The Energy Plan 1.0

dunedin

Contents

Front cover, inside cover and rear cover photos by Stefan Mutch

Foreword

Modern cities require an efficient, reliable and affordable energy supply. This Energy Plan 1.0 is about how to meet those requirements long term to ensure Dunedin is one of the world's great small cities.

The Plan has eight actions and the scene is set for more over time. The actions build on Dunedin's strengths, and recognise expertise and financial constraints by using existing resources and leveraging planned activity or partnerships as far as possible. The Energy Plan 1.0 sits within Dunedin's Economic Development Strategy. The success of the Economic Development Strategy lies in the strong partnerships it fosters, with each partner working toward the same practical, achievable goals. The Energy Plan 1.0 follows in those footsteps.

Dunedin is already taking action. Port Otago's energy management scheme saves it hundreds of thousands of dollars each year. Dunedin's largest health and education institutions have substantial energy efficiency initiatives underway. The University of Otago is leading international research into energy use and behaviour. Dunedin is home to businesses that export leading heating and waste-to-energy products and technologies. Otago Polytechnic has made a major investment in high-tech woodchip for heating. We have several programmes for insulating and heating homes, making them warmer and drier while reducing their energy use. These are a handful of the many ways Dunedin organisations are already creating energy cost savings for themselves or others. For our city, these actions deliver development, jobs and health.

Energy Plan 1.0 at a glance

Key Goals:

Takes advantage of economic opportunities in a changing energy context

Saves costs and enhances quality of life from energy efficiency improvements

Boosts the city's energy security and ability to adapt to future change

Reduces Dunedin's climate change and environmental effects

1 SUBMISSIONS CONTAINING 200+ INDIVIDUAL IDEAS

From a city-based emissions trading scheme to a new tramway for the city

2 REVIEW OF EXISTING INITIATIVES

Including development of a Second Generation District Plan encouraging renewables, passive solar housing and a Cycleways Strategy

3 EXPERT ADVICE AND STAKEHOLDER INTERACTION

Including local and international academics and Grow Dunedin Partnership members

Links with other Strategies

The Energy Plan 1.0 ties in with other strategies, including:

Economic Development Strategy

The strategy looks at ways to reduce energy dependence and boost locally sustainable energy sources.

The strategy allows us to understand the economics of low carbon cities, identify the economic benefits of reducing energy demand and carbon emissions to Dunedin's economy and make practical recommendations about the development of a local energy infrastructure that accelerates decarbonisation of the local economy and opens up commercial opportunities for local business.

Social Wellbeing Strategy

Dunedin people live in warm and healthy homes.

The DCC will promote a whole of city approach to improving the quality of Dunedin's housing stock.

Spatial Plan

Dunedin is a liveable city (the City has warm and energy efficient housing).

Dunedin is an environmentally sustainable city (the City has embraced sustainable energy production).

City Integrated Transport Strategy

The challenges of volatile fuel prices and climate change are addressed (the Energy Plan will look at alternative transport options).

Environment Strategy

Dunedin is resilient and carbon zero.

We'll implement appropriate climate change mitigation and adaptation.

NIGHT SKY CITY

Dunedin has energy efficient external lighting and is an internationally attractive night sky destination

ENERGY LEADERS

Dunedin saves energy and money, inspires local energy innovation and opens new economic opportunities

BASELINE ENERGY

Dunedin's energy data is accessible and progress is measurable

DUNEDIN ELECTRIC VEHICLES

Dunedin adopts electric vehicles and the infrastructure to support their use

COSY HOMES

Every Dunedin home will be warm and cosy by 2025

ENERGY FAST TRACK

Dunedin supports grassroots energy innovation and enterprise

BIOMASS

Dunedin explores and grows its potential to produce and use biomass energy

FOOD RESILIENCE

Dunedin promotes sustainable food as part of a thriving local economy

ENERGY PLAN EVOLUTION OVER TIME

Introduction

Vision

Dunedin has its sights on becoming one of the world's great small cities.

Strategic context

Being smart with energy is key to achieving our vision of becoming one of the world's great small cities. By taking action on energy issues now we'll be creating opportunities for employment, more disposable income, better health and increased energy security.

The Energy Plan 1.0 will deliver on our vision and the objectives set out in the city's strategic framework, developed by the Dunedin City Council (DCC) and the community. The plan falls under Dunedin's Economic Development Strategy, which aims to create 10,000 jobs over 10 years and an average $10,000 extra income for each person. Being forward-thinking about energy is essential if we are to meet these economic objectives, and others including having warm, healthy homes, reducing reliance on non-renewable energy and exploring better use of energy sources.

The Energy Plan 1.0 ties into other work, such as Te Ao Tūroa – The Natural World, Dunedin's Environment Strategy, which seeks to reduce carbon emissions. This plan is a living document and will change as work is undertaken, such as the development of the city's Parks and Recreation Strategy.

Development of the plan was led by the DCC, working with Grow Dunedin Partners, key stakeholders, the community and energy experts.

Strategic Framework

FOR DUNEDIN

Goals

This Energy Plan 1.0 sets four goals:

1. Take advantage of economic opportunities in a changing energy context
2. Save costs and enhance quality of life resulting from energy efficiency improvements
3. Boost the city's energy security and ability to adapt to change
4. Reduce Dunedin's climate change and environmental effects

Strong, city-wide consensus that we have the right goals was confirmed through community feedback on a discussion paper on Dunedin's energy challenges released in 2013. As a result of this endorsement, further investigation focused on what can be done in Dunedin to meet these goals.

Actions

Dunedin is a city of innovation and knowledge – strong credentials when it comes to tackling energy challenges. There is already a lot of energy-related work happening in Dunedin's businesses and communities. The plan aims to address some of the gaps through actions that comprise strategic, partnership projects.

Two of the actions build a framework for future action development: Dunedin Energy Leaders and Energy Fast-Track. Other actions are Night Sky City, Cosy Homes, Baseline Energy, Dunedin Electric Vehicles, Biomass and Food Resilience.

The actions have been identified as work on the plan has progressed. The ideas of many people in our city have been analysed and assessed, expert advice has been examined and worked through, and technical work carried out around wind energy and street lighting possibilities. There have been many conversations with a wide range of stakeholders.

Effort has been focused on initial actions that build on strengths and have real foundations and partners committed to delivery. Economic development is a key focus for the actions – whether in the form of employment opportunities or disposable income. The result is a set of initial actions that are real projects with partners and wide support, and some have already begun. These actions are just the start. The Energy Plan 1.0 will get Dunedin some runs on the board by completing actions and demonstrating results.

Scope

The Energy Plan 1.0 is intended to be a beginning, and a working action plan rather than a high level strategy. The actions outlined here will evolve as work takes place, as new technologies and new thinking develops and as the context changes. New actions and partners will be added as they emerge and are refined into a ready-to-go state.

The process of working together on this plan is important, with partners and the community shaping the way forward through their actions over time. For example, as a result of the city deciding to work on the Energy Plan 1.0, the Otago Chamber of Commerce set up an Energy Committee that has driven the development of a baseline assessment identifying how and where we are using the most energy in Dunedin. This work was funded by the University of Otago, Otago Chamber of Commerce and the DCC.

Dunedin likes to get on with things, and the Energy Plan 1.0 is about taking early action to improve our lives now and into the future. The more people involved in the city's energy work, the better the outcomes will be.

Energy Leaders

Photo by Stefan Mutch

Energy Leaders

Current position

Our city is home to a wealth of energy-related activity, some of which is unique in New Zealand. Dunedin already has leaders in the energy space, namely:

- major energy users working creatively to manage their energy costs
- innovative energy sector businesses with a commercial and employment presence in the city
- businesses that have undertaken valuable energy initiatives
- membership organisations, like the Otago Chamber of Commerce, that have individual members taking smart action on energy.

These leaders already work together, from informal discussions around fuel suppliers to commercial partnerships and joint research.

Action and delivery

Energy Leaders builds on this platform. The Dunedin Energy Leaders Accord establishes a formal alliance around good energy practice and innovation. Members of the Dunedin Energy Leaders Accord signal their recognition that greater energy efficiency and security is important to achieving the city's economic development ambitions and can create commercial opportunities for local business.

The starting point for the accord is major energy users, where the biggest gains in using energy more efficiently in Dunedin are likely to be made. Major users are likely to realise more financial savings and be more able to fund work to reduce their energy bills. While this might mean they have already made changes to reduce their energy use, they are also unlikely to have reached their full potential.

At a high level, the accord will include commitments from Dunedin's energy leaders to:

- share energy thinking, activity, data, information and case studies
- support the energy work in the wider Dunedin community by sharing energy leaders' expertise and profiling approaches
- pursue and publicise their individual and joint activities in the energy space, highlighting Dunedin's innovative approaches and concrete action to a wide audience
- support work to improve links between business and research on energy issues
- seek opportunities to pursue local partnerships with a preference for Dunedin-based service providers.

To support the accord there will be a biannual Energy Leaders Panel for accord members and academics in the energy space to ensure energy challenges and innovative energy research are linked for success.

Over time, it is anticipated Dunedin's energy leaders will take forward work to strengthen other Energy Plan 1.0 actions, for example supporting smaller businesses and the community through mentoring or establishing a local energy award for small businesses. Large users may also begin to direct corporate social responsibility activities to community energy initiatives.

Measuring success

Successful delivery of this action will result in:

- reduced combined energy intensity[1] of the accord's members to enable future economic development
- more media coverage of Dunedin's energy activity
- greater inclusion in national work to address energy issues.

1 Energy intensity is the ratio of energy spend to operational expenditure overall – this measure will be explored with early accord partners during the consultation period.

Key delivery partners

A number of organisations have already agreed to participate in the accord, including:

- ADI Systems Inc.
- Ahika Consulting
- Aurora Energy
- Cadbury
- Dunedin City Council
- Dunedin International Airport
- Energy Link
- Ngāi Tahu
- Otago Chamber of Commerce
- Otago Museum
- Otago Polytechnic
- Otago Southland Employers' Association
- Pioneer Generation
- Port Otago
- University of Otago

"Our research suggests that many small and medium businesses don't see energy as a major cost. Yet we've also unearthed some businesses that have made major energy savings. Steve McNulty at Classic Jaguar Limousines in Dunedin is a superb example. Doing 8000 kilometres of business a month makes every fuel-saving action count, from fitting older cars with bigger wheels and electric fans to purchasing new aluminium-bodied vehicles. Steve started with a sustainability focus but his bankers can't believe the financial gains he's achieved.

Steve is applying the same approach to every facet of his award-winning business and is impelling his suppliers to make changes that ultimately benefit all of their customers. That type of leadership is helping to make Dunedin's economy stronger."

DR SARA WALTON | SENIOR LECTURER, OTAGO BUSINESS SCHOOL, UNIVERSITY OF OTAGO

Steven McNulty | Owner, Classic Jaguar Limousines and Dr Sara Walton

Photo by Stefan Mutch

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Boost energy efficiency action through an Energy Leaders Accord with city-wide membership representing most of Dunedin's large energy users, energy research institutions and key energy sector firms. • Accord drafted and signed by early adopter partners • Panel meetings scheduled • Energy Plan 1.0 co-ordinator support confirmed • Establish links between business and research focused on commercial opportunities • Define energy reduction plans (potential individual/common energy savings targets) • Sharing of energy data where useful and possible	**Dunedin City Council** **Port Otago** **Otago Polytechnic** **University of Otago** **Ngāi Tahu** **Otago Chamber of Commerce** **Otago Southland Employers' Association** **Aurora Energy** **Ahika Consulting** **Energy Link** **ADI Systems Inc.**	Number of confirmed participants in accord Proportion of annual energy consumption/ expenditure/research funding/contracts represented by accord participants Level and term of secretariat support secured Number of panel meetings/attendance at meetings Annual publication of energy use and savings /individual reduction plans publicly available Number of energy leaders sharing data
Create a local energy award and/or submit nominations for existing energy awards	**Otago Chamber of Commerce**	Level of sponsorship secured Number of nominations Number of businesses recognised for energy good practice (similar to the tourism Qualmark Enviro Awards)
Energy leaders commit to profiling and promoting their own, and Dunedin's energy actions, good practice and innovation through their networks or the media	**Dunedin City Council**	Number of media stories related to energy work associated with accord participants
Support (from expertise to financial) other Energy Plan 1.0 actions and other energy initiatives	**Dunedin City Council**	Number of energy leaders actively involved in other Energy Plan 1.0 actions Funding contributed

"Energy Link has been around since 1996, coming out of a need to understand the changing electricity market, which underwent a major change at that time, including deregulation and increasing competition. Our business is now about a deep understanding of the electricity market, its participants and market data. We've got an enviable reputation in our niche throughout New Zealand and overseas. We're not a big business but people do take notice when we have something to say about the power market and our clients are drawn from government and the country's blue chip companies. And we see growth opportunities. Right now we're developing a new web-based self-service model for large electricity consumers to find their best possible energy prices. One of the great things about Dunedin is that we've built expertise on work originally undertaken at the university which accelerates the business building process. I see collaboration with the university building new careers with Energy Link just as it did for me."

GREG SISE | MANAGING DIRECTOR, ENERGY LINK

Photo by Stefan Mutch

Energy Fast-Track

"It's only been a year but we've found that many visitors and Dunedin residents want the low impact, high value experience that Glenfalloch Green Bikes offers them. If we work as a community, solving range, storage and safety issues, then I can see ready access to e-bikes becoming an amazing selling point for our city. It's not hard to imagine even older visitors taking an electric bike ride from Taiaroa Head to Port Chalmers, fast charging or swapping a bike in town or even on a ferry ride across the outer harbour. That possibility would be a boon to commuters, too."

ANNIE VILLIERS | MANAGER SPECIAL PROJECTS, OTAGO PENINSULA TRUST

Photo by Stefan Mutch

Energy Fast-Track

Current position

Dunedin has inspiring examples of what community groups, businesses, and researchers working on innovative energy projects can achieve. The Energy Plan 1.0 will support these activities and encourage further action in new areas.

Potential community energy initiatives range from relatively modest requests for funding for energy education to more ambitious plans for local wind generation. Somewhere in between, there are infrastructure concepts such as a central city electric car and bike charging station.

Action and delivery

Rather than considering each initiative as a potential stand-alone Energy Plan 1.0 activity, this action recognises that many emerging energy ideas may benefit from forms of support that already exist. It is not about identifying every idea that has or will emerge but rather identifying the mechanisms that can help Dunedin communities realise their energy ambitions.

On the business side, the Grow Dunedin Partnership is already assisting a range of entrepreneurs. This support is a good avenue for commercial and social enterprises seeing a future in energy. The Audacious programme and Startup Space are ideally suited to students and entrepreneurs looking to establish a foothold for energy innovations. This is especially so in Dunedin, given our access to skills and research through the involvement of the Otago Polytechnic and University of Otago. Likewise, Enterprise Dunedin's Business Hub business advice clinics are free and accessible to all.

Dunedin's GigCity status has extended the services and resources available to the digital sector, which increasingly overlaps with the energy sector through big data, smart control systems and the 'internet of things'. GigCity has seen the Digital Ambassadors programme extended and the Co.Starters service created.

Crowdfunding, where money is raised from the community at large, can be powerful in the energy space, particularly for community, social enterprise and commercial start-ups. The DCC has, in principle, commitment from PledgeMe to provide a platform through which Energy Fast-Track projects can seek crowdfunding in a supported way.

There is demand for a dedicated fund for small-scale energy projects that offer community benefits, potentially with new, energy-specific funding added in to the DCC's existing grants framework. Standard criteria apply to all grant applications but applications would also need to meet specific energy criteria (e.g. must demonstrate a clear contribution to Energy Plan 1.0 goals and strategic objectives). Grants funding is typically awarded twice a year.

To complete the circle of action throughout the city, the Energy Leaders Accord is intended to involve those partners in supporting smaller businesses and community organisations through mentoring, encourage local procurement of energy services and begin to direct corporate social responsibility activities to community energy initiatives.

Measuring success

Successful delivery of this action will result in:

- a growing number of energy sector clients approaching Grow Dunedin Partnership/ Enterprise Dunedin programmes
- matched funding leveraged, e.g. for every dollar made available through grant processes, a further two dollars are invested by the non-government sector.

Key delivery partners

The principal partners for the Energy Fast-Track will be Grow Dunedin partners in the first instance:

- Dunedin City Council
- Otago Chamber of Commerce
- Otago Polytechnic
- Otago Southland Employers' Association
- University of Otago

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Specifically acknowledge and support Energy Fast-Track in Grow Dunedin Partnership programmes, including Startup, Audacious and Business Hub	**Dunedin City Council**	Number of applications for assistance
Provide access to energy expertise for Energy Fast-Track projects and assist with leveraging funding from other sources	**Energy Leaders Accord partners**	Number of contact points between community/energy experts
Formalise arrangement with crowdfunding service provider, PledgeMe	**Dunedin City Council** **PledgeMe**	Number of applications for assistance
Explore additional funding sources, e.g. potential corporate contributions from Dunedin energy leaders	**Energy Leaders Accord partners**	Amount of additional funding secured
Subject to funding, establish an Energy Fast-Track component of the DCC grants scheme, and include an energy representative on the Grants Subcommittee	**Dunedin City Council**	Number of applicants/amount of funding awarded annually
Establish community energy awards or create a community energy award within an existing awards structure or nominate community energy projects for relevant national/international awards	**Energy Leaders Accord partners**	Establishment of sponsored award for community energy initiatives Number of nominations Achievement at local/national/international level

"One of New Zealand's early waste-to-energy projects was developed at Invermay more than two decades ago in response to expected national farm fuel supply shortages. Since then I've stayed with waste treatment systems, focusing on the energy extraction side. I've seen it grow into a large worldwide industry, while still living and working in Dunedin. ADI Systems have chosen to stay with Dunedin as the workbase for our major developments from Australia to Indonesia, to Argentina and Brazil. We have been able to support local industry and institutions, forming alliances with local companies like Switchbuild, Aotea Electric, Farra, Action Engineering and Otago University. Dunedin has executed many visionary projects over the years, such as the water supply from Deep Stream, and possesses considerable depth in energy expertise and great creativity."

STEVE BREWSTER | ELECTRICAL DESIGN AND COMMISSIONING ENGINEER, ADI SYSTEMS ASIA PACIFIC

Steve Brewster (centre) and some of the ADI Systems staff in Dunedin

Photo by Stefan Mutch

Night Sky City

Photo by Stefan Mutch

Night Sky City

Current position

Dunedin residents are used to experiencing amazing night skies, from the Milky Way to the Aurora Australis. These views are one of the great things about living in our remote part of the world. We also enjoy a night-time cityscape of new and heritage buildings lit to draw the eye. Most recently, work to regenerate Vogel Street in the heart of Dunedin has included the installation of light projectors that shine images inspired by fragments of chinaware found in the area onto the pavement.

Globally, there is increasing concern that we are losing our natural night sky environment to a haze of human light pollution. There is a growing body of evidence that light pollution not only blocks our view of the stars but also wastes energy, costs a lot of money, disrupts ecosystems and can affect the quality of our sleep and our health.

Action and delivery

This action speaks to a simple idea, established by the International Dark-Sky Association (IDA): light what you need, when you need it. Some light at night is necessary for safety and recreation, but light is not the only safety tool and it is clear that with advances in technology we can do this better with energy efficient, smart infrastructure. Dunedin could also be far more innovative with night lighting, using clever lighting to highlight a path to the stadium from the city centre on match days, for example.

The DCC is currently planning, through the asset renewal process, to upgrade Dunedin's street lighting from low-pressure sodium to light-emitting diode (LED), which will save a significant amount in electricity and maintenance costs. The new LED fittings will also include significant shielding to prevent light spilling upwards. There is a unique opportunity for the city to maximise the benefits of this asset renewal by exploring how to leverage from the upgrade of the street lighting. This action is focused on how to do this.

There are multiple economic benefits on offer. Dunedin would be New Zealand's first dark sky city, and would lead the way for New Zealand to be the world's first dark sky country. As a unique selling point for our already strong tourism sector, it is a way to further differentiate New Zealand's appeal. There is also significant spend on outdoor lighting, and savings free up resources for other activities.

There is great potential for the Night Sky City action to drive innovation and economic development, with our companies, entrepreneurs and communities working to find solutions to our local challenges. Some of these solutions may be of export quality. These economic benefits are supported by the environmental and social benefits that protecting our night sky offers.

Dunedin has an opportunity to test ways lighting challenges can be addressed for the whole country, build expertise in energy efficient outdoor lighting and promote research and adoption of energy-saving measures.

If Dunedin is successful in approaching night lighting in a truly 21st century way, re-imagining how the world's urban and rural areas approach the dark, we will play our part in keeping our night skies full of stars, now and into the future.

Measuring success

Successful delivery of this action will result in:

- increased visitor nights
- savings on street lighting energy costs
- improved quality of night sky vistas.

Key delivery partners

Several organisations are emerging as key partners in progressing thinking about Dunedin's night sky, including:

- Dark Skies Advisory Panel and Dunedin City Council
- Dunedin Dark Skies Group
- NZ Transport Agency (Transport Agency)
- Otago Chamber of Commerce
- Otago Museum
- Upstart Trust

Photo by Stefan Mutch

"Maui – A Modern Man" by Rowan Holt (worn by Nick Price-Ellison), "Matariki at the Marae" at Puketeraki Marae

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Establish a Night Sky City Advisory Panel to advise on (1) key city outdoor lighting projects, and (2) the street lighting asset renewal from a big picture perspective	**Dunedin City Council** **Ngāi Tahu** **Dunedin Dark Skies Group** **University of Otago** **Otago Polytechnic** **Otago Museum**	Number of lighting projects discussed by the panel Global and national good practice collated and examined
Investigate what LED lighting solution(s) are right for Dunedin's uses, as we have considerable expertise in the city and a number of different desired outcomes	**Dunedin City Council** **Dark Skies Advisory Panel**	Number of projects discussed and advised on by the panel DCC outdoor lighting framework developed
Upgrade around 15,000 city street lights to LED over time as part of Dunedin's asset renewal programme, which will deliver substantial energy and maintenance cost savings	**Dunedin City Council** **Transport Agency**	Number of street lights upgraded Savings on energy costs Savings on maintenance costs
Continue to support the growth of key festivals and events that speak to the Night Sky City ambitions, particularly Puaka Matariki and the Midwinter Carnival	**Dunedin City Council** **Creative Dunedin Partnership** **Government funding agencies** **Dunedin Midwinter Celebrations** **Puaka Matariki Steering Roopū**	Number of people attending key festivals and events that speak to the Night Sky City ambitions
Investigate SMART control management systems for outdoor lighting	**Dunedin City Council** **Aurora** **Energy Efficiency and Conservation Authority**	Number of projects for which SMART controls are assessed

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Join the LUCI (Lighting Urban Community International) network of cities on urban lighting	**Dunedin City Council** **Otago Chamber of Commerce** **University of Otago** **Otago Polytechnic** **Ngāi Tahu**	Best practice shared
Develop a specific lighting accord to support Night Sky City action, both preventing light pollution and driving creativity and innovation in the outdoor lighting space, including public engagement	**Dunedin City Council** **Otago Polytechnic** **Dunedin Dark Skies Group** **Transport Agency**	Creation of lighting accord Number of participants Number of efficient light fittings installed/ decrease in outdoor lights Value of financial savings and associated benefits
Advocate for the upgrade of state highway lights within Dunedin	**Dunedin City Council** **Dunedin Dark Skies Group**	Number of Transport Agency lighting assets upgraded
Explore instituting local standards and requirements for private street lights	**Dunedin City Council** **Otago Property Investors Association**	Number of private street lights upgraded Number of new LED lights installed in private developments
Encourage positive activity (and discourage negative ones) through improved lighting distribution and design of parks and recreation facilities	**Dunedin City Council** **Getting Dunedin Active** **Sport Otago** **ACC** **Dunedin Police**	Number of participants in sport and recreation at night Metres of track/cycleway adequately lit for night use Hours of booked sportsfield use at night

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Establish a nationwide network of local and central government to explore the potential of New Zealand as the world's first dark sky country	**Dunedin City Council** **Otago Chamber of Commerce** **Dunedin Dark Skies Group** **University of Otago**	Dark Sky New Zealand network established
Develop Night Sky City tourism packages	**Otago Museum** **Otago Motel Association**	Number of motels receiving Night Sky City tourists Number of packages developed
Connect people and projects to the Dark Skies Advisory Panel	**Dunedin City Council** **Dark Skies Advisory Panel**	Number of city projects considered by the panel

"The City of Dunedin has an extraordinary opportunity to become one of the best places in the world to view the night sky and kick start a new 'dark sky' tourism industry in our region. Dunedin could become New Zealand's first and largest Dark Sky City.

If the wrong choices are made, the beautiful views we now enjoy of the night sky may be lost forever. We need to use the least light polluting technologies available and we need to use them smartly."

IAN GRIFFIN | DUNEDIN DARK SKIES GROUP

Photo by Stefan Mutch

"We knew we were making a great product in Technobond right here in Dunedin. So we worked with the Dunedin City Council to make sure people could choose Technobond through the Warm Dunedin rates programme. After that the local support was clear. People knew and trusted the Ellis Fibre name. And we don't let them down. They tell us they can feel the difference on the very first night after the insulation's gone in. It's worrying that there are houses in Dunedin without insulation when we're making the solution here. We want Cosy Homes to work."

GLENN ALEXANDER | MANAGING DIRECTOR, ELLIS FIBRE

Cosy Homes

Photo by Stefan Mutch

Cosy Homes

Current position

When we live in poor quality housing we spend a high proportion of our money on energy bills or, for those unable to afford energy bills, suffer poor health as a result.

Dunedin is estimated to have over 18,000 homes that are not warm or dry enough to keep people healthy and comfortable at reasonable cost. We have cheap housing by New Zealand standards but around half is estimated to be of relatively poor quality, mainly due to age. The city has a national reputation for having cold student flats, an experience some regard as a rite of passage. A significant amount of low income rental housing is just as cold as our student housing.

Improving housing is a top priority for the city and has been for a number of years. When the DCC developed its Social Wellbeing Strategy in 2013, poor housing was raised by the community and stakeholders as a critical issue. The final strategy identified Better Homes as one of three key areas of focus and stated a commitment to "a whole-of-city approach to improving the quality of Dunedin's housing stock".

A solid base of past and current initiatives supports these strategies. The DCC's annual healthy homes grants, in conjunction with Energy Efficiency and Conservation Authority and the Otago Regional Council, with substantial funding support from the Otago Community Trust, have been targeted at community services card–holding home owners or those with high health needs. The Warm Dunedin targeted rate has advanced around $1.2 million to ratepayers to purchase and install insulation and clean heating. Between 200 and 600 homes a year have been insulated over the time these programmes have been operating, the number changing in response to factors such as funding levels and installation costs. This year the DCC again plans to join with the Otago Community Trust and Energy Efficiency and Conservation Authority to focus on rental homes tenanted by community services card holders to see many more houses insulated. A five year, $5 million upgrade of DCC community housing stock is now nearing completion, benefiting many homes with improved insulation and ventilation.

The feasibility of a national 'warrant of fitness' for rental housing is also being explored. Preferred options for changes to the Second Generation District Plan would help to ensure better solar gain for new houses.

Many submissions on the Energy Plan 1.0 discussion paper related to housing standards and fuel poverty. A great deal of housing work is already underway and, following the Cosy Homes Symposium of 2013, is increasingly directed towards an ambitious but shared vision.

Action and delivery

Our city has developed an ambitious goal for housing: that everyone lives in a warm and cosy home by 2025. We know that better housing means healthier people, but better housing is also a 'must' for economic development. It is vital for making Dunedin a place where people want to live and study. Lower energy costs for our homes equal more money in our pockets to spend on other things. We have local businesses that can benefit from us focusing on upgrading our city's housing. And people take less sick leave if their homes are healthy, another saving for businesses and a gain for our economy.

The Cosy Homes Trust, established at the beginning of 2015, is now at the heart of driving toward the 2025 cosy homes goal. The trust, which is supported by a wide range of organisations and businesses in the city, is intent on upgrading the poor quality homes in Dunedin, focusing strongly on insulation and clean heating. The trust provides a way to better co-ordinate and work in partnership on housing actions for Dunedin.

The Energy Plan 1.0 formalises the place of the Cosy Homes Trust and the 'every home is warm and cosy by 2025' ambition within the city's strategic framework. The plan also proposes that a strand of action, led by the Otago Chamber of Commerce, leverages opportunities associated with the plan, adding a focus to encourage and support businesses and social enterprises in the goal to improve our housing.

Cosy Homes has developed as a brand for a range of activities. While the Cosy Homes Trust is a stand-alone entity, the vision is shared by many. Energy Plan 1.0 partners can help to achieve Cosy Homes objectives, including:

- connecting householders with service providers of insulation and heating
- educating householders about good energy practices and healthy home environments
- encouraging communication and collaboration amongt all parties
- communicating Cosy Homes work to the public
- co-ordinating funding applications and processes
- advocating for work in this area at local and national levels
- monitoring and measuring progress.

The Energy Plan 1.0 can further support this work by linking economic and business development opportunities to Cosy Home' goals. This can take a variety of forms, from continuing to support local insulation manufacturers and installers through to assisting social enterprises to establish themselves (like Generation Zero's Rate My Flat initiative) and encouraging organisations to mix commercial and social objectives (for example, *www.energymentor.co.nz*). The DCC and the Otago Chamber of Commerce have agreed to work together to ensure these benefits and opportunities are maximised, and to attract more partners to this goal.

Measuring success

Successful delivery of this action will be measured by the:

- number of homes improved annually
- amount of new funding leveraged.

Key delivery partners

- Cosy Homes Trust and associated entities (see table), Dunedin City Council, Otago Chamber of Commerce, Energy Efficiency and Conservation Authority
- Wider housing stakeholders (for more information see the Cosy Homes Symposium summary and delegate list)
- Insulation, clean heating and other relevant manufacturers and service providers

"Blueskin facilitated more than 400 local housing insulation retrofits in 2009. It was a huge effort, but knowing that a mere $2,000 of insulation would deliver $8,000 in health benefits to a family was strong motivation. We'd also gained insights about community engagement and networks that we could export. University researchers backed our practical experience with evidence, testing different approaches in partnership with us, working with the Brockville community and the TV473 group in North East Valley. We found that tenants and owners responded to trained local people on the ground, and to trusted advisers who would support them to wisely invest to reduce fuel poverty. From there we worked with Presbyterian Support in Pine Hill. These experiences taught us just how big Dunedin's housing problems were. Forty six percent of our residents are in fuel poverty, or would be in fuel poverty if we heated our homes to healthy levels? That's just wrong! We had to make fuel poverty too big to ignore. That's what the citywide Cosy Homes concept grew out of."

SCOTT WILLIS | MANAGER, BLUESKIN RESILIENT COMMUNITIES TRUST

Alex King | North East Valley Project, and Scott Willis

Photo by Stefan Mutch

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Maximise the work of the Cosy Homes Charitable Trust with support of all Dunedin housing stakeholders and deliver on goals by: • co-ordinating housing action and support in the city • securing new funding for housing improvements to increase energy efficiency and quality of life for Dunedin residents.	**Cosy Homes Trust: Dunedin City Council, Otago Regional Council, Southern District Health Board, Presbyterian Support Otago, Blueskin Resilient Communities Trust, Presbyterian Support Otago** **Cosy Homes Steering Group, the organisations above and: Council of Social Services Otago, Otago Property Investors Association, Ministry of Social Development, University of Otago, Anglican Family Care and Energy Matters** **Energy Efficiency and Conservation Authority** **Otago Chamber of Commerce** **Insulation and clean heating manufacturers and service providers**	Number of homes improved annually Amount of new funding leveraged
• Encourage SMEs to participate as service providers and through social enterprise	**Otago Chamber of Commerce** **Dunedin City Council**	Number of housing-focused business and social enterprise initiatives
• Explore the potential for the DCC community to showcase a community housing unit using energy-efficient thinking and technology to show difference in costs and other benefits	**Dunedin City Council**	Number of new builds using energy efficient thinking/technology
• Work with schools to explore opportunities for raising awareness of housing quality issues and demonstrating solutions	**Enviroschools** **Schools** **Otago Polytechnic** **University of Otago**	Number of school initiatives

Photo by Stefan Mutch

Leander Schulz, Letisha Nicolas and Cade Bedford

"Most tenants would have wondered why Dunedin's housing is so patchy when it comes to warmth and heating? We took the same thought a bit further, and did something, working with our landlord to fix our own flat. Which led us to ask, why doesn't everyone? A big chunk of incomes go to energy. Just putting up with cold and damp can have serious health consequences. So the first thing you want to know is how good or bad a flat might be, before signing the lease. That's where Rate My Flat comes in. It uses the power of the web and crowd sourcing to inform renters about liveability and cost. But that's only half the benefit. Landlords were missing out on advice about really cost-effective solutions that can make their properties much more attractive to the tenants they want. Rate My Flat has started as a Dunedin solution to a Dunedin problem, but with one in three NZ properties rented, there's no reason it can't go further."

LETISHA NICHOLAS | CO-FOUNDER, RATE MY FLAT

Baseline Energy

"The Dunedin Energy Baseline Study gave us a better understanding of how we use energy in Dunedin and identified opportunities for the future.

In coming years we need to be thinking about things like how much firewood and coal we use in our homes, regional and citywide LPG distribution and the energy use of our businesses.

Dunedin has a great deal to offer in terms of natural resources, innovation and leadership capability. Continuing the baseline energy action will help us understand our starting point and secure a more sustainable energy future for all."

DR CLE-ANNE GABRIEL

Photo by Stefan Mutch

Baseline Energy

Current position

The actions proposed in this plan need the support of the city's businesses, community groups and research community. The Energy Leaders enabling action is designed to encourage and facilitate this support. But how will the success of these actions be measured? How will monitoring, evaluation and feedback take place?

In September 2015 the Dunedin Energy Baseline Study was published. It was the first time our city had the opportunity to take a good look at current energy use and where we get our energy from. The baseline provided a framework for encouraging research that will enable us to monitor our energy inputs in years to come.

This Baseline Energy action is an information action. It recognises and formalises the need to continue to monitor, evaluate and report.

Action and delivery

The 2015 Energy Baseline brought together and used knowledge held by many city stakeholders. The intention is for stakeholders to continue gathering and sharing relevant energy data annually to inform and assist with the implementation of the Energy Plan 1.0's actions. The Night Sky City action aims to reduce the cost of the city's public lighting while improving its overall energy efficiency. The city's main electricity stakeholders have already shown interest in Energy Leaders and a commitment to helping achieve these goals. The Baseline Energy action establishes collaboration with these stakeholders to monitor the city's electricity use and consumption. It will also work with these stakeholders to improve the detail and relevance of the energy information that is reported to the public.

Likewise, the Cosy Homes action will encourage work already underway to help Dunedin's homes become warm and cosy by 2025. The Baseline Energy action will monitor changes in heating fuel use.

The Dunedin EV action focuses on facilitating the use of electric vehicles in the city. It also lends support to other alternative and communal forms of transport, such as those outlined in the city's Integrated Transport Strategy. The Baseline Energy action will monitor the impacts of these activities by keeping track of the city's imports of conventional fuels.

Further community energy initiatives (see Energy Fast-Track action) will develop from, and be influenced by, monitoring Dunedin's energy use and inputs. Problem areas may be identified. Improvements and achievements can be highlighted and celebrated. Ideas emerging from Dunedin's communities can receive the support and advocacy they deserve.

Measuring success

Successful delivery of this action will result in:

- Dunedin's energy data being published annually, into the foreseeable future
- better understanding of Dunedin's energy inputs and uses over time
- consistent media interest and coverage of the study's findings.

Key delivery partners

The Dunedin Energy Baseline Study (2015) was completed with the support of:

- Centre for Sustainability, University of Otago
- Otago Chamber of Commerce
- Dunedin City Council

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Establish Baseline Energy as a part of Dunedin's ongoing energy activities and commitments	**Dunedin City Council** **University of Otago** **Otago Chamber of Commerce**	Annual baseline energy report for Dunedin is published each year
Identify and/or appoint a lead for future monitoring and reporting of the city's energy inputs	**Dunedin City Council** **Energy Leaders Accord partners**	Lead appointed
Identify key holders of energy data and information important to the community	**University of Otago** **Otago Chamber of Commerce** **Energy Leaders Accord partners** **Dunedin City Council**	Number of energy stakeholders whose data is included in the study Proportion of all energy types and uses represented in the study Number of identified gaps in the data filled
Formalise commitments by energy leaders to provide, share and publish data	**Dunedin City Council**	Energy Accord signed
Collect and share data on Dunedin's energy situation annually	**Energy Leaders Accord partners**	Energy Baseline findings presented to energy leaders
Engage energy leaders in taking identified actions forward	**Energy Leaders Accord partners**	Number of actions progressed by energy leaders

Dunedin EV

"Businesses are continually looking for ways to improve their performance. The natural progression for many will be towards using electric vehicles as part of their ongoing drive to provide better outcomes all round and achieve eco-friendly objectives."

DOUGAL MCGOWAN | CEO, OTAGO CHAMBER OF COMMERCE

Dougal McGowan

Photo by Stefan Mutch

Dunedin EV

Current position

Transport in Dunedin is changing. Dunedin's Integrated Transport Strategy is driving changes that impact on energy use, with millions of dollars being, or planned to be, spent on alternative transport options. Our community has also indicated a wish for the city to make the shift to energy efficient electric vehicles (EVs). The Energy Plan 1.0 provides a framework for supporting communities and organisations that have already started, or are interested in, shifting to EVs.

Progress is already being made. Local businesses are re-engineering conventional vehicles to run on electricity. Otago Polytechnic and the University of Otago are focal points for research on EV technologies and consumer preferences. A number of stakeholders, including the DCC, Otago Chamber of Commerce, Delta and Otago Polytechnic, have taken bold steps and installed the city's first EV charging stations, including the South Island's first fast charger.

The Dunedin Energy Baseline Study shows transport fuels are a major part of Dunedin's energy consumption. EVs are a step towards saving energy dollars and improving our overall energy efficiency and economy.

Embracing EVs requires some infrastructure and logistical changes. The Dunedin EV action outlines activities that will facilitate these changes. The action also lends support to other alternative and communal forms of transport, such as those outlined in Dunedin's Integrated Transport Strategy.

Action and delivery

Dunedin EV builds on a platform of already collaborating stakeholders and community groups.

Dunedin's first EV charging stations are already installed and in use. Expanding this infrastructure across the city requires identifying other potential hosts: car parks, retail stores and other accessible public spaces. In the medium term, stakeholders will shed light on the advantages of hosting charging infrastructure and the potential for win-win collaborations between business, institutions and the research community.

Who should own and manage Dunedin's charging infrastructure, and what payment methods are preferred by the city's EV users? Dunedin EV will facilitate the discussions needed to answer these questions, and ideally create market opportunities in the transport sector.

It's anticipated this action will support the switch to EVs in Dunedin. The city's businesses and entrepreneurs may take an interest in improving access to EVs. Given the variety of possible user groups in the city, there is potential for different uptake patterns to emerge: corporate entities are taking steps to switch to an EV fleet; community groups and individuals are looking at options around leasing EVs and promoting the use of electric bikes; and the city's public transport network is likely, over time, to include electric bikes and buses.

Measuring success

Successful delivery of this action will result in:

- more charging stations available at convenient locations throughout the city
- increased uptake of EVs for private and corporate drivers
- increased use of electric buses and bikes by the city's commuters.

Key delivery partners

A number of organisations are already engaged in the discussion around electric vehicles in Dunedin, including:

- Aurora Energy
- Dunedin City Council
- New Zealand Automobile Association
- Otago Chamber of Commerce
- Otago Polytechnic
- University of Otago

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Establish Dunedin's first EV charging infrastructure	**Dunedin City Council** **Otago Polytechnic** **University of Otago** **Delta** **Otago Regional Council**	Number of sites chosen, permits and consents obtained Number of cars recharging onsite at public charging points
Work with the Otago Regional Council on potential EV transport activity	**Dunedin City Council** **Otago Regional Council**	Number of projects with joint ORC and DCC involvement
Proposed activities		
Enable a group of energy leaders advise on: • potential locations for additional charging stations • ways to support EV uptake	**Dunedin City Council** **Otago Chamber of Commerce** **Otago Polytechnic** **University of Otago**	Energy leaders group for EV meets three times a year
Advocate for alternative and/or communal forms of transport such as electric buses	**Dunedin City Council** **Otago Regional Council**	Number of bus companies that adopt EV technology Proportion of trips made using communal and alternative transport
Establish links with potential charging station hosts and/or owners	**Dunedin City Council** **Otago Chamber of Commerce** **Otago Polytechnic** **University of Otago**	Number of local businesses showing interest in hosting charging stations At least one EV service centre operating in city
Showcase local EV successes	**Energy Leaders Accord partners**	Number of EV successes in local publications
Define key user groups and models for EV uptake	**Energy Leaders Accord partners**	Report prepared on key user groups and models for EV uptake
Highlight research on the latest developments in EVs and charging infrastructure	**Energy Leaders Accord partners**	Updates provided to EV Panel members and stakeholders at least annually on latest developments

Biomass

"Dunedin's wood biomass renewable heat hub is a great example of what can be achieved by utilising a waste product that would normally remain on the forest floor. Dunedin polytechnic, hospitals and other major organisations are choosing to switch to woodchip fuel because it is locally sourced, readily available and low operating cost. These organisations have switched from expensive non-renewable fuels and saved hundreds of thousands of dollars in the process.

Our southern neighbours are looking to emulate what we've started, wanting to see the multi-million dollar investment in woodchip infrastructure that we've seen in Dunedin. I would like to see the city continue moving forward with this technology that creates local jobs, keeps money in the local economy and strengthens our green brand."

LLOYD MCGINTY | DIRECTOR, AHIKA CONSULTING

Photo by Stefan Mutch

Biomass

Current position

Our city's biomass resources offer viable energy alternatives. If managed sustainably, biomass can provide a source of energy that is economical, local and can reduce environmental effects.

Dunedin's industries are already showing signs of adopting biomass energy as a way of improving their triple bottom line. Woodchip is now being used by a number of organisations to replace coal and gas boilers. A micro district heating network has long supplied the university and hospital. Discussion of new or expanded district heating systems to meet more of Dunedin's energy needs has begun. This may include using biogas, either in new generators like the Green Island landfill or organic waste streams closer to their source.

This action outlines the first steps towards realising Dunedin's biomass potential.

Action and delivery

A considerable proportion of Dunedin's forests already provide the city with economic benefit through resource ownership, export earnings and employment. Increasingly, this and other sources of wood fuels are heating some of our largest and most important buildings, including health and education campuses. It is important that this energy resource is well understood and carefully managed. The Baseline Energy action should help us better understand the extent and any limitations of biomass resources.

The Energy Leaders action will support cooperation and information sharing among industries interested in biomass energy. Those already using woodchip and other bioenergy will be encouraged to share their experiences and further actions will be developed based on these experiences, including a better understanding of the potential for shared or district heating systems and any regional implications or opportunities.

Measuring success

Successful delivery of this action will result in:

- better understanding of the extent and limitations of the city's biomass energy resources for the foreseeable future
- additional uptake of biomass fuels driven by economic and environmental benefit.

Key delivery partners

A number of organisations are already involved in the discussion around bioenergy potentials in Dunedin, including:

- ADI Systems Inc.
- Ahika Consulting
- City Forests
- Dunedin City Council
- Otago Chamber of Commerce
- Otago Polytechnic
- University of Otago

Delivery activities	Lead organisations	Measuring progress
Proposed activities		
Inform and use the findings of Baseline Energy to better understand the extent and limitations of Dunedin's biomass energy resources	**Dunedin City Council** **Otago Polytechnic** **University of Otago** **Otago Chamber of Commerce** **Otago Regional Council** **City Forests** **ADI Systems Inc** **Ahika Consulting**	Report on the extent and limitations of the city's biomass energy resources completed
Engage with stakeholders in switching to biomass fuels, and link with relevant energy leaders	**Dunedin City Council** **Energy Leaders Accord partners**	Number and proportion of the city's bioenergy stakeholders engaged Number and proportion of the city's bioenergy stakeholders actively involved in implementing actions Number of meetings held between the city's bioenergy stakeholders
Gather and publicise lessons learned from existing use of biomass fuel	**Dunedin City Council** **Energy Leaders Accord partners**	Presentation of case study to Dunedin audiences
Advocate for city composting and/or biogas generation from organic wastes, where appropriate	**Energy Leaders Accord partners**	Formal engagement channels created with waste services
Commission feasibility studies for shared or district heating systems for the city	**Dunedin City Council** **Otago Chamber of Commerce** **Energy Leaders Accord partners**	District Heating Feasibility Study commissioned District Heating Feasibility Study completed

Food Resilience

"Our current food system is overly reliant on fossil fuels, both directly and indirectly. We need to find local solutions to these and other problems that face us all as we strive to create a more resilient society."

ANDY BARRATT | OUR FOOD NETWORK

Food Resilience

Current position

Modern food systems are frequently complex, industrialised and international. These features mean food production can be energy intensive with high associated greenhouse gas emissions and increasing vulnerability to environmental and social shocks. Successful implementation of the food resilience project will deliver an improved local food system, ensuring a reliable and affordable supply of good quality food, produced locally and sustainably. Overseas, the role of local authorities in building food resilience is increasing and DCC has committed to joining with these forward-thinking cities. Undertaking food resilience work will mean we:

- have thriving local food producers and businesses
- actively protect our food production environment
- support better environmental outcomes
- make it easy for communities to grow their own food
- ensure an equitable supply of healthy, affordable food for Dunedin residents.

Building food resilience is consistent with, and will enhance, Dunedin's goal to be one of the world's great small cities. It is also consistent with the Council's strategic objectives to be an environmentally sustainable and resilient city that enables a prosperous and diverse economy.

Action and delivery

Every local food system is complex and unique, and building food resilience requires a mix of local solutions and best practice from overseas experience. Locally there are already a number of individuals and organisations operating in this space; subsequently this work will require a collaborative effort with input and leadership from business, community and research sectors.

A key objective of this project is to bring consumers and producers closer together, creating energy efficiencies by shortening the food chain. There are two obvious opportunities to do this:

- Most of the fresh produce we produce locally is transported to distribution centres in other parts New Zealand, some then returning to Dunedin to be purchased in supermarkets. An opportunity exists to enable local growers and producers to supply local retailers directly.
- Having land available for food production in close proximity to urban areas would also decrease the length of the food chain, as well as creating local markets for produce.

An important early step in the delivery of the food resilience project will be the development of a local 'food charter'. Signatories to the food charter will commit to working toward environmentally sustainable and energy efficient food practices.

Measuring success

Successful delivery of this action will result in:

- increased knowledge of, and access to, locally grown/manufactured food
- increased access to information and resources that enable residents to grow/farm their own food
- increased number of food growers and manufacturers adopting energy efficient production methods
- decreased food-related waste
- enhanced awareness of the effects of climate change on food production.

Key delivery partners

A number of organisations are engaged in the discussion around food resilience in Dunedin, including:

- Dunedin City Council
- Otago Polytechnic
- Our Food Network
- University of Otago

Delivery activities	Lead organisations	Measuring progress
Confirmed activities		
Establish an internal food resilience working group	**Dunedin City Council**	Group established
Develop a Dunedin food charter	**Dunedin City Council**	Charter established
Identify areas important for food production, e.g. those where high class soils are present	**Dunedin City Council**	Important food production areas identified and considered through the development of the Second Generation District Plan
Support local agencies that are working to address food inequity	**Dunedin City Council** **FoodShare** **Presbyterian Support Otago**	Number of agencies supported, and frequency of contact
Proposed activities		
Investigate marketing campaigns to support local food producers and manufacturers	**Dunedin City Council**	Feasibility study undertaken Campaign developed, if appropriate
Identify input on food resilience issues within climate change adaption strategies	**Dunedin City Council**	Food resilience issues identified included in climate change adaptation and mitigation planning

The Energy Plan 1.0 is a living document – the most current version of the plan will always be available at *www.dunedin.govt.nz/energy-plan.* As work progresses, some actions will be completed, or amended to reflect a changing context, and new actions may be added as new information emerges and people and businesses with different skills and interests become involved. We're keen to hear from you at any time, as your ideas and feedback will help to keep the plan moving forward. Email us at *energyplan@dcc.govt.nz* or call 03 477 4000.

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DUNEDIN CITY COUNCIL
Kaunihera-a-rohe o Otepoti

OTAGO POLYTECHNIC

UNIVERSITY OF OTAGO
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THE OTAGO CHAMBER OF COMMERCE

Te Rūnanga ō Ōtākou (Inc)

Kāti Huirapa Runaka ki Puketeraki