Name of the project:
Victoria Harbour Climate Positive experience – Implementing district energy solutions.

Project's objective:
To contribute to Victoria Harbour’s Climate Positive vision by implementing a district energy solution using trigeneration technology that provides low carbon heating, cooling and electricity on site.

Key players (in alphabetical order):
CitiPower – Project Partner. Electricity Distributors who manage the poles, wires and equipment that deliver electricity to homes and businesses in Melbourne.
City of Melbourne – Project Partner. The local Government governing Victoria Harbour. They provided support, knowledge and leadership to the project.
Cofely Australia – Project Partner and Strategic Advisers. Cofely, the local Australian (& New Zealand) subsidiary of GDF SUEZ Energie Services, electricity world leader in energy services and district energy and would have built, owned and operated the district energy solution if the project progressed.
Lend Lease – Project Leader. Developer specializing in project management and construction, real estate investment and development.
Places Victoria – Project Partner. The Government land agency (previously known as VicUrban) with whom Lend Lease is working at Victoria Harbour.
What did we learn?

While the project didn’t progress all the way through to construction and operation, no insurmountable technical barriers emerged during the feasibility investigations. District energy solutions (including the use of tri-generation) have been implemented in many parts of the world so the knowledge and the technology generally exist to overcome them.

However pioneering new solutions, like tri-generation, in existing systems is often challenging. One of the best ways to avoid or minimize problems is to establish open and productive conversations amongst the key players as early as possible. For this project that involved talking with electricity distributors, CitiPower, at the project planning and design stage.

While the many barriers could be solved individually, at this stage Project Leader, Lend Lease, and the project partners have not been able to develop a solution that meets all of the project’s needs. Namely to:
- Significantly reduce the operating greenhouse gas (GHG) emissions, while
- Delivering a high quality, efficient building product to the precinct.

Which would therefore meet the requirements for the Climate Positive Development Program, contribute to achieving Green Star ratings for individual buildings throughout the development and generate an appropriate commercial return on investment.

The proposed trigeneration plant was a part of a broader integrated district energy solution being designed, owned and operated by Cofely Australia for Lend Lease. However, it was a critical element of achieving the energy and carbon savings Lend Lease was seeking to meet Climate Positive and Green Star requirements. Due to the barriers described below Lend Lease will not proceed with the project, but will instead explore other options to achieving the sustainability requirements of Victoria Harbour (on and off-site renewable, further sustainability initiatives).

Changes in legislation to create clear and consistent regulation and timelines would help the successful delivery of district energy solutions. This would allow partners to introduce new technology that reduces carbon and delivers appropriate commercial returns. In order to be successful, the key players need to work collaboratively while they change the established way of doing business.

Context:
The Victoria Harbour project is a participant in the C40 Climate Positive Development Programme, which was launched in partnership with the Clinton Climate Initiative and the US Green Building Council in 2009. Climate Positive was created to meet the pressing challenges of rapid urbanization and climate change. The Climate Positive Development Programme supports the development of large-scale urban projects that are striving to reduce operational GHG to below zero.

Through real-world projects the Programme aims to create models for urban communities that reduce GHG as much as possible technologically and economically, and result in the highest standards of sustainability and climate resilience. Lend Lease has a long history as a company leading sustainability and is the first company in Australia to participate in the Climate Positive Development Programme. Of the 18 projects that feature in the Climate Positive Programme worldwide, Lend Lease is the developer of three of these sites. Namely: Victoria Harbour, Barangaroo, and Elephant & Castle (London). Cofely is a world leader in the development,
ownership and operation of energy efficient and sustainable solutions, with more than 180 district energy schemes in its portfolio, including London’s Olympic Park.

Victoria Harbour is part of the Melbourne inner city suburb of Docklands, in the state of Victoria, Australia. The development commenced construction in 2001. It includes commercial, residential and retail uses and a range of other facilities including a child care center, public art and green spaces. The site will be completed in 2021.

Lend Lease identified that the majority of Victoria Harbour’s GHG emissions were from building energy use. In response they developed a plan to achieve carbon neutrality, or better, that includes building energy efficiency measures, renewable energy, improvements to infrastructure efficiency and increasing industry capacity through knowledge sharing.

This case study focuses on the strategy to increase infrastructure efficiency by building a trigeneration plant that generates low carbon energy for the district.

Trigeneration is the simultaneous production of electrical energy, thermal energy and cooling through gas as a primary input fuel. District energy and the integration and use of trigeneration is innovative in Australia, with no operational precinct trigeneration system currently existing within a commercial and residential community.
Barriers encountered:
Policy/Regulatory barriers
The complex regulatory environment faced by the project was by far the hardest barrier to overcome.

The Australian National Electricity Rules are complex and further complicated by state based electricity and planning regulations. Currently the connection of trigeneration to the local electricity distribution network is assessed on a case-by-case basis without transparent or consistent guidelines for decision-making. When a project needs to connect into the electricity grid, the electricity distributor outlines to the project owner the connection requirements they must meet. This includes the technical and safety requirements as well as any connection costs payable. On the basis of this information, the project owner then has to decide whether to proceed with the connection.

The lack of a standardized or coordinated approach to trigeneration creates uncertainty, which has a significant impact on building the business case for low carbon energy solutions. It is a significant barrier for projects in Victoria and the entire industry in Australia.

There were additional complications. In order to design the district energy solution to maximize the carbon and financial benefits, significant electricity would be generated (too much for one building to use) and need to be transmitted across title boundaries, especially in Victoria. Therefore it either required a mutual commercial agreement with CitiPower to feed the excess electricity back into the network, or special authorization from the Victorian Government Energy Minister to build a private wire network to transmit electricity across title boundaries, an unclear and potentially lengthy process.

Technical barriers
There were not any major technical barriers that could not be solved. However, it was found that the imposed technical solutions could change the business case and create commercial barriers.

There are three key things that CitiPower consider when assessing a district energy solution that is looking to connect into the grid:

1. The public safety considerations for the CitiPower network, and surrounding customers, when connecting to the network.
2. To efficiently utilize the network infrastructure, whether it already exists or is newly required.
3. Ensuring the network can receive and support the amount of power being proposed to be generated back into the grid.

Commercial barriers
The key commercial barriers for Lend Lease were:

1. Gas price uncertainty. Gas is the major trigeneration fuel and has been traditionally a much cheaper option. However the option of using it as a low carbon option is becoming less economically viable in Australia as the export market builds and domestic prices rise.
2. Low tariffs (at a wholesale rather than retail rate) offered for extra electricity fed back into the grid (dramatically reducing the potential pay back and eroding the business case).
3. “Spark spread”. This is the difference between the price of electricity sold by a generator and the price of the fuel used to generate it, in this case gas. Generally the saved energy (from installing tri-generation) is electrical, so the difference in electricity and gas prices has to be factored into the commercial model.
Strategies employed:
Policy/Regulatory, Commercial and Technical Strategies

In order to resolve the barriers Lend Lease and their partners implemented one critical strategy; to work in a collaborative manner. This involved:

- Being open and honest in their discussions.
- Understanding the different drivers and commercial realities for each partner.
- Being clear about the end goals.
- Sharing what they learn along the way.

This helped them build mutually respectful, trusting and beneficial relationships with each other. Working in this way also provided Lend Lease with introductions to influential individuals and ensured that other project partners used their networks and influence to help work through barriers.

Here’s what key players say about working collaboratively (in alphabetical order):

"We are on a mission to talk to and work with developers - we want to support these projects and encourage people to talk to their network as early in the process as possible."
- Neil Watt, Manager Network Strategy Electricity Networks, CitiPower Pty & Powercor Australia

"To achieve the ambitions goals for the city we need to change current industry practice and government policy. Everyone has a role to play, our role is often facilitation. We use our networks and relationships to bring the right people together to help make the change happen."
- Krista Milne, Manager Sustainability, City of Melbourne (Project Partner).

"Because much of our business with clients is on a long term basis, we understand the importance of building trust in order to deliver innovative solutions in partnership and cooperation with our customers. We approach our relationships in a very open and transparent way to achieve trust and long term security to implement our solutions and services."
- Vaughan Furniss, Managing Director, COFELY Australia Pty Limited (Project Partner).

“(The) shared vision and agenda that the City of Melbourne’s role in C40 Cities provides has been critical in overcoming some of the challenges experienced throughout the project.”
- Kate Pearsall, National Sustainability Manager Apartments – Development, Lend Lease

In these collaborative working relationships each barrier was methodically worked through, exploring possible solutions and continually coming back to the principles of delivering a low to below carbon solution for the precinct that is economically and socially viable.

Next Steps
While still committed to achieving a Climate Positive development at Victoria Harbour, Lend Lease has decided to not proceed with a district energy solution or deploy a trigeneration plant onsite.

However the project has resulted in important lessons and useful activity that will be used in other projects:

Explore your options
There are still some potential solutions to the legislative and technical barriers, however the
commercial realities (such as an uncertain gas market) require a re-examination of available technological, social and environmental solutions. Lend Lease will take some time to explore the options available with their partners.

**Hold onto your vision**
While they are exploring their options, Lend Lease is going back to basics. With more detailed energy monitoring, the team will explore even greater improvements in building performance and finding the most innovative ways to deliver as much solar energy as possible to the precinct.

**Build on your expertise**
The experience of this project has built significant internal expertise and has, in part, led to the development of Lend Lease’s Green Utilities Team. This team specializes in building district scale infrastructure and developing integrated delivery systems. This becomes a significant enabler for generating positive sustainability outcomes for all developments in the future.

**Further reading**

- ACIL Tasman, Distributed generation: Implications for Australian electricity markets, April 2013  

- Alliance to Save Energy, Distributed Generation in Australia: a Status Report, 2011  