Before Independent Hearings Commissioners
appointed by the Northland Regional Council

under: the Resource Management Act 1991

in the matter of: an application by Meridian Energy Limited for resource consents for earthworks, associated stormwater diversion and discharges and vegetation clearance for the construction of a solar farm at Ruakākā, Northland (APP.045356.01.01)

between: **Meridian Energy Limited**
Applicant

and: **Northland Regional Council**
Consent Authority

Statement of Evidence of Grant Telfar (Company)

Dated: 19 July 2024

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STATEMENT OF EVIDENCE OF GRANT TELFAR

INTRODUCTION

1 My full name is Grant John Barnard Telfar.

2 I am an industry advisor in the Development team for Meridian Energy Limited (*MEL*) based in Wellington. I have held this position since 2021, and have over 30 years' experience in the electricity industry.

3 I hold a BSc (Hons) in mathematics and statistics and an MSc in statistics and operations research.

4 My responsibilities in my role for MEL include:

4.1 ensuring that a long-term strategic view guides MEL's renewable energy development aspirations and activity; and

4.2 the commercial valuation of MEL's pipeline of renewable energy options as projects move from concept through to a final business case and investment decision.

5 Overall, I help guide the creation and management of MEL's long-term power system, economic, and market views to 2050, which includes the role of new generation assets such as the proposed Ruakākā solar farm (the *Proposal*).

6 Before my current role, from 2019 I was the modelling and portfolio manager within the Wholesale Trading team at MEL. Prior to that, from 2014, I was a strategic advisor within the Strategy and Finance team at MEL. In these roles I was responsible for identifying future energy system scenarios and leading the economic modelling to underpin iterations of MEL's corporate strategy. I provided the main economic and financial analysis and advice for a number of business cases for MEL Board decisions to invest in nearly 700MW and approximately $2 billion of new generation development projects, spanning the period 2014 to 2024.

7 Prior to 2014, I held a variety of roles with MEL, and with a number of local and international advisory consulting firms, focusing primarily on strategy, analytics, and power system economics.

8 I am authorised to give this evidence on MEL's behalf in relation to MEL's application to Northland Regional Council (*Council*) for regional consents associated with the Proposal. I note that MEL has already obtained the necessary district consents from Whangarei District Council, as well as all necessary consents for the related Ruakākā Battery Energy Storage System (the *BESS*). The BESS is under construction and scheduled to commence operations in December 2024.

9 As an employee of MEL, I am not purporting to give this evidence as an independent expert witness. However, my evidence is intended to assist the Commissioners in understanding the context and importance of solar development options as part of the wider electricity system in New Zealand, particularly in the context of increasing demand scenarios as New Zealand moves towards a lower-carbon economy. To the extent that my evidence covers matters within my area of professional expertise, I therefore confirm that I have read the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2023, and I have complied with it when preparing my evidence.

SCOPE OF EVIDENCE

10 My evidence will address:

10.1 an overview of MEL;

10.2 New Zealand's energy system;

10.3 how the energy system operates;

10.4 future energy demand;

10.5 energy supply options and the development of projects; and

10.6 the Proposal and the associated benefits.

11 I have read and am familiar with the evidence of **Micah Sherman** for MEL, which covers the site selection and design of the Proposal in more specific detail. **Mr Sherman's** evidence also provides a company response to submissions received on the Proposal and the Council's section 42A report.

SUMMARY OF EVIDENCE

12 The Proposal is an exciting high-quality project that will deliver substantial benefits for the Northland region and New Zealand. It responds to the increasing need for electricity into the future and satisfies and supports a number of government policies. It is viewed by MEL as a positive, viable, and imminent project.

13 There is a clear imperative to move New Zealand's electricity system to 100% renewable generation by 2035 (or close to it) and to move to a zero-carbon economy by 2050. This will require the development of a substantial amount of new renewable electricity generation over the next 10–30 years to meet thermal retirement and expected demand.

14 With a potential energy generation capacity to the grid of around 100-150 MW, and an estimated annual production of approximately

150-200 GWh, the Proposal is well placed to contribute to meeting the demand growth predictions.

15 The Proposal site was carefully selected to meet the necessary attributes for a successful solar development, including, in particular, proximity to transmission infrastructure, the ability to pair with the BESS, a reliable solar resource, a suitable location within the power system, and the ability to achieve a constructible but low environmental impact design. The Proposal is uniquely the best grid connection option that MEL is aware of in Northland and it will add resilience to the electricity system in an area that is notably supply short.

16 MEL thanks the Commissioners, Council and submitters for their time and consideration, and seeks that the necessary regional consents that are the subject of this hearing be granted.

OVERVIEW OF MEL

17 MEL was one of four companies formed from the split of the Electricity Corporation of New Zealand beginning with Contact Energy Limited (*Contact*) in November 1995, followed by Genesis Energy Limited, Mighty River Power (now Mercury NZ Limited) and MEL on 1 April 1999. All companies are now listed, with Contact fully privatised, while the other three mixed ownership model companies remain partially state owned. MEL is listed on the New Zealand and Australian stock exchanges and is 51% owned by the New Zealand Government.

18 MEL is a renewable energy generator and electricity retailer, and is committed to generating electricity from 100% renewable sources – sun, water and wind. MEL generates around 30% of New Zealand's current electricity production.

19 MEL's core business is the generation, marketing, trading and retailing of electricity and the management of associated assets and ancillary structures in New Zealand. MEL retails electricity across New Zealand with around 290,000 customers supplied through its Meridian and Powershop brands.

20 In New Zealand, MEL owns and manages:

20.1 two hydro-electricity schemes: the Waitaki Power Scheme (from Lake Pūkaki downstream and comprising six power stations), and the Manapōuri Power Scheme;

20.2 six wind farms: Te Uku (Raglan), Te Āpiti (Manawatū), Harapaki (Hawke's Bay – currently under construction), Mill Creek (Wellington), West Wind (Wellington) and White Hill (Southland) and has entered into a joint venture with New Zealand Windfarms Limited for the repowering and extension of the Te Rere Hau windfarm (Manawatū-Whanganui); and

20.3 one BESS: the Ruakākā BESS, under construction.

21 MEL's hydro stations generate enough electricity to power the equivalent of around 1.6 million homes each year and its wind farms generate enough electricity to power the equivalent of around 270,000 homes each year.

22 MEL is actively investigating and pursuing options for new renewable generation capacity and is investigating a number of sites that have potential for solar and wind development.

23 MEL has recently put forward two projects which it considers should be in the list of projects included in the Fast-track Approvals Bill:

23.1 the Waiinu Energy Park, located 42km north-west of Whanganui in South Taranaki. This project would comprise solar generation (400 MW), wind generation (350 MW, 50 turbines), and a BESS, with a maximum annual generation of approximately 2,000 GWh. The project is one of the largest economic renewable energy development opportunities in New Zealand that MEL is aware of; and

23.2 Western Bay Solar, located on the western side of Lake Taupo. This project would have a maximum capacity of 500 MW.

24 MEL is also developing grid resilience and reserve options. For example, the broader Ruakākā Energy Park will include the Proposal together with the BESS, a 100 MW, 2-hour battery storage system. As noted in my introduction, the BESS is already consented and is currently under construction.

25 The BESS is New Zealand's first large-scale grid battery storage system. It will store enough energy to power approximately 60,000 homes for two hours. This allows MEL to make power available in the morning and evening peaks or whenever the sun is not shining. This helps create a more secure power system with fewer outages and lower carbon emissions, as a BESS allows intermittent generation to better match load.

26 MEL has a proven track record in the development and operation of energy projects both in New Zealand and overseas, and within sensitive areas such as the Fiordland National Park and Ross Island, Antarctica. We have an experienced generation team which has been managing hydro schemes and wind farms for over 25 years.

27 MEL brings this approach and experience to the design of the Proposal, and to its construction and operation should the regional consents, which are the subject of this hearing, be granted.

NEW ZEALAND'S ENERGY SYSTEM

28 The nature of New Zealand's energy system is determined by its geography, population base and natural resources (see **Figure 1** below). The network by its nature is isolated, long and drawn out across the length of the country. Demand is dominated by the North Island with energy being exported or imported between both islands via the High Voltage Direct Current (*HVDC*) link. Most of the time there is a positive flow of electricity to the North Island via this link, although sometimes the flow of electricity is in the opposite direction, depending on the state of hydro generation and storage in the South Island and relative levels of demand.

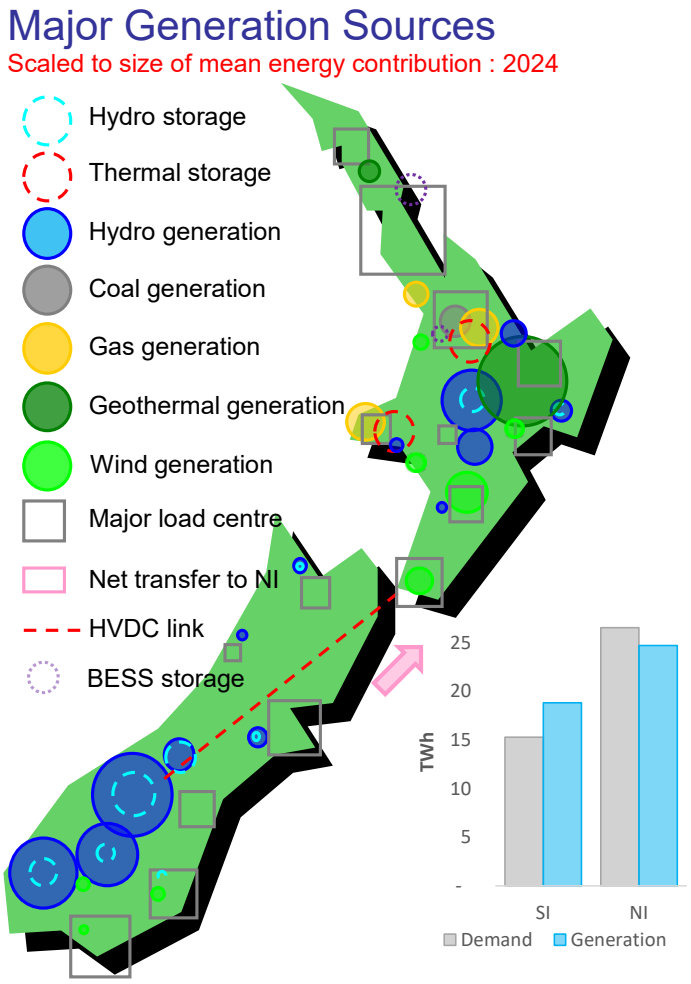

Figure 1: The New Zealand power system – key generation sources by fuel type, MEL

29 The New Zealand energy system has historically been characterised by the dominance of hydro generation. As other new generation has been added to the system, the proportion of total generation from hydro has declined from a high of 80% in the 1970s to between 50–60% in recent years, depending on rainfall. This proportion will likely reduce further over time as total demand and supply grow with only a modest amount of remaining economic and realistically-consentable hydro development likely.

30 There has been a significant wave of new wind, geothermal and solar projects commissioned and committed to over the last few years. However, hydro generation is still the largest single source of generation at approximately 57% per annum in a typical year. Geothermal contributes around 20%, wind contributes 10%, and coal, gas and thermal plant together contribute 5–15% depending on rainfall conditions. Solar and biomass currently contribute <1%. Solar is growing quickly as a new source of renewable energy.

31 The current contribution of different types of generation to the energy system is expected to be transformed in the coming decades as old thermal plant are replaced with new renewable generation, and as new renewable generation is built to supply increasing demand.

32 Solar generation in New Zealand started with the installation of early adoption household and commercial roof-top projects. Solar power in New Zealand has increased in scale steadily and is now on the cusp of significant growth with a number of grid-connected commercial developments committed to over the next few years. Across rooftops and a number of facilities scattered around the motu there is approximately 565MW of total solar capacity at 2024 – see **Figure 2**. Most commentators suggest there will be a large increase in the contribution from solar to the power system over the next three decades (Boston Consulting Group Limited (*BCG*) in **Figure 3** suggest that at 6,000MW by 2050 there could well be a tenfold increase from today). **Figure 3** also suggests that no single source of new generation, roof-top solar or otherwise, is alone going to be sufficient to meet New Zealand's targets and multiple utility scale projects, such as the Proposal, will be required.

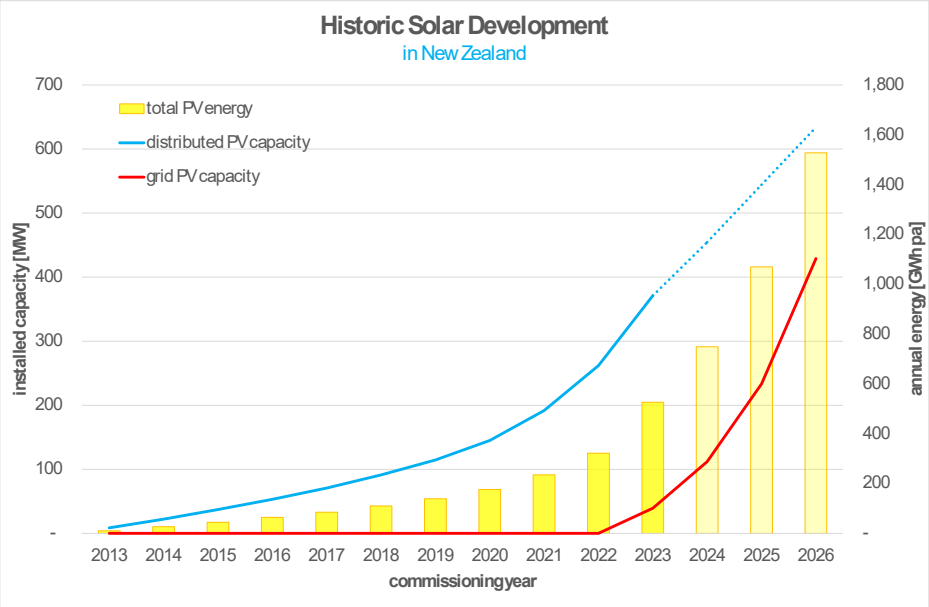

Figure 2: Historical solar development in New Zealand 2013 to 2026, Meridian Energy Limited, 2024

HOW THE ENERGY SYSTEM OPERATES

33 The New Zealand electricity system and how it operates today are a product of the country's physical resources and the historic development of the electricity system, overlaid by Government reforms prior to and during the 1990s. This culminated in the establishment of a wholesale marketplace for the generation and sale of electricity in 1996. The government reforms split the sector into generation, transmission, distribution, retail and consumers, and established a regulatory regime to oversee the competitive and monopoly elements of the industry.

34 The New Zealand Electricity Authority, which replaced the previous government authority (the Electricity Commission) in November 2010, was established as an independent Crown entity responsible for the efficient operation of the New Zealand electricity market. The Authority is a dedicated electricity market regulator. Its purpose is to promote competition and ensure a reliable supply by the efficient operation of the electricity industry for the benefit of consumers. The Commerce Commission regulates the monopoly aspects of the industry, transmission and distribution.

35 Transpower New Zealand Limited (*Transpower*) performs two functions within the electricity system. Its first function is as the Grid Owner and operator of the national grid. Its second function is as the System Operator. As System Operator Transpower is responsible for managing the real-time power system and operating the wholesale electricity market. This ensures that generation matches demand at all times and that electricity is dispatched to meet demand securely and at lowest cost. The System Operator facilitates the market clearing process to ensure that demand and supply match at all times. It is not in and of itself responsible for any individual actions taken within the power system, aside from actions specified in the Electricity Industry Participation Code that can be taken during rare periods of emergency management of the power system when under stress.

36 The electricity market in New Zealand is an energy-only marketplace. Generators compete for the opportunity to produce electricity and get paid for what they supply at the marginal market price for each half hourly trading period. The marginal market price is the highest price at which electricity is supplied to the grid in each half hour. There is open and equal access to transmission and distribution networks. Finally, there is full retail contestability between providers. In broad terms, this means that any new retailer or any new load or generation that complies with consent conditions and connection standards can begin operations when they themselves are convinced that there is a commercial opportunity.

37 The New Zealand electricity market includes competitive wholesale and retail markets. Electricity markets have relatively unique

characteristics in that, once generated, electricity cannot be easily stored in the system and generation must be continuously matched with consumption on a moment-to-moment basis to ensure that the entire system is maintained in a stable and secure state. As discussed above it is the role of the System Operator to co-ordinate the matching of supply and demand in real time.

FUTURE ENERGY DEMAND

38 In 2015, New Zealand signed the United Nations Framework Convention on Climate Change Paris Agreement. Under the agreement, New Zealand is now committed to reducing our net greenhouse gas emissions to 50% below gross 2005 levels by 2030.

39 The Climate Change Response (Zero Carbon) Amendment Act 2019 (*Zero Carbon Act*) came into force in July 2019 and commits New Zealand to achieving net zero greenhouse gas emissions by 2050.

40 In June 2022, the New Zealand Government produced our first Emissions Reduction Plan, which sets out the net zero emissions targets, and plans to meet those targets. This includes phasing out fossil fuels while "massively ramping up renewables in… electricity generation", including a target to generate 100% renewable electricity by 2030.

41 In July 2024, the new Coalition Government outlined a five-point climate change strategy reiterating the country's commitment to meeting its climate change targets. In particular, the strategy emphasised ensuring that the country has resilient infrastructure, and that clean energy is abundant and affordable.

42 Electricity demand in New Zealand has been relatively flat for the past decade as energy efficiency (LEDs, insulation, appliances, domestic heat pumps, industrial process improvements) has lowered the level of demand growth for electricity.[1]

43 This static demand picture will change as the economy decarbonises, in addition to population and economic growth, meaning electricity demand will increase over the next 30 years.

44 There is general agreement amongst key organisations, including the Ministry of Business, Innovation and Employment, Transpower and BCG, that around a doubling of electricity demand by 2050 is likely (see **Figure 3** below).

[1] Transpower 2018: Te Mauri Hiko – Energy Futures white paper.

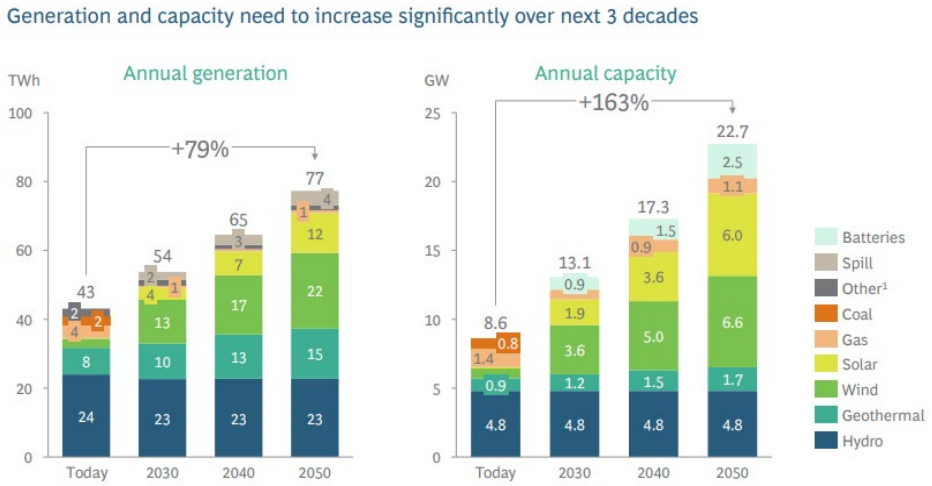

Figure 3: The Future is Electric, Generation and Capacity Needs, Boston Consulting Group, 2022

45 Transpower projects significant electrification – the shift from energy sources such as coal, gas and oil to renewable electricity – while the rate at which transport and stationary energy (process heat, industrial boilers, etc) will electrify will depend on a variety of factors.

46 There is broad consensus that taken together these features describe an increasingly large role for electricity in the future New Zealand economy, and create a need for additional generation, the bulk of which must be renewable if international climate obligations and current domestic government policy goals are to be met. The construction of new renewable generation and the move away from non-renewables will happen over time as asset life-cycles naturally require replacement and generators respond to demand growth and the market opportunities this presents for commissioning new generation projects.

47 Regardless of climate ambitions, demand growth and retirement of existing generation plant will necessitate a significant ongoing role for new generation build. In addition, other factors influencing renewable electricity demand over the next few decades include the prospect of new, energy intensive industry in New Zealand, for example data centres or the production of green products such as hydrogen.[2]

48 There is accordingly an urgent need for new renewable electricity generation. Around 1,250 GWh of new renewable generation will be required on average each year until 2050. In practical terms, New Zealand's electricity infrastructure will have to grow by approximately five solar farms the size of the Proposal each year until 2050 to cater for this increased demand.

[2] For example, see MEL's Southern Green Hydrogen project: https://www.meridianenergy.co.nz/new-projects.

ENERGY SUPPLY OPTIONS AND THE DEVELOPMENT OF SOLAR PROPOSALS

49 There are a range of generation options available for meeting future demand for electricity. Viable generation options are limited by any company's ability to efficiently connect to the electricity transmission and distribution networks, gain the necessary land access or ownership, and obtain consent for particular projects. Other factors such as government policy, regulation and transmission investment may influence the set of available options.

50 In terms of which projects proceed to construction, an overarching issue is project economics. From an economic perspective, in New Zealand's energy generation market, of all of the consented projects, those that should proceed to construction are the ones with the lowest long-run marginal cost. The market contains incentives to achieve this, and the cost of advancing expensive or uneconomic projects is borne by the project proponent.

51 Even if the overall economic environment is favourable for renewable projects, depending on the relative economics of various projects, new renewable investment may be limited to those few projects with favourable attributes (such as quality of resource and access to transmission grid capacity).

52 This analysis is confirmed in the 2022 report prepared for the power industry by BCG where solar, provided it has the suitable building blocks described above for development, is – along with wind – considered the most cost effective investment for new generation.[3] These renewable technologies have become significantly cheaper over the last 10 years, and are expected to do so (in real terms) in the future. This is illustrated in **Figure 4** below.

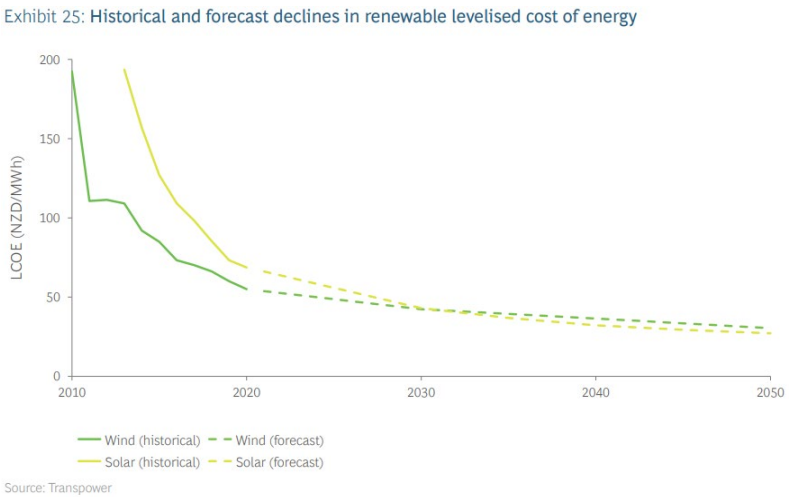

Figure 4: The Future is Electric, Historical and forecast LCOE, Boston Consulting Group, 2022

[3] Climate Change in New Zealand: The Future is Electric, BCG 2022.

53 The benefit of low-cost power is a community/societal benefit. It is critical that companies such as MEL meet the challenge of a growing need for electricity by pursuing the lowest cost options that are available to them. The electricity market and commercial investment disciplines ensure that MEL and other market participants make prudent decisions about which projects to consent and construct.

54 MEL is continuously assessing potential solar farm sites throughout New Zealand. The determining factors associated with solar farm development include:

54.1 a reliable solar resource;

54.2 the ability to connect into local networks or the national grid and capacity in the transmission to convey the energy;

54.3 where relevant (and increasingly so), the ability to pair with battery storage systems;

54.4 the ability to obtain access to or ownership to land;

54.5 topography and site size;

54.6 environmental considerations, both on and off-site;

54.7 the applicable legislative and planning framework;

54.8 constructability; and

54.9 the commercial implications of each site location (as discussed above).

55 These are all key influences that feed into the site selection and project development processes.

56 The careful selection and development of appropriate sites will result in both environmental benefits and the market and system benefits of secure power supply at lowest cost.

THE PROPOSAL

57 Large-scale solar is a relatively new generation technology in New Zealand. However, in addition to our significant general experience outlined above, MEL already has substantial solar experience. For example:

57.1 MEL's United States operations were at one point the largest solar developer and owner/operator in California;

57.2 MEL has good experience gained from constructing solar facilities in Tonga; and

57.3 MEL also has a well-established commercial solar business unit that helps commercial customers install medium-scale roof-top solar.

58 With MEL's existing experience, we are able to maximise the chances of project success (both consenting and economic). MEL is careful and deliberate in our approach to all aspects of developing a solar farm proposal and follows the site selection and development process outlined above, and in more detail in **Mr Sherman's** evidence. We focus on developing good relationships that will thrive, not just survive, throughout the inevitable ups and downs of a project.

59 The Proposal is a major commitment for MEL. MEL has spent the time and resources necessary to thoroughly investigate the Proposal. We consider we have all the key ingredients for a successful solar development at Ruakākā. The MEL Board has approved our seeking resource consents for this project because it is satisfied that it is a viable project. In particular, this is reflected in the grant of the district consents from Whangarei District Council.

60 MEL is eager to progress the Proposal. Should consents be granted, MEL is confident that a positive final investment decision will subsequently be made by the MEL Board. In that case, MEL expects to move quickly onto the construction phase of the project. This Proposal is not merely an option, such as is the case for some other similar projects in the country. Early-stage commercial tendering of elements of project construction are already underway. MEL does not need to secure additional funds nor does it require an off-take agreement with any additional party in order to progress the Proposal.

61 MEL's assessment is that both the construction and operation of the Proposal, should consents be granted, will result in significant regional and national benefits. The benefits are both social and economic.

62 As noted in the application and addressed above, key benefits from an energy perspective are security and reliability of supply for the Northland region and, more broadly, the national grid.

63 Critical to the ability to incorporate large amounts of solar generation into New Zealand's generation mix is geographic diversity in the siting of solar farms. If solar farms are located in separate parts of the country the effect of intermittency, which is based on whether the sun is shining or not, is reduced. MEL has adopted a strategy of having geographically dispersed solar farm sites to better use the weather patterns over the extent of the country and the Proposal aligns with MEL's strategy in this respect. Pursuing renewable development projects is all the more relevant in the Northland context, which has limited suitable opportunities due to the grid, topography and other variables.

64 Intermittent technologies are supported by other types of generation which can be used in a flexible manner, such as hydro generation and newer battery technologies (such as the BESS). The BESS together with the Proposal will enable the provision of a secure and reliable electricity supply for Northland. These elements of the broader Ruakākā Energy Park are therefore inextricably linked.

65 The security of supply issue was highlighted very recently when a Transpower pylon collapse caused a mass power outage in Northland, with 100,000 people in the region losing power.[4] In this particular case, the Ruakākā Energy Park would not have prevented the immediate full de-powering of the Northland grid. But over subsequent hours and days, as power was slowly restored and lines reconfigured, solar generation and battery storage at Ruakākā would, had it been in place, together been able to help restore power to more households, and sooner, than occurred in the days following the event.

66 In addition, when solar farms are generating, hydro inflows can be held in storage. When solar generation is low, reserved hydro capacity can make up for the shortfall. Solar variability is strongest over a few days, while hydro storage varies over a longer timeframe (typically six months), so solar and hydro together make an excellent combination for a secure supply.

67 Further, economic gains accrue where renewables are dispersed, rather than concentrated in a single location. Dispersed development means that each region can make a contribution to a national system providing diversity and resilience, one that is greater than the sum of all its parts. The location of the Proposal within New Zealand's overall generation and distribution network is therefore a positive factor.

68 Northland wholesale power prices and associated retail tariffs are amongst the highest in the country, in large part due to the need to import the bulk of the region's power from where it is made further south. However, higher prices encourage the development of options like the Proposal. Over time, these projects will help mitigate power price increases in Northland. In the future, if Northland becomes a net power exporter, which is possible, then its local power prices and costs to consumers may even become lower than regions to the south.

69 The Proposal will have a total budget of between $185 and $200 million. Based on MEL's previous experience, it is anticipated that at least 10% (i.e. $20 million) of this will be spent in the Northland region. For example, for MEL's Harapaki wind farm, MEL set itself a target of 10% of the total budget to be spent directly in the region.

[4] RNZ: https://www.rnz.co.nz/news/national/520400/transpower-reveals-why-pylon-fell-causing-major-northland-outage.

This has been well exceeded, with 18% of the total budget being attributed to 'local spend'. This was formally embedded in the contractual arrangements for the project, with a key performance measure of the construction team being that more than 40% of the workforce's primary place of residence being Hawke's Bay.

70 Local expenditure in the construction of a solar farm comes predominantly from civil works, electrical infrastructure installation, panel transportation, and project management. For the Proposal, this spending would be spread over the construction timeframe which is likely to be 12-18 months in total.

71 Once constructed, the operations phase would begin. A solar farm such as Ruakākā would have staff on-site to manage the maintenance and operational aspects of the solar farm, as well as a number of ongoing external staff visits for regular equipment inspections and engineering support. Additional staff may be required for major maintenance activities such as mid-life refurbishments or ongoing transmission, substation, communications and road maintenance. Our experience from our fleet of wind farms has seen a number of these staff base themselves close to the site for ease of access and as a result become part of the community. Operational phase local expenditure is for supply services such as engineering, civil works (maintaining roads and erosion controls), warehouse storage, and repairs to and maintenance of equipment.

72 Beyond direct employment opportunities, MEL typically also provides a community fund to recognise the contribution our generation communities make to our operations and to the country's wider electricity sector. There are currently funds established and operating for the benefit of each of the communities associated with Te Āpiti, White Hill, West Wind, Mill Creek and Te Uku and wind farms, and for both our Waitaki and Manapōuri hydro schemes. A Harapaki wind farm fund is currently being established. If the Proposal proceeds to construction, at the discretion of the MEL Board, a fund may be established for the local community.

19 July 2024

Grant Telfar