9.4. Distributed Energy Project
13. That the IMAP Implementation Committee approve the expenditure of \$180,000 on the project as outlined at 5) above.

*DRAFT ONLY 8 FEB 2012.**FOR INFORMATION AND CONSULTATION WITH IMAP COUNCILS.*

Mapping and modelling opportunities for CO₂e emission reductions across the inner Melbourne councils

Overview

The Inner Melbourne Energy Map (IMAP) study will identify opportunities for pursuing energy efficiency and low carbon distributed generation initiatives in the IMAP region ('the study area'). It will take into consideration distribution network opportunities and constraints, as well as current and future peak demand and energy reduction opportunities. Later stages of the study will also consider the economics of implementing various technologies, the impacts of these on the grid, including economic impacts. This will also provide the basis for comparing the economics of localised distributed generation against purchasing renewable energy generated elsewhere through the grid.

Project Partners	Other Collaborating Parties
<ul style="list-style-type: none">- CSIRO- City of Melbourne- City of Port Phillip- City of Stonnington- City of Yarra- Yarra Energy Foundation	<ul style="list-style-type: none">- SP Ausnet- Jemena- United Energy- CitiPower- AER? Others?

Objectives

1. Identify opportunities for pursuing energy efficiency and low carbon distributed generation initiatives in the study area;
2. Evaluate current and future distribution network opportunities and constraints;
3. Evaluate current and future peak demand and energy reduction opportunities, including those related to planned future developments;
4. Identify substation precincts which are, and are not, suitable for the development or expansion of localised distributed generation;

DRAFT ONLY 8 FEB 2012.

FOR INFORMATION AND CONSULTATION WITH IMAP COUNCILS.

5. Model the economics of implementing various technologies and their impacts on the grid, including economic impacts;
6. Evaluate and compare the economics of distributed generation sited in the study area against those of purchasing renewable energy generated elsewhere;
7. Report on the findings to building owners, developers, network operators and policy makers in a clear and easily understood format including, where appropriate, with GIS interfaces; and,
8. Prototype the methodology for undertaking similar studies elsewhere.

Methodology

- Estimate energy use in residential, commercial and industrial sectors in the study area based on selected building typologies using CSIRO modelling tools;
- Develop a screening tool to evaluate energy efficiency, distributed generation and demand response options for selected building typologies;
- Develop prototype model to estimate the least cost mix of grid power, distributed generation, energy efficiency and demand response measures to achieve emission reduction target accounting for indicative network costs;
- Conduct power systems modelling to determine network impacts of least-cost technology mix (subject to additional funding); and,
- Re-run prototype model to estimate least-cost mix of grid power, distributed generation, energy efficiency and demand response measures to achieve emission reduction target accounting for additional network costs.

Outcomes

It is understood that there are electricity network constraints which prevent the deployment of some distributed generation systems in inner Melbourne.

The study will develop an understanding of the distribution grid and identify opportunities for pursuing distributed generation, energy efficiency and demand response initiatives in the study area. This will be based on energy demand, land use mapping, and analysis of the electricity network.

These findings will be made publicly available and will inform key stakeholders (including businesses, building owners, property developers, councils, government and energy services companies) of the opportunities for greenhouse gas reduction based on specific locations, and the network attributes in those locations. Where appropriate, the findings will be communicated through graphics interfaces.

DRAFT ONLY 8 FEB 2012.

FOR INFORMATION AND CONSULTATION WITH IMAP COUNCILS.

The study will also provide information about optimal locations to pursue energy efficiency and distributed generation projects to take advantage of network constraints and opportunities which may exist.

Deliverables

The deliverables for the project have been grouped into five activities.

Activity 1: Project inception and governance.

1a: Develop stakeholder relationships

1b: Finalise project scope and draft project plan

1c: Reference Group Membership agreed

1d: Data transfer issues between Councils and CSIRO identified and resolved as required

1e: Data transfer agreements between CSIRO and CitiPower agreed and signed

1f: Detailed CSIRO Project Plan finalised

1g: Funding Agreement with CSIRO signed

1h: Report to IMAP Committee

Activity 2: Data gathering and evaluation.

2a: Ongoing end user consultation (CoM/CSIRO): 29/8/11 – 16/3/12

Work with CoM where required to determine interests of external stakeholders and provide context for the work program.

2b: Data gathering – IMAP (IMAP Councils): 3/10/11 – 29/03/12

Assist CoM in gathering data from CoM and other IMAP councils.

2c: Data gathering – electricity networks (CSIRO/Electricity DNSPs): 3/10/11 – 29/03/12

Work with DNSPs to determine what data are readily available in regard to grid topology, network performance, forecast demand and current issues (e.g. fault level tolerance, system voltage profiles etc). Organise exchange of data including security and privacy issues.

2d: Data gathering – gas networks (CSIRO/ Gas DNSPs): 3/10/11 – 29/03/12

Work with DNSPs to determine what data are readily available in regard to forecast growth, system adequacy and current issues. Organise exchange of data including security and privacy issues.

DRAFT ONLY 8 FEB 2012.

FOR INFORMATION AND CONSULTATION WITH IMAP COUNCILS.

2d: Data evaluation (CSIRO): 3/10/11 – 29/03/12

Examine network data to determine current demand loadings. Identify regions of current constraint and excess in supply. Using Smart Meter data (where available) determine profiles of household, commercial and industrial demand. Extrapolate demand profiles to building stock and compare loadings on local substations with actual maxima and higher temporal data where available.

Identify Green and Brownfield locations, estimate growth in demand using estimates from economic modelling, council information and DNSP forecasts.

2e: Report of energy data and building and network stock (CSIRO): 30/1/12 – 29/03/12

Deliver report on data evaluation and present findings to IMAP councils and other relevant parties.

Activity 3: Network opportunities modelling

3a: Undertake energy demand projections (CSIRO/IMAP): 5/12/11 – 17/2/12 (date?)

Work with IMAP councils to identify Green and Brownfield locations. Estimate growth in demand using estimates from economic modelling, council information and DNSP forecasts.

3b: Develop energy demand map (CSIRO): 5/12/11 – 2/3/12 (date?)

Develop in consultation with IMAP councils a GIS interfaced model for demand projections and produce maps identifying building stock type (e.g. residential, commercial, industrial), demand projections on 5 year basis until 2030 (in line with Victorian DNSP determination timelines).

3c: Report on energy demand projections (CSIRO): 30/1/12 – 2/3/12

Deliver report on energy demand projections identifying growth in different end use sectors. Present findings to IMAP councils and other relevant parties.

3d: Develop network opportunities and constraints model (CSIRO): 3/10/11 – 29/6/12

Develop an analytical model that considers network asset replacement and augmentation. The model will identify network and non network (e.g. energy efficiency, demand side response and distributed generation) options for supplying estimated demand.

3e: Develop network opportunities and constraints map (CSIRO): 2/4/12 – 29/6/12

Export outputs from the network opportunities model to GIS for visualisation of areas of constraint and opportunity in time. Showcase an optimal mix of technologies based on a least cost solution.

3f: Report on network opportunities model (CSIRO): 2/4/11 – 29/6/12

Deliver a report detailing the modelling framework and findings from the prototype model.

DRAFT ONLY 8 FEB 2012.

FOR INFORMATION AND CONSULTATION WITH IMAP COUNCILS.

Activity 4: Emissions reduction options

4a: Examine emission reduction options (CSIRO): 7/5/12 – ongoing

Using the network opportunities and constraints model examine potential emission reduction strategies by looking at alternative optimisation constraints e.g. least cost, highest emission saving, preferred fuel type etc.

Activity 5: Reporting

5a: Communications prepared around final report (CSIRO/IMAP): 1/5/12 – ongoing

Work with CoM and other IMAP councils to determine the structure of a final report and communications package. Write a communications strategy and get agreement from project partners.

5b: Final report and communications released (CSIRO/IMAP): 4/6/12 – ongoing

Deliver a final report and present findings consistent with the agreed communications strategy.

IP sharing

It is anticipated that the IMAP councils would own the outputs of the modelling, while CSIRO would retain ownership over its background IP, and any new IP developed through this project that enhances CSIRO's pre-existing modelling and simulation engines used in the project. If and when other investment partners are identified, negotiation of IP ownership is likely.

Governance

A project Steering group comprising funding partners will be established. The Project steering group will be responsible for overseeing the implementation of the project. The project will report on progress towards deliverable milestones to the Steering Group.

An expert technical reference group will be established. The role of the technical advisory group will be primarily to provide technical and strategic advice to ensure that the project direction and findings will be useful and relevant to end users, and that the inputs and to act as a panel to review assumptions and inputs. The reference group will comprise of technical experts and end users of the findings.