ESSENTIAL SERVICES COMMISSION

INQUIRY INTO THE TRUE VALUE OF DISTRIBUTED GENERATION

Our Proposed Approach

December 2015

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EXECUTIVE SUMMARY

Under section 41 of the *Essential Services Commission Act 2001,* the Essential Services Commission has been asked to carry out an inquiry into the true value of distributed generation. This paper outlines the Commission's proposed approach to the inquiry and highlights the issues we think will need to be taken into account as it proceeds.

As we carried out our initial research it became clear that given the complexity of the issues involved, we required more time to properly investigate these issues. We are therefore proposing to the Government that the inquiry be split into two parts, allowing us to separately consider the *energy* value of distributed generation and the *network* value of distributed generation. We have also requested from the government an extension to the inquiry timeline.

The Commission is proposing that the inquiry focuses on:

- Distributed generation below 5 MW in size.
- All forms of distributed generation, regardless of fuel source, including battery storage.
- The total output of distributed generation, i.e. that which is used to meet a customer's demand as well as that which is exported.

The Commission is proposing that the focus of this inquiry is on identifying the public benefit (as opposed to the private benefit) that arises from the investment in distributed generation, and determining whether and how a distributed generator is rewarded for any quantified public benefit it generates.

For the purposes of this inquiry, the Commission is proposing to define three elements of public benefit that could flow from the investment in distributed generation. These are:

- The economic benefit of distributed generation to the electricity market and distribution network.
- Any environmental benefit that can be attributed to distributed generation.
- Any other benefits that can be attributed to distributed generation.

The regulatory framework governing the deployment, valuation and remuneration of distributed generation is a mix of state, national and Commonwealth measures. Through this inquiry, the Commission is seeking to understand the practical impact of the measures.

Based on the research we have carried out to date, the Commission makes the following observations:

- The electricity generated by a distributed generator can have an economic benefit to the wholesale electricity market. This is currently reflected in the feed-in tariff rate calculated annually by the Commission. The benefit to the electricity market varies by time and location. The Commission is proposing to evaluate the merits of developing a methodology for calculating the economic benefit on a time-of-use and locational basis.
- The electricity generated by a distributed generator can reduce the carbon emissions associated with the supply of electricity. In the absence of a carbon price this benefit is no longer reflected in the electricity price. However, the existence of the Renewable Energy Target (RET) may mean that the environmental benefit of distributed generation is sufficiently reflected in the payments available via the RET. For sources of distributed generation not eligible for the RET, it is possible to calculate a carbon benefit based on the emissions intensity of the distributed generator.
- The Commission has been unable to identify other public benefits that can be attributed to the electricity generated by distributed generation that are easily quantifiable. We are seeking evidence from stakeholders as to other public benefits that can be attributed to the electricity generated by distributed generation and how any identified value can be quantified.
- Distributed generation can have an economic benefit to the distribution network. The extent of this value is highly dependent on the time and location of the

generation. The Commission is proposing to take forward further work to determine if it is possible to develop a methodology to enable the calculation of this benefit.

- The Commission has so far been unable to identify specific environmental or other public benefits that a distributed generator provides to the distribution network, that are easily quantifiable. We are seeking evidence from stakeholders as to whether these benefits can be identified and quantified.

Stakeholders are invited to provide submissions to this Proposed Approach Paper by **5pm Friday 12 February.**

ACRONYMS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
DLF	Distribution Loss Factor
DUOS	Distribution Use of System
EIA	Electricity Industry Act
FIT	Feed-in Tariff
IPART	Independent Pricing and Regulatory Tribunal
kVA	Kilovolt Amp
kW	Kilowatt
kWh	Kilowatt Hour
LGC	Large-scale Generation Certificate
LGNC	Local Generation Network Credit
LRET	Large-scale Renewable Energy Target
LRMC	Long Run Marginal Cost

MLF	Marginal Loss Factor
MW	Megawatt
MWh	Megawatt Hour
NEM	National Electricity Market
NER	National Electricity Rules
PFIT	Premium Feed-in Tariff
PV	Photovoltaic
RET	Renewable Energy Target
RIT-D	Regulatory Investment Test – Distribution
SFIT	Standard Feed-in Tariff
SRES	Small-scale Renewable Energy Scheme
STC	Small-scale Technology Certificate
TFIT	Transitional Feed-in Tariff
TOU	Time of Use
TSS	Tariff Structure Statement
TUOS	Transmission Use of System
VCEC	Victorian Competition and Efficiency Commission

TABLE OF CONTENTS

EXECUTIVE SUMMARY III

ACRONYMS VI

1 INTRODUCTION 1

1.1 SCOPE OF INQUIRY 1

1.2 THE COMMISSION'S PROPOSED APPROACH TO THE INQUIRY 2

1.3 PURPOSE AND STRUCTURE OF THIS REPORT 9

2 CONTEXT 11

2.1 DEFINITION OF DISTRIBUTED GENERATION 11

2.2 WHAT VALUES CAN BE ATTRIBUTED TO DISTRIBUTED GENERATION? 14

3 REGULATORY FRAMEWORK 25

3.1 VICTORIAN REGULATIONS 25

3.2 NATIONAL REGULATIONS 33

3.3 COMMONWEALTH REGULATIONS 39

4 KEY ISSUES FOR THE INQUIRY 43

4.1 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO THE ELECTRICITY MARKET 43

4.2 THE ENVIRONMENTAL BENEFIT OF THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION 47

4.3 OTHER BENEFITS RELATED TO THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION 49

4.4 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO DISTRIBUTION NETWORKS 50

5 REGULATORY CHANGES 53

6 NEXT STEPS 55

6.1 CONSULTATION 55

6.2 CONSULTATION QUESTIONS 56

APPENDIX A - LOCAL GENERATION NETWORK CREDIT RULE CHANGE 59

1 INTRODUCTION

1.1 SCOPE OF INQUIRY

In September 2015, the Essential Services Commission (the Commission) received terms of reference from the Minister of Finance to conduct an inquiry into the true value of distributed generation. The terms of reference request the Commission to:

- Examine the value of distributed generation including: the value of distributed generation for the wholesale electricity market; the value of distributed generation for the planning, investment and operation of the electricity network; and the environmental and social value of distributed generation.
- Assess the adequacy of the current policy and regulatory frameworks governing the remuneration of distributed generation for the identified value it provides.
- Make recommendations for any policy and/or regulatory reform required to ensure effective compensation of the value of distributed generation in Victoria.

The terms of reference also state that:

The inquiry **will not** consider the policy and regulatory frameworks governing the costs of connecting distributed generation to the network. The inquiry **will not** consider whether the feed-in tariff should be deregulated.

The inquiry should have regard to reviews and reports completed in Victoria and other jurisdictions which may be relevant to the objectives of this inquiry.

The inquiry will involve extensive consultation with industry, environmental organisations and consumer advocacy groups.

1.2 THE COMMISSION'S PROPOSED APPROACH TO THE INQUIRY

The initial inquiry Terms of Reference required the Commission to deliver a draft report by the end of November 2015 and a final report by the end of February 2016. As we carried out our initial research, it became clear that given the complexity of the issues involved we required more time to investigate these issues.

We have therefore proposed to the Government that the inquiry be split into two parts, and the timeline extended, allowing us to consider separately the *energy* value of distributed generation and the *network* value of distributed generation.

The *energy* value of distributed generation represents the value to the energy market, which is to say, the value to other consumers of having electricity produced by a distributed generator. The *network* value of distributed generation represents the value to the distribution (and transmission) businesses of having electricity produced closer to the point of consumption.

Through this inquiry the Commission is looking to:

1. Determine the most efficient and effective methodology for identifying and calculating the energy and network values of distributed generation.
2. Determine whether the regulatory framework allows for this methodology(s) to be used to calculate a value for distributed generation and for any identified value to be realised by distributed generators.

The Commission's proposed approach to this inquiry is to:

- Define distributed generation for the purposes of this inquiry.
- Determine what values can be attributed to distributed generation and whether methodologies exist to enable the calculation of these values.
- Understand how the regulatory framework accommodates the value of distributed generation.
- Identify any regulatory changes needed to improve the framework for valuing distributed generation.

1.2.2 WHAT IS TRUE VALUE AND WHY IS IT IMPORTANT?

In taking forward this inquiry it is important to provide a working definition for the term 'true value'". It is the Commission's view that the true value of distributed generation is reflected by a return to investors in distributed generation that captures, as accurately as possible, the total benefits produced by that investment. If this were not the case, for example, if the return on investment was lower than the benefits produced, then it is highly likely that from a system-wide perspective there would be insufficient investment in distributed generation. Conversely, if the return to investors was greater than its 'true value' then unwarranted investment in distributed generation is likely to follow - with potentially costly consequences.

Identifying the true value of distributed generation will support the development of efficient payment structures (for example, feed-in tariffs) that can be made to investors in distributed generation - payment structures that promote the socially optimal level of investment in distributed generation. In this sense, these payment structures should not be viewed as a form of compensation or reward. Rather, they are a vehicle for promoting investment in distributed generation where and when it is needed.

In order to identify the system and community-wide benefits accruing from individuals' investment in distributed generation, the Commission seeks to distinguish between the private and public benefits produced by that investment. Private benefit refers to the value accruing directly to the party making the investment. It can consist of monetary benefits (such as lower energy bills) or non-monetary values (such as knowledge that the owner is 'doing their part for the environment'). Public benefit refers to all monetary and non-monetary benefits accruing to any party other than the investor in the distributed generation - for example, benefits derived by other customers or service providers in the energy system to which the new generation is connected.

The focus of this inquiry is on identifying the public benefit (as opposed to the private benefit) that arises from the investment in distributed generation, and determining whether and how a distributed generator is rewarded for any quantified public benefit it generates.

For the purposes of this inquiry the Commission is proposing to define three elements of public benefit that could flow from the investment in distributed generation. These are: economic, environmental and social:

- The economic benefit is related to the impact that distributed generation has on the efficient operation of the electricity industry - potentially extending through the supply chain to: generation, transmission, distribution and retail. To the extent these efficiencies produce cost savings for industry operators, all (or some) consumers could expect to benefit from lower electricity costs.
- The environmental benefit is related to the extent to which distributed generation contributes to the reduction of a particular environmental impact arising from the production, movement and consumption of electricity. We expect the main environmental impact of relevance to this inquiry is avoided carbon emissions.
- The social benefit of distributed generation is harder to define and represents the public benefits not attributable to economic or environmental outcomes. Through this inquiry the Commission is seeking to identify these other values, in addition to economic and environmental benefits, that could be attributed to distributed generation.

Based on the initial analysis the Commission has carried out, it would appear that distributed generation can produce economic public benefits through its impact on the wholesale electricity market and the operation of the distribution network. Where the electricity produced by a distributed generator has a lower emissions profile than centrally dispatched electricity, an environmental public benefit may also arise. It is less clear whether environmental benefits arise by virtue of network efficiencies arising from investment in distributed generation. Likewise, we are unclear about the types of social benefits that may contribute to the energy or network value of distributed generation. The proposed framework for deriving the true value of distributed generation in shown in Box 1 along with our preliminary thoughts regarding the potential sources of that value. How the Commission proposes to take forward further investigation of each of these value components is outlined in Chapter 4.

BOX 1 THE VALUE OF DISTRIBUTED GENERATION

To produce a socially optimal outcome the payments to be made to investors in distributed generation should ideally reflect:

1. the **source** of the value that arises from that investment; and
2. the **type** of benefits that investment produces.

There are two sources of value; namely, the energy value and the network value arising from distributed generation. The energy value reflects the value to other consumers of having electricity produced by a distributed generator. The network value reflects the value to the distribution (and transmission) businesses of having electricity produced closer to the point of consumption.

The benefits produced from these two sources of value can accrue to the individual investor ('private benefits') or to other parties ('public benefits'). Private benefits are not relevant to this inquiry as these already accrue to the individual investor. For the purposes of this inquiry, we have divided public benefits into three sub-types: economic, environmental and social benefits.

This framework for identifying the value of distributed generation is shown in the figure below.

		TOTAL BENEFIT (type)			
		Private Benefit	Public Benefit		
			Economic	Environmental	Social
"TRUE VALUE" (source)	Energy Value	not relevant to this inquiry	✓	✓	?
	Network Value	not relevant to this inquiry	✓	?	?

In developing a methodology for determining the energy value and network value of distributed generation (based on the economic, environmental and social benefits it produces), the Commission proposes to adopt a few principles to guide its work. These are:

- **Materiality.** The benefits being investigated must be material insofar as their ultimate impact on payments made to an investor in distributed generation. That is, there is little to be gained from the effort required to calculate benefits that will have only a fractional impact on such payments.
- **Simplicity.** The identified benefits must be readily convertible into a payment structure that is simple to understand (and administer) by all relevant market participants
- **Behavioural response.** The benefits derived must be readily convertible into a payment structure that signals or drives the appropriate behavioural response - namely, investment in distributed generation where and when it is needed.

QUESTION FOR CONSULTATION

Q1. Do you agree with how the Commission is proposing to define true value? If not, why not? Are there other definitions the Commission could use?

Q2. Do you agree with the Commission's view that this Inquiry is focussed on identifying the public benefit of distributed generation? If not, why not?

Q3. Do you agree with how the Commission is proposing to define public benefit as it relates to distributed generation?

1.2.3 THE COSTS OF CONNECTING DISTRIBUTED GENERATION

As the terms of reference make clear, this inquiry is not considering the costs of connecting distributed generation to networks. However, for the purposes of the inquiry it is important that the Commission understands how the costs of connecting distributed

generation to networks is accounted for. The Commission understands that these costs comprise two elements:

- The cost of connecting a specific distributed generator to the network. This process, including the contribution that individual distributed generators should make to the costs of connecting, is underpinned by elements of the National Electricity Rules and Victorian specific guidelines.
- The costs associated with the operation of the network to accommodate connected distributed generation.

Distribution businesses make forecasts for the level of both of these costs during the process of developing their five yearly regulatory determination proposals. These forecasts are based on their assessment of the amount of distributed generation that will be connected and operating on their networks during the regulatory period. These costs, once approved by the Australian Energy Regulator (AER), are recovered from customers. .

Based on this understanding of the how the costs of connecting distributed generation are dealt with, the Commission will assume, for the purposes of this inquiry, that the costs to distribution businesses and consumers of connecting distributed generation and using the network are already accounted for.

QUESTION FOR CONSULTATION

Q4. Is the Commission's understanding of how the costs, to network businesses and consumers, of connecting distributed generation are calculated and recovered correct? If not, why not?

1.2.4 THE VICTORIAN COMPETITION AND EFFICIENCY COMMISSION INQUIRY

In taking forward this inquiry, the Commission is taking as its starting point the Victorian Competition and Efficiency Commission (VCEC) *2012 Inquiry into Feed-in Tariffs and Barriers to Distributed Generation*[1].

The VCEC conclusions and the Commission's view as to their relevance for this inquiry are outlined in Chapter 4.

1.2.5 PROPOSED INQUIRY TIMELINE

End 2015	Proposed Approach Paper (This paper)

PART 1 – THE ENERGY VALUE OF DISTRIBUTED GENERATION

April 2016	Draft Report on the energy value of distributed generation
August 2016	Final Report on the energy value of distributed generation

PART 2 - THE NETWORK VALUE OF DISTRIBUTED GENERATION

First half of 2016	Discussion Paper on the network value of distributed generation
October 2016	Draft Report on the network value of distributed generation
February 2017	Final Report on the network value of distributed generation

This revised timeline is subject to formal approval from the government.

[1] *Victorian Competition and Efficiency Commission 2012*, Power from the People: Inquiry into Distributed Generation, final report, *www.vcec.vic.gov.au/Inquiries/Completed-inquiries/Feed-in-tariffs-and-Barriers-to-Distributed-Generation/Final-Report Accessed 23 November 2015*

QUESTION FOR CONSULTATION

Q5. Do you agree with the Commission's proposed approach to the inquiry? If not, why not, and what alternative approach would you propose?

1.3 PURPOSE AND STRUCTURE OF THIS REPORT

This paper outlines the Commission's proposed approach and timelines and highlights the issues we think will need to be taken into account as the inquiry proceeds. It contains the following Chapters:

Chapter 2 - Sets out the context for the inquiry

Chapter 3 - Describes the current regulatory framework

Chapter 4 - Outlines the Commission's initial view of the key issues to be explored by this inquiry

Chapter 5 - Provides the Commission's initial view on any regulatory changes

Chapter 6 - Sets out the next steps.

2 CONTEXT

This chapter sets the context for the inquiry. It presents the Commission's proposal as to how distributed generation will be defined for the purposes of this inquiry. It then discusses what values can be attributed to distributed generation.

2.1 DEFINITION OF DISTRIBUTED GENERATION

The term 'distributed generation' (also known as embedded generation) refers to any generation connected to the distributed network, as opposed to the transmission network. This includes a small solar photovoltaic (PV) system of a few kilowatts (kW) of capacity installed on a householder's roof, up to large multi megawatt (MW) power stations, such as the 160 MW gas-fired Somerton power station in Melbourne.

This broad definition can be further broken down via various legal and regulatory definitions that apply to different capacities of distributed generation and determine how they interact with the energy market. There are effectively four sub-categories of distributed generation:

- Distributed generators connected via an inverter[1] prescribed by AS4777[2] which may have a capacity of no more than 200 kVA single phase or 30 kVA three phase. This applies to the majority of household rooftop PV systems.
- Distributed generators larger than this but no more than 5 MW in size that are exempt from the need to register as a generator with the Australian Energy Market Operator (AEMO).

[1] An inverter converts the Direct Current (DC) electrical output from a generator to the Alternating Current (AC) that can be used by the grid.

[2] AS4777 is the Australian Standard for the Grid Connection of Energy Systems via Inverters. It sets out the technical standards that must be met when connecting a generator to the grid via an inverter.

- Distributed generators between 5 MW and 30 MW that must register as a generator with AEMO, or obtain an exemption; often defined as non-scheduled generation[3].
- Distributed generators larger than 30 MW in capacity that must be registered as generators and participate in central dispatch of electricity; often defined as scheduled or semi-scheduled generation.

Given the wide ranging definition of distributed generation, the different market rules governing the different sizes of distributed generation, and the differences in how different types and sizes of distributed generation interact with the market, it is important to determine which types of distribution generation will be the focus of this inquiry.

2.1.1 DEFINITION OF DISTRIBUTED GENERATION FOR THIS INQUIRY[4]

Based on our understanding of how distributed generation interacts with the energy market the Commission is proposing to define distributed generation for this inquiry as:

- **Distributed generation below 5 MW capacity**. It is generally understood that distributed generators of this size are not stand-alone generators; they are normally installed in or on a host's property and supply electricity to the host's site. The entities generating also tend not to be direct market participants. They are not able to negotiate a price for their output because they are effectively price takers. The price they receive for their output may be determined either through negotiation with an off-taker[5] or via the mandated feed-in tariff payment.
- **Distributed generation of any fuel type**. Distributed generation can be of many fuel types, with wind, solar, biomass and natural gas the most common.
- **Including battery storage.** Whilst not strictly generation, a battery storage system can supply electricity and as such operates in the same way as a generator. Battery storage can operate in one of two ways:

[3] In Victoria, generators of less than 30 MW capacity can gain an exemption from the need to hold a generation licence, subject to certain conditions being met.

[4] The definition proposed here is broadly similar to that used by the VCEC inquiry, with the addition of battery storage.

[5] This could be a customer or a retailer.

- as a distributed generator in its own right; or
- integrated with other distributed generation technologies, and solar PV in particular, when it can enhance the opportunity for distributed generation to supply energy to the grid.

Depending on how it is configured, the output from a distributed generator can be used in two ways. All of the output can be provided to the grid (exported), or the output can be used to meet a customer's electricity demand, with any excess exported to the grid.

Where all the output is exported, it will most likely be supplied to a nearby customer, offsetting the need for that supply to be sourced from more centralised generation. This may reduce both the amount of energy that a retailer has to purchase from more centralised sources to meet that customer's demand, and may also reduce demand on the network.

Where the output of a distributed generator is first used to meet a customer's demand (also known as operating 'behind-the-meter'), this reduces the amount of electricity the customer needs to purchase from a retailer. It also reduces the customer's use of the distribution network, as it reduces their demand for electricity from the grid.

The Commission is proposing to look at the value of the total output of distributed generation to both the electricity market and the distribution network, including both the output used to meet a customer's demand as well as that which is exported and supplied to the grid.

QUESTION FOR CONSULTATION

Q6. Do you agree with how the Commission is proposing to define distributed generation? If not, why not?

Q7. Are there other definitions of distributed generation the Commission could consider?

2.2 WHAT VALUES CAN BE ATTRIBUTED TO DISTRIBUTED GENERATION?

As outlined in Chapter 1 the Commission is proposing to focus this inquiry on the public benefits that can be attributed to distributed generation. We are proposing to explore the following:

- The economic benefit of distributed generation to the electricity market and any identifiable and quantifiable environmental and other benefits.
- The economic benefit of distributed generation to the distribution network and any identifiable quantifiable environmental and other benefits.

Through this inquiry the Commission is looking to determine if it is possible to quantify these benefits and, if so, how to ensure that the identified benefit is realised.

2.2.1 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO THE ELECTRICITY MARKET

The electricity produced by a distributed generator, whether used by a customer to meet their own demand or supplied to the grid, is essentially offsetting the need for that electricity to be supplied by more centralised sources. The electricity produced therefore has two potential benefits:

- A benefit based on the wholesale price of electricity, as the output from a distributed generator reduces the amount of electricity that a retailer must purchase from the wholesale market. The wholesale price of electricity is determined by the National Electricity Market (NEM) and is set on a half-hourly basis. The price at

each half-hour period reflects the demand-supply balance at that time. This means that the benefit of a unit of electricity produced by a distributed generator will depend on the time of day that is produced.

- A benefit that reflects the avoided line losses of distributed generation. As distributed generation is consumed close to the point of generation, line losses can be avoided.

This is the basis on which the current Victorian Feed-in Tariff rate is calculated.

THE TIME-OF-USE BENEFIT OF DISTRIBUTED GENERATION

The electricity produced by a distributed generator, has an economic benefit, which is broadly equivalent to the wholesale electricity price at the time of generation, and this price varies throughout the day.

The impact that these time varying prices have on the benefit of the electricity produced by a distributed generator has been demonstrated by analysis carried out for the 2012 VCEC inquiry into distributed generation and analysis carried out for the NSW Independent Pricing and Regulatory Tribunal (IPART) review of feed-in-tariffs.

The Commission considered the setting of time-of-use feed-in tariffs in 2013 but found that it was not possible under the existing legislation.

VCEC Analysis

In 2012, ACIL Tasman (now ACIL Allen), carried out analysis for the VCEC inquiry that looked at the energy value of distributed generation for a range of different generation profiles. These were:

- Flat load – a distributed generator that operates constantly
- Solar PV – a typical residential installation exporting electricity whenever total output exceeds total use. This was modelled assuming a 2.5 kW solar system installed by a household with an average load profile.

- Storage – A device that buys electricity each day when the wholesale spot price is at its lowest and sells it when the price is highest[6].
- Peaker – a distributed generator that exports whenever the wholesale spot price of electricity is greater than a threshold of:
  - $50 per MWh (5c/kWh)
  - $100 per MWh (10c/kWh)
  - $150 per MWh (15c/kWh)

Table 2.1 shows the outcome of the analysis for each of the different generation profiles

TABLE 2.1 ESTIMATED AVERAGE ENERGY VALUE OF DISTRIBUTED GENERATION, FOR VARIOUS GENERATION PROFILES

Generation profile	2013 c/kWh	2014 c/kWh	2015 c/kWh
Flat	6.1	6.9	7.3
Small-scale solar (net-metered)[7]	7.0	10.2	12.4
Storage	12.0	15.0	16.9
Peak $50	8.5	10.1	10.7
Peak $100	62.1	80.1	63.3
Peak $150	148.7	253.4	381.6

Source: ACIL Tasman, Modelling Feed-in Tariffs, May 2012[8]

This analysis shows that the economic benefit of the electricity produced by a distributed generator varies dramatically depending on the generation profile. Those generators that are able to control their output are able to operate when their generation is of more value to the electricity market, when wholesale electricity prices are higher.

[6] This means that the storage unit charges when the wholesale price is low and dis-charges when the wholesale price is high.

[7] Net metering is when the output of a distributed generator is first used to meet a customer's demand, with any excess being exported.

[8] *ACIL Tasman 2012*, Modelling Feed-in Tariffs Final Report, *www.acilallen.com.au/cms_files/ACILTasman_VCEC_FeedInTariffs_2012.pdf Accessed 23 November 2015*

IPART Analysis

In 2014, Frontier Economics provided analysis to IPART to inform its review of the 2014 - 2015 feed-in-tariff. This included looking at the time-of-use value of solar PV exports. The analysis considered two different Time-of-Use profiles:

- **The two-hour period during the day when the value of solar exports was highest**. Frontier Economics analysed the value of solar PV exports at different times of the day, and suggested a two-part tariff designed to incentivise customers to align their solar panels to produce at peak times. The analysis determined the two-hour block each day that was expected to provide the greatest market value for solar PV exports. The analysis took into account both the amount of solar PV exports in a two-hour period and the price that applies in that two-hour period. So, while this two-hour block may not be the time at which solar is producing the most exports, it is the time at which solar exports are most valuable relative to a flat profile.

  The analysis determined that the peak two-hour period when the value of solar exports was highest was between 3pm – 5pm. The results of this analysis are shown in Table 2.2.

- **A peak period 2pm - 8pm consistent with the NSW network peak**. As well as estimating the value of solar PV exports during the most valuable two-hour period of solar production, Frontier Economics also estimated the value of solar PV exports using a definition of the peak period that is consistent with the time of the network tariff peak period (that is, between 2pm and 8pm). Table 2.3 shows the results of this analysis.

TABLE 2.2 ESTIMATED MARKET VALUE OF SOLAR PV EXPORTS FOR 2014/15 – TIME OF USE WITH PEAK PERIOD FROM 3PM-5PM (C/KWH)

Time of Use period	Gross metered customers[9]	Net metered customers[10]
Peak period (3pm – 5pm daily)	10.00	9.27
Off-peak period (all other times)	5.06	4.86

[9] Gross metering is when all of the output of a distributed generator (in this case solar) is exported

[10] Net metering is when the output of a distributed generator is first used to meet a customer's demand, with any excess being exported.

Source: Frontier Economics, Market value of solar PV exports, June 2014[11]

TABLE 2.3 ESTIMATED MARKET VALUE OF SOLAR PV EXPORTS FOR 2014/15 – TIME OF USE WITH PEAK PERIOD 2PM -8PM (C/KWH)

Time of Use period	Gross metered customers	Net metered customers
Peak period (2pm – 8pm daily)	8.20	7.62
Off-peak period (all other times)	4.64	4.52

Source: Frontier Economics, Market value of solar PV exports, June 2014[12]

This analysis provides further evidence that the economic benefit to the electricity market, of the electricity produced by a distributed generator, varies depending on the time of generation . It shows that the benefit of the output is significantly higher during defined peak periods than off-peak periods.

2.2.2 THE ENVIRONMENTAL BENEFIT OF THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION

A unit of electricity from a distributed generator may have a lower environmental impact than a unit of electricity supplied by the wholesale market. Whether it does or not depends on the fuel used by the distributed generator, and the type of generation it is replacing.

In terms of carbon emissions, the removal of the carbon price means that there is no direct mechanism in the electricity market to reflect the benefit of electricity generation with lower carbon emissions. It is possible to attribute a carbon emission reduction value to distributed generation by identifying the comparative emissions intensity of the generation and applying a carbon price.

However, the Commonwealth government's Renewable Energy Target scheme (RET) is intended to support the reduction in emissions from the electricity sector, through the

[11] *Frontier Economics 2014*, Market value of solar PV exports, *www.ipart.nsw.gov.au/files/b6cc362c-4984-444a-a6ee-a34c0089a5b5/Consultant_Report_-_Frontier_Economics_-_Market_value_of_solar_PV_exports_-_June_2014.pdf Accessed 23 November 2015*

[12] Ibid

deployment of renewable energy technologies. This needs to be considered when exploring the environmental benefit of distributed generation from renewable energy sources.

2.2.3 OTHER PUBLIC BENEFITS ATTRIBUTABLE TO THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION

The Commission has so far been unable to identify other public benefits that could be attributed, and easily quantified, to the electricity generated by distributed generation. We would welcome evidence of other public benefits that could be attributed to the energy component of distributed generation, and how any identified benefit can be quantified

Q8. Are there other public benefits that the electricity generated by a distributed generator provides? How can these identified benefits be quantified?

2.2.4 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO DISTRIBUTION NETWORKS

The electricity produced by a distributed generator can provide an economic benefit to the distribution network as it can reduce network demand.

A consumer's demand for electricity is supplied via the network of poles and wires that transfer the electricity from the generator to the consumer's premises. Network companies operate their networks (meaning to maintain, augment, and manage connections to the network) to enable the maximum electricity demand to be supplied. Reducing the demand for electricity to be supplied along the network (network demand) can reduce the expenditure needed to operate the network, which can result in lower electricity prices for consumers.

Distributed generation can reduce the demand for electricity to be transported along the network through:

a. reducing the host consumer's need for electricity to be supplied along the network; and/or
b. supplying electricity to a nearby customer, reducing the amount of electricirty that needs to be supplied via the network,

The ability of a distributed generator to provide this benefit is highly dependent on the location of the generation and its ability to provide supply when network demand is high.

Two recent pieces of analysis have looked at the network benefit of distributed generation. They are presented here as they provide examples of the benefit that distributed generation can provide networks, and outline potential methodologies that could be adopted for calculating that benefit. They are:

- Work to inform a Local Generation Network Credit (LGNC) Rule change proposal, currently being considered by the Australian Energy Markets Commission (AEMC).
- Analysis by Ernst & Young (EY) of the value of small-scale generation to networks.

Details of the rule change are provided in Appendix A. Table 2.4 details the parameters being considered by the rule change proponents to develop a methodology for calculating the LGNC. Table 2.5 provides a summary of the parameters included by EY in their methodology for calculating the value of small-scale generation to networks.

TABLE 2.4 BENEFITS AND COSTS OF DISTRIBUTED GENERATION TO DISTRIBUTION NETWORKS

Category	Cost or Benefit	How captured
Reduction in distribution costs: • Avoided or deferred augmentation capital expenditure • Progressive downsizing of replacement infrastructure reducing the Regulated Asset Base • Reduction of associated operating cost expenditure	Benefit	Calculate as Long Run Marginal Cost (LRMC) of avoided costs
Reduction in transmission costs: Categories as per above	Benefit	Calculate as either: a) LRMC method above, or b) Avoided Transmission Use Of System (TUOS) charge using existing calculation framework
Avoided Losses • Reduced energy generation requirement • Reduced upstream network capacity	Benefit	Currently addressed in feed-in-tariff arrangements Apply as uplift to capacity impact on LRMC of avoided transmission and distribution capital costs for upstream levels
LG-driven network augmentation costs: Including management of: Fault levels Two-way electricity flows Voltage stability in areas of high penetration	Cost	Addressed via a 'gate' system with the effect that generators are not paid when augmentation costs are imposed by the distributed generator or as a netting of costs in LRMC calculation

Source: Institute for Sustainable Futures 2015, Towards a Method to Calculate a Local Network Credit[13]

2.2.5 THE ENVIRONMENTAL AND OTHER BENEFITS OF DISTRIBUTED GENERATION TO DISTRIBUTION NETWORKS

As outlined in Chapter 1, the Commission has so far been unable to identify specific environmental or other public benefits that distributed generation provides to the distribution network. We would welcome evidence of any environmental or other public

[13] *Institute for Sustainable Futures 2015*, Towards a Method to Calculate a Local Network Credit *www.uts.edu.au/sites/default/files/LNCVNM_towards_an_LNC_methodology.pdf Accessed 23 November 2015*

benefits that distributed generation provides to distribution networks, and how any identified benefits can be quantified.

QUESTION FOR CONSULTATION

Q9. Are there any environmental or other public benefits that a distributed generator provides to the distribution network? How can these identified benefits be quantified?

TABLE 2.5 EY VALUATION CATEGORIES INCLUDED IN THE FRAMEWORK FOR THE VALUATION OF DISTRIBUTED ENERGY RESOURCES (DERS)

Value category	Financial impact on network	Cost or Benefit	Description
Network augmentation	High	Either	Changes in expenditure on any network augmentation associated with the DERs, including replacements or upgrades of cables and transformers. This also includes entirely new developments, for example, where a brand new feeder or similar is to be developed
Network support	High	Either	Benefits or costs associated with DERs offsetting generation from contracted network support facilities or avoiding the need to obtain such contracts
Voltage regulation	Moderate	Either	Costs from adjusting taps on transformers, or installing/upgrading transformers to maintain acceptable voltage levels for customers
Power quality issues	Moderate	Either	Any associated value from grid support that the DER might provide/require. These are managing harmonics, DC injection and flicker
Reassessment of fault level co-ordination	Low	Cost	Fault current settings may need to be changed and retested, depending on the designed operation of the DERs during a fault
Network reliability	Currently low, but potentially significant	Either	As part of operating and maintaining a distribution network DNSPs have reliability standards to meet with associated penalties if they don't. These penalties are intended to be related to the Value of Customer Reliability (VCR). This category refers specifically to these penalties
Islanding capability	Currently not applicable, but potentially significant	Benefit	Any benefit to customer reliability through being able to use the DERs to create a stable island network during a fault. This value would be set to zero if the DERs are configured to automatically disconnect during a fault. EY notes that islanding is not currently desirable in networks due to their present design characteristics.

Source: Clean Energy Council 2015, Calculating the value of small-scale generation to networks[1]

[7] *Clean Energy Council 2015,* Calculating the value of small-scale generation to networks *www.cleanenergycouncil.org.au/fpdi/reports/value-of-small-scale-generation.html Accessed 23 November 2015*

3 REGULATORY FRAMEWORK

This Inquiry has been asked to assess the adequacy of the current regulatory framework governing the remuneration of distributed generation in Victoria.

The framework governing the valuation and remuneration of distributed generation is a combination of state, national[1] and Commonwealth[2] regulations. In order for the Commission to assess the adequacy of the regulatory framework in Victoria, the Commission needs to consider the impact of other relevant regulatory frameworks.

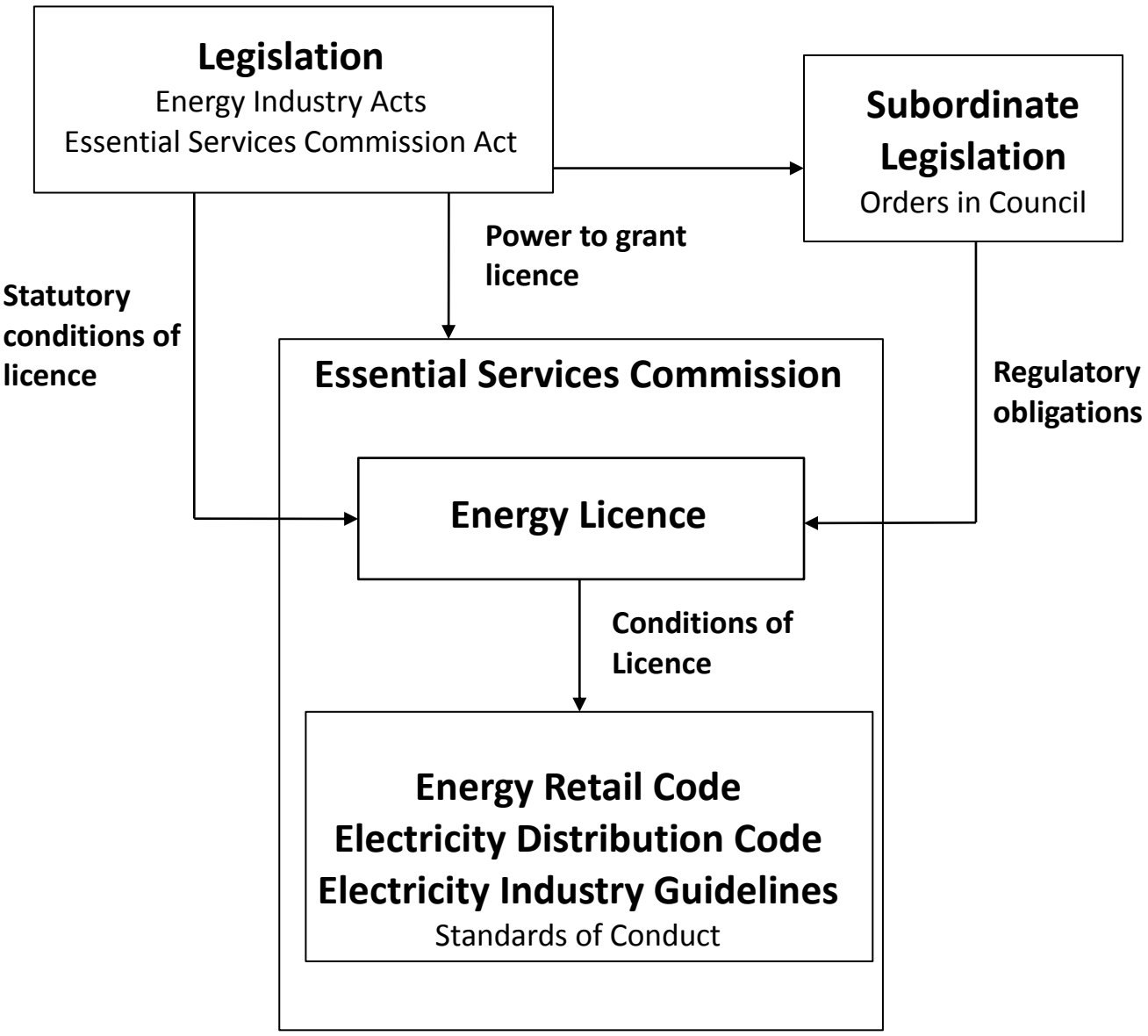
This chapter outlines the Commission's understanding of the current regulatory frameworks that impact distributed generation in Victoria.

3.1 VICTORIAN REGULATIONS

There are a range of regulatory instruments in Victoria that govern the operation of the energy sector, and which are relevant to the operation of distributed generation. These include legislation, Orders in Council, Licences and associated Codes and Guidelines. This framework is outlined below.

[1] National in these context refers to the rules and regulations that govern the National Energy Market (NEM), which encompasses the eastern states and territories of Queensland, New South Wales, Victoria, South Australia, Australia Capital Territory and Tasmania.

[2] These are regulations that come under the jurisdiction of the Australian Government, such as the Renewable Energy Target (RET).



3.1.1 THE ELECTRICITY INDUSTRY ACT 2000 (EIA)

Under the EIA the generation of electricity for supply or sale is prohibited unless the generator is licensed or has been exempted from the requirement to hold a generation licence.

The Essential Services Commission is currently conducting a review to modernise its licensing framework. For more details see:
http://www.esc.vic.gov.au/Energy/Modernising-Victoria-s-Energy-Licence-Framework.

The Victorian government is reviewing the deemed licence exemptions framework. For more details see: **http://www.energyandresources.vic.gov.au/energy/about/legislation-and-regulation/georeview.**

The EIA also includes a range of measures related to the Victorian feed-in tariff schemes. This includes:

- Requiring distribution companies to credit relevant retailers with the appropriate Premium Feed-in-Tariff or Transitional Feed-in Tariff rate, and allowing for this credit to be recovered from all of the distribution companies' customers.
- Requiring retailers to pay eligible technologies a feed-in tariff, at a rate no lower than that determined by the Essential Services Commission.
- Requiring the Essential Services Commission to calculate the current feed-in tariff rate annually. The legislation requires the Commission to take into account various factors when setting the feed-in tariff rate.

Further details of the Victorian feed-in tariff schemes are outlined in Section 3.1.6 below.

3.1.2 VICTORIAN ENERGY LICENCES

The Commission is responsible for granting or refusing licence conditions, determining conditions under which energy businesses must operate, and monitoring and enforcing compliance with these conditions.

Victorian retail licences are the route through which the Victorian Feed-in Tariff provisions are enforced. Failure to meet any relevant provisions in the EIA, including the feed-in tariff provisions, would be a breach of licence conditions.

Victorian distribution licences require licensed distributors to offer connection services to embedded generators.

3.1.3 THE ELECTRICITY DISTRIBUTION CODE

The *Victorian Electricity Distribution Code*[3] *(the Code),* with which all licensed distribution businesses are required to comply, places conditions on how the distribution business should engage with a distributed generator that requests a connection. These include:

- Distributors are required to ensure they are able to receive supply from a connected embedded generator in accordance with a connection agreement.
- Distributors and embedded generators are required to negotiate in good faith to reach a connection agreement.

The Code also outlines the technical and safety standards that embedded generators connecting to the distribution system in Victoria must satisfy.

3.1.4 ELECTRICITY INDUSTRY GUIDELINE NO.15: CONNECTION OF EMBEDDED GENERATION

Guideline 15, which distributors must follow as a condition of their distribution licence, outlines how a distributor should interact with a distributed generator to facilitate a connection[4]. It contains a range of provisions including:

- Requiring distributors to maintain a standard connection agreement containing the terms and conditions upon which they will provide embedded generation[5] services to small embedded generators[6].
- Requiring distributors to negotiate generator access arrangements with embedded generators in good faith.

[3] *Essential Services Commission 2012,* Electricity Distribution Code, Version 7 *www.esc.vic.gov.au/getattachment/c2697e4e-d485-4b6d-a5a5-11149fa3b3df/Electricity-Distribution-Code-May-2012.pdf Accessed 23 November 2015*

[4] *Essential Services Commission 2004,* Electricity Industry Guideline No.15, Connection of Embedded Generation Issue 1 *www.esc.vic.gov.au/getattachment/a9e6e27a-e286-403a-9f94-ec3b5e10e1f9/Guideline-15-Conection-of-embedded-generation-2004.pdf Accessed 23 November 2015*

[5] Embedded generation is the same as distributed generation.

[6] Small embedded generators are defined as distributed generation systems that:
- Have a capacity of no more than 2 kW, or
- Are connected by an inverter prescribed in AS 4777

- Requiring distributors to provide embedded generators with reasonable information to allow the generator to make the relevant assessments of the connection agreements being sought and offered.
- Outlining the conditions under which a distributor can charge a distributed generator for connection and use of system.
- Requiring that distributors must pass through a share of avoided Distribution Use of System (DUOS) costs to embedded generators. The guideline outlines how this should be calculated.
- Requiring that distributors must pass through the value of any Transmission Use of System charges they avoid due to the use of distributed generation. The guideline requires that the amount of avoided TUOS to be calculated according to clause 5.5 of the NER.
- Allowing distributors to be compensated by a distributed generator for failing to provide network support services as and when required.

3.1.5 ELECTRICITY INDUSTRY GUIDELINE NO.14: PROVISION OF SERVICES BY ELECTRICITY DISTRIBUTORS

A number of clauses of Guideline 14, which distributors must follow as a condition of their distribution licence, are referred to by Guideline 15[7]. These clauses contain additional provisions relating to:

- dispute resolution between distribution businesses and distributed generators;
- the terms and conditions of connection agreements; and
- connection charges for small embedded (distributed) generators.

[7] *Essential Services Commission 2004,* Electricity Industry Guideline No.14 provision of services by electricity distributors, Issue 1 *www.esc.vic.gov.au/getattachment/b57f7430-0352-4eba-ae98-0995c99511cd/Electricity-Industry-Guideline-No-14.pdf Accessed 23 November 2015*

3.1.6 VICTORIAN FEED-IN TARIFF ARRANGEMENTS

There are four feed-in tariff schemes in Victoria. Three are closed to new applications. Customers already receiving feed-in-tariff payments under one of the three closed schemes may continue to receive these payments for many years to come.

THE PREMIUM FEED-IN TARIFF (PFIT)

The (PFIT) started in late 2009 and closed to new applicants at the end of 2011.

The scheme offered eligible households, businesses and community organisations with small-scale solar systems of five kilowatts or less a credit of at least 60 cents per kilowatt hour for electricity fed back into the grid.

More than 88,000 Victorian households, small businesses and community groups are receiving the PFIT.

Eligible properties with an effective PFIT contract will continue to receive this rate until 2024, provided they do not add extra solar panels to their system.

TRANSITIONAL FEED-IN TARIFF (TFIT)

The TFIT replaced the Premium Feed-in Tariff in 2011 and closed to new customers on 31 December 2012.

The TFIT scheme offered eligible properties with small-scale solar PV systems of five kilowatts or less a minimum credit of 25 cents per kilowatt hour for excess electricity fed back into the grid.

Eligible premises with an effective TFIT contract in place will continue to receive this rate until 31 December 2016, provided they remain eligible.

Payment of the PFIT & TFIT

Payment of the PFIT and TFIT is via the distribution businesses. Distribution businesses credit[8] the relevant retailers with the PFIT or TFIT rate for customers on

[8] This is the payment a customer is entitled to under the PFIT or TFIT. Rather than a direct payment to the customer the payment may simply appear as a credit (reduction) on the customer's bill.

their network. The retailers then pass on these amounts to PFIT or TFIT customers. The credits paid by the distribution business are funded by all customers of a distribution business. The distribution business includes the costs of the PFIT and TFIT in the annual network tariffs that are applied to all customers' retail bills.

STANDARD FEED-IN TARIFF (SFIT)

The SFIT commenced in January 2008 and closed to new applicants on 31 Dec 2012. Eligible properties with an effective SFIT contract will continue to receive payments under this scheme until 31 December 2016, provided customers maintain their eligibility under the scheme.

The SFIT provided a 'one-for-one' payment based on the retail electricity rates paid by the customer, for excess renewable electricity exported to the grid. Renewable energy systems, such as solar, wind, hydro or biomass, with a system size of less than 100 kW were eligible for the scheme.

The SFIT rate is not mandated, but under the EIA retailers are expected to pay a fair and reasonable price for any electricity fed into the grid from eligible generators. The Essential Services Commission has determined that fair and reasonable in relation to the Standard Feed-in Tariff means that the price paid to customers supplying electricity from distributed generation should not be less than the price they pay the retailer for electricity bought from the network.

CURRENT FEED-IN TARIFF

The current Victorian Feed-in Tariff commenced on 1 January 2013 and will continue until at least the end of 2016. It is based on the VCEC's recommendations for feed-in-tariff design. The Feed-in Tariff is designed to reflect the value to retailers of the distributed generation. The Feed-in Tariff is paid by the retailer directly to the eligible distributed generator.

Renewable energy technologies such as solar, wind, hydro and biomass with a system size of less than 100 kW are eligible for the scheme. Additional low-emissions technologies are also eligible under the scheme. Low emission technologies are defined as being of less than 100 kW in capacity, and having a carbon intensity of 0.4 t CO2 -e/MWh or lower. .

The EIA requires the Essential Services Commission to calculate the Feed-in-Tariff rate annually until 2016. The Act requires that the following factors are taken into account when determining the Feed-in-Tariff rate:

a. Prices of electricity in the wholesale electricity market.
b. Any distribution and transmission losses avoided in Victoria by the supply of small renewable energy generation electricity.

The methodology the Commission uses to set the Feed-in-tariff is outlined below.

In determining the Feed-in-tariff rate the Commission considers:

- The marginal cost of the equivalent amount of electricity that would otherwise need to be purchased from central generators
- The locational value of electricity produced close to the final consumers compared to relatively distant central generators

To derive the marginal cost of the equivalent amount of electricity that would otherwise need to be purchased from central generators, the Commission requires a forecast of the value of electricity produced by small renewable energy generation facilities and delivered into the grid. The energy value of photovoltaic (PV) electricity is calculated as a weighted average of the forecast spot market prices for Victoria for each half-hour period.

The weights used for averaging the spot market prices represent the relative amount of PV net exports which can be attributed to each half-hour period over the year. These weights represent the time-profile of PV net exports over the year. The Commission uses the 2013 actual profile of PV exports data from a sample of Victorian customers.

Line losses are taken into account when determining the Feed-in Tariff by applying a loss factor to the weighted average wholesale price of electricity. These are calculated using AEMO estimates for Marginal Loss Factors (MLF) and Distribution Loss Factors (DLF) published by the distribution businesses.

The Commission also takes into account avoided market fees and network costs in calculating the Feed-in Tariff rate. Retailers pay these fees based on the amount of their electricity purchases from the wholesale market and avoid these fees to the extent that they source electricity from small embedded generators.

The ESC set the current Feed-in Tariff rate at 6.2 c/kWh. The rate to apply from 1 January 2016 will be 5.0 c/kWh[9].

3.2 NATIONAL REGULATIONS

3.2.1 THE NATIONAL ELECTRICITY RULES (NER)

In Australia, the eastern states (Queensland, New South Wales, Victoria, South Australia, Australian Capital Territory and Tasmania) operate as part of the National Electricity Market (NEM), and are therefore subject to the National Electricity Rules (NER). These contain a number of provisions relating to distributed generation located in Victoria. These provisions are outlined below.

THE ECONOMIC REGULATION OF DISTRIBUTION BUSINESSES

Under Chapter 6 of the NER, all distribution businesses operating in the NEM must submit proposals to the AER outlining the revenue they believe is necessary to operate their networks during the upcoming five year regulatory period. The AER assesses these proposals against a range of criteria outlined in Chapter 6 and makes a decision (determination) as to how much revenue the distribution business can collect during the regulatory period. The revenue that distribution businesses are allowed to collect is recovered from all electricity customers via network charges.

Alongside a decision on the amount of revenue a distribution business is allowed to recover from its customers, Chapter 6 also requires a distribution business to submit a Tariff Structure Statement (TSS) to the AER. This outlines the tariff structures a distribution business proposes to apply to each of its customer classes to recover its allowed revenue. These are reviewed and approved by the AER. Finally, Chapter 6 requires that every year a distribution business must submit a pricing proposal to the AER that details the charges that will be applied to each element of the approved tariff structure.

[9] Further details on how the Commission set the 2015 and 2016 feed-in tariff rates are available here: *http://www.esc.vic.gov.au/Energy/2014-Minimum-Feed-in-Tariff*

The AER is currently assessing expenditure proposals and Tariff Structure Statements for the next five year regulatory period that runs from January 2016 – December 2020.

In November 2014, changes were made to the NER governing how distribution businesses set their network tariffs and prices. These originated in recommendations from the Australian Energy Market Commission (AEMC) Power of Choice review. Broadly, these new rules aim to achieve three objectives:

- Better signals of the cost drivers of distribution networks.
- The explicit consideration of the impact of changing tariffs on consumers.
- Transparency and greater certainty as to the tariff strategies that will be employed during a regulatory period.

The Victorian distribution businesses published their initial Tariff Structure Statements (TSS) in September 2015. These outline the tariffs the distribution businesses intend to roll out during the 2016 - 2020 price review period. The AER intends to publish draft decisions on the Victorian TSS proposals in February 2016 with final decisions in July.

Broadly, the changes to the tariff setting process have resulted in the Victorian distribution businesses proposing that the tariffs for all customer classes include a demand charge, based on a customer's maximum demand during a defined peak period. Currently only larger business customers are exposed to a specific demand charge.

This is relevant to distributed generation in Victoria as the introduction of a specific demand charge for all customers means that they will have a specific incentive to reduce the amount of electricity they draw from the grid at peak times. One way that a customer can reduce the amount of electricity they draw from the grid is by using distributed generation.

SELLING ELECTRICITY

The NER sets out the rules governing the sale of electricity into the market. There are currently three options:

- *Electricity is sold directly through the NEM at spot prices*. Any generating unit that receives payment from AEMO for sent-out electricity[10] must be registered as a market generator regardless of size. Generators of 5 MW capacity or below, which would otherwise be eligible for an exemption from registration, would need to be registered as a market participant if they wanted to sell their output directly through the NEM. This would entail significant registration and participation fees.
- *The electricity is sold under contract to a local retailer or customer at the same connection point*. This applies to any generator under 5 MW that wishes to be exempt from registering as a direct participant in the NEM. Under the conditions of the exemption the electricity must be sold to a local retailer or customer at the same connection point. These often result in the generator entering a fixed price contract for their output.
- *The electricity is sold through an aggregator*. Following a rule change in 2012 a new type of market participant, a Small Generation Aggregator, was established. A distributed generator can now supply their electricity to an aggregator who will be financially responsible for trading the output of small generating units in the NEM. Each individual distributed generator does not have to be registered as a market participant with AEMO.

DISTRIBUTION NETWORK PLANNING AND EXPANSION FRAMEWORK

Following a rule change in 2013, the NER now includes a framework for electricity distribution network planning and expansion, which places obligations on distribution businesses in relation to demand-side activity, including distributed generation. The aim of the framework is to provide better information as to the opportunities for demand side activities, including distributed generation, and to facilitate the deployment of distributed generation. The framework includes a number of elements:

- *Distribution annual planning review*. All distribution businesses are required to conduct an annual planning review covering a forward planning period of five years. The planning review must include all distribution assets and activities undertaken by distribution businesses that would be expected to have a material impact on their networks.

[10] Sent-out electricity is measured at the generator connection point, and represents only the electricity supplied to the market, excluding a generator's auxiliary loads (the energy used by the generator to generate electricity)

- *Distribution annual planning report.* All distribution businesses must publish an annual planning report. The report will set out the outcomes of the annual planning review and will include information on: forecasts, including capacity and load forecasts; and system limitations
- *Demand side engagement obligations.* The rules require distribution businesses to undertake a number of demand side engagement activities, including:
  - developing and documenting a demand side engagement strategy
  - an obligation to engage with non-network providers and consider non-network options in accordance with this strategy

THE REGULATORY INVESTMENT TEST FOR DISTRIBUTION (RIT-D)

The RIT-D was introduced into the NER late in 2013 and came into force on 1 January 2014. The RIT-D establishes the framework electricity distribution businesses have to follow when planning investments

Where electricity distribution network businesses identify a need to invest in the network, they have a range of options to choose from. The RIT-D requires distribution network businesses to consider all credible network and non-network options.

For example, a network option might be to build electricity infrastructure, while a non-network option might be a demand-side management project (including distributed generation). The preferred option is the one which maximises the economic benefit to all those who produce, consume and transport electricity in the NEM.

The RIT-D only applies when the estimated cost of the most expensive credible option exceeds $5 million.

THE CONNECTION OF DISTRIBUTED GENERATION

Following rule changes in 2014, the NER now includes two new processes that govern the connection of distributed generation.

Chapter 5 of the NER defines a detailed connection process for distributed generation greater than 5 MW. Connection under Chapter 5 is a negotiated process. The distributors ‘must use reasonable endeavours’ to provide the access arrangements

sought by the connection applicants, subject to those arrangements being consistent with 'good electricity industry practice.'

Chapter 5A of the NER outlines a connection process for distributed generation of 5 MW and below. It provides for a shorter and more flexible connection process for non-registered embedded generators and micro embedded generators (embedded generator connections that comply with Australian Standard AS4777).

It provides three different connection options for distributed generators:

- Basic connections for micro embedded generators (for example, residential roof top solar systems).
- Standard connections for embedded generator proponents that are not covered by a basic connection but for which there is an AER approved model standing offer.
- Negotiated connections for all other embedded generator proponents in Chapter 5A and those that elect to use this option.

Legislation to implement Chapter 5A in Victoria was introduced into the Victorian Lower House in December 2015. It is expected to be in place in Victoria during 2016. If the proposed amendments pass into law, the Commission will consider the need for a review of Victorian Electricity Industry Guidelines 14 and 15.

THE VALUATION OF DISTRIBUTED GENERATION

The NER provides for distributed generators, of any size, to be paid for the provision of two specific benefits: avoided Transmission Use of System (TUOS) costs and for the provision of other specific network support services.

Avoided TUOS

The NER requires a distributor to pass through to a distributed generator any TUOS costs that have been avoided. In the NEM, a distributor is liable for prescribed TUOS payments to be made to the transmission company. A distributed generator can potentially reduce the distributor's demand at times of system peak on the transmission network. Where the distributor's demand at times of system peak on the transmission network is reduced, there is a corresponding reduction in the distributor's liability for prescribed locational TUOS. This reduced liability is calculated and is required to be passed on to the embedded generator in the form of an avoided TUOS payment.

Network Support Payments

This allows for a payment to distributed generators by transmission companies for specific network support services provided in addition to any avoided TUOS. These payments could be made:

- solely for firm generation provided at times other than system peak demand requirements;
- solely for deferring a specific shared transmission network asset; and/or
- for a firm service to contribute to reliability and security requirements which defer shared transmission network augmentation.

The Commission understands that very few avoided TUOS payments have been made to distributed generators in Victoria. Similarly we understand that very few Network Support Payments have been made to distributed generators. Through this inquiry we are seeking evidence as to the scale and scope of payments made under these mechanisms.

DEMAND MANAGEMENT INCENTIVE SCHEME (DMIS) AND INNOVATION ALLOWANCE

The aim of the DMIS is to provide distribution businesses with an incentive to undertake efficient expenditure on relevant non-network options relating to demand management. This can include distributed generation.

The innovation allowance has been introduced to provide distribution businesses with funding for research and development in demand management projects that have the potential to reduce long term network costs. The allowance will be used to fund innovative projects that have the potential to deliver ongoing reductions in demand or peak demand.

The AER is required to develop and publish the incentive scheme and innovation allowance by 1 December 2016. These mechanisms could be applied to distribution businesses from 2017, but it is likely that they will not be applied until the next pricing review period beginning in 2020.

3.3 COMMONWEALTH REGULATIONS

3.3.1 THE RENEWABLE ENERGY TARGET (RET)

The Commonwealth government's Renewable Energy Target (RET) is a market based mechanism to support the deployment of renewable energy. First introduced in 2000, its design has been through a number of iterations, most recently in 2015.

The Renewable Energy Target is underpinned by the *Renewable Energy (Electricity) Act 2000* and the associated regulations. The purpose of the RET, as outlined by the Objects of the Renewable Energy Act is:

a. to encourage the additional generation of electricity from renewable sources;
b. to reduce emissions of greenhouse gases in the electricity sector; and
c. to ensure that renewable energy sources are ecologically sustainable.

The Act and Regulations create a framework for meeting the objects that involves the issuing of certificates for the generation of electricity using eligible renewable energy sources and requiring certain purchasers (liable entities) to surrender a specified number of certificates for the electricity that they acquire during a year.

The RET has two components: the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

THE LARGE-SCALE RENEWABLE ENERGY TARGET (LRET)

The LRET supports the deployment of renewable energy technologies over 100 kW in capacity. An eligible, accredited renewable energy generator is awarded a Large-scale Generation Certificate (LGC) for every MWh of electricity they produce. This certificate can then be sold to a liable party who has to surrender a certain number of LGCs every year to meet an annual target.

To participate in the scheme a generator must produce electricity from an eligible fuel source. What classifies as an eligible fuel source is defined in the *Renewable Energy (Electricity) Act 2000*[11] and the *Renewable Energy (Electricity) Regulations 2001*[12].

[11] https://www.comlaw.gov.au/Series/C2004A00767

Eligible fuel sources include: sun, wind, ocean waves and the tide, geothermal-aquifers, wood waste, agricultural waste, bagasse (sugar cane waste), black liquor (a by-product of the paper-making process), or landfill gas.

The LRET does not provide a fixed price for the generation from an eligible generator. The price of LGCs is based on the supply demand balance at any point in time.

The LRET includes a shortfall charge mechanism. If a liable party does not surrender enough LGCs to meet their annual target, they are required to pay a shortfall charge on the outstanding amount. The shortfall charge is fixed at $65 per MWh. The costs of purchasing LGCs are tax deductible, whilst payment of a shortfall charge is not. This makes the tax effective shortfall charge $93 (assuming a company tax rate of 30 per cent). This acts as a cap on the price of LGCs as once the price of LGCs goes above $93 it is cheaper for the liable party to meet their LGC liability through paying the shortfall charge.

THE SMALL-SCALE RENEWABLE ENERGY SCHEME (SRES)

The SRES supports the deployment of renewable energy technologies with a capacity of 100 kW or less. Support under the SRES is available to the following technologies: solar PV, wind turbines, hydro systems, solar water heaters, and air source heat pumps.

Eligible small-scale renewable energy systems are entitled to a number of small-scale technology certificates (STCs). Unlike the operation of the LRET, where certificates are only issued after the electricity has been generated, and this generation has been verified, an eligible small-scale renewable energy system is issued on installation, with the total number of STCs for the electricity it is expected to produce over 10 or 15 years [13].

The certificates that are created by a small-scale renewable energy system are then able to be sold to a liable party who is required to surrender a certain amount of STCs every year, as determined by the Clean Energy Regulator.

[12] https://www.comlaw.gov.au/Series/F2001B00053

[13] Solar water heaters and heat pumps can get STCs deemed for 10 years. Solar PV, wind and hydro systems can get STCs deemed for 15 years (or as many years remain until the end of scheme in 2030)

Like the LRET, the SRES does not provide a fixed price for the STCs created by a small-scale renewable energy system. The price is set by the STC market based on the supply demand balance at any point in time.

The SRES includes a Clearing House mechanism, administered by the Clean Energy Regulator. The Clearing House was established to provide a capped price of $40 per certificate. The Clearing House only sells STCs. If the holder of an STC opts to use the Clearing House, they can place their certificates in the Clearing House queue, at no charge. A liable party can then purchase an STC from the Clearing House at $40 per certificate. This effectively caps the price of STCs sold outside the Clearing House at $40.

The deeming provisions - the creation of STCs equivalent to the expected generation for up to 15 years when then system installed - have the effect of providing an upfront subsidy for the installation of the small-scale renewable energy system. Most small-scale renewable energy systems are sold with the value of the STCs included as an upfront discount to the full cost of the system.

QUESTIONS FOR CONSULTATION

Q10. Are there particular aspects of the current regulatory framework outlined in this paper that the Commission should consider when evaluating the adequacy of the current Victorian policy and regulatory frameworks governing the remuneration of distributed generation?

Q11. What is the impact of the current regulatory framework on the valuation of distributed generation in Victoria? In particular, what has been the scale and scope of support provided to distributed generators by: avoided TUOS payments, avoided DUOS payments, Network Support Payments, the Distribution Network Pricing and Assessment Framework, and the RIT-D?

4 KEY ISSUES FOR THE INQUIRY

This chapter puts forward the Commission's initial views on the issues to be further explored by this inquiry. It outlines the additional work the Commission is proposing to undertake in relation to the elements being considered:

- The economic benefit of distributed generation to the energy market and any related environmental and other benefits
- The economic benefit of distributed generation to the distribution network and any related environmental and other benefits.

4.1 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO THE ELECTRICITY MARKET

4.1.1 VCEC CONCLUSIONS

The key findings of the VCEC inquiry were:

- Appropriately determined feed-in-tariffs are the best way to recover the output value of electricity produced by distributed generators
- The output from distributed generation will have more value in locations where the system losses from transporting electricity from centralised generators are high and at times when system demand is at its peak, so the costs of purchasing electricity on the wholesale market are high. These values should be reflected in an efficient feed-in-tariff and provide incentives for people to invest in distributed generation.
- They noted that at the time of their report (2012), whilst the installation of smart meters across Victoria allowed for peak demand, or the maximum electricity consumed in any half hour interval, to be measured, there was a moratorium on the information collected by these meters being used in retail electricity pricing.

4.1.2 COMMISSION'S INITIAL VIEWS

It is clear that the economic benefit of distributed generation to the electricity market varies depending on when and where it is generated. The analysis completed for the VCEC report in 2012, and for IPART in 2014, shows that the value of distributed generation to the wholesale electricity market varies significantly throughout the day.

Since 2012, the roll-out of smart meters has continued and flexible pricing has been introduced in Victoria. This means that there is more detailed data available as to energy usage across the network, and consumers, retailers and distributors are more familiar with the concept of time-of-use pricing.

In 2013 the Commission supported the development of feed-in-tariff rates that reflected the energy value at different times. The Commission's Final Decision for the 2014 Feed-in-Tariff said:

The Commission will consider the opportunities to develop a time-of-use minimum FiT when it considers the FiT for 2015. Insights from the introduction of time-of-use electricity retail pricing will be taken into account. Over the coming months the Commission intends to carry out the quantitative research needed to develop options for time-varying FiTs[1].

However, in the Commission's Final Decision for the 2015 Feed-in-Tariff it concluded that:

The Commission has previously indicated its intention to consider the opportunities to develop time varying FiTs when determining the 2015 FiT. The Commission has been advised that the EIA requires the Commission to set a single FiT rate for each calendar year, precluding the use of time varying minimum FiTs[2].

Notwithstanding the existing barriers within the EIA to setting use of time varying minimum Feed in Tariffs, analysis conducted by the ESC and elsewhere indicates that

[1] Essential Services Commission 2013, Final Decision – Minimum Feed-in Tariff for 2014 www.esc.vic.gov.au/getattachment/36719711-eccb-454b-b4d3-00139d88d87d/FDP-Final-Decision-Minimum-Feed-in-Tariff-for-2014.pdf Accessed 23 November 2015

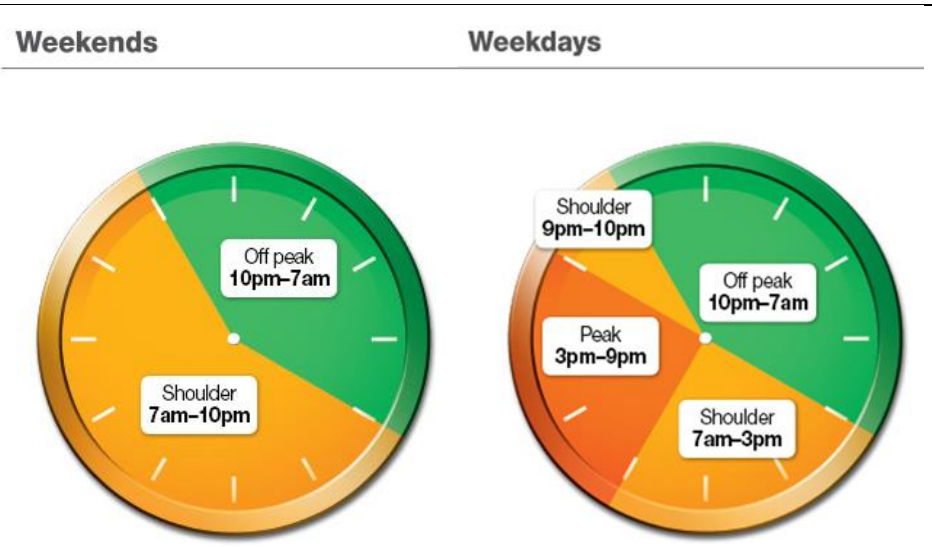
[2] Essential Services Commission 2014, Minimum Electricity Feed-in Tariff to Apply from 1 January 2015: Final Decision www.esc.vic.gov.au/getattachment/0364a70d-f8c7-4fb2-a341-3c3d6694adf6/Final-Decision-Minimum-Feed-in-Tariff-for-2015.pdf Accessed 23 November 2015

there may be benefits from more flexible Feed in Tariffs. As part of this inquiry the Commission will review this analysis. If this confirms that there would be benefits of calculating a Victorian Feed in Tariff that is calculated on a time-of-use basis, we may propose regulatory amendments to enable such a Feed in Tariff to be set.

Key to taking forward the analysis will be determining the different time-of-use periods. Based on our initial research the Commission's initial view is that there are two leading options for defining the time-of-use periods. These are:

1. Using the peak, off-peak and shoulder periods in place for flexible pricing in Victoria. Customers who have opted for flexible pricing are charged different rates for the electricity they use at different times of the day. This is outlined in Figure 4.1 below.

FIGURE 4.1 EXAMPLE OF TYPICAL FLEXIBLE PRICING PLAN



● **Peak:** The price of electricity is higher during the 'peak' times, typically on weekday afternoons and evenings, when the demand for electricity is the highest.

● **Shoulder:** The price of electricity is lower than the peak rate and higher than the off-peak rate.

● **Off-peak:** The price of electricity is lowest when the demand for electricity is the lowest.

Source: http://switchon.vic.gov.au/bills-pricing-and-meters/flexible-pricing

2. Identifying the time periods when the value of the electricity generated, to the wholesale electricity market, is highest, as per the Frontier Economics modelling for IPART, outlined in Section 2.2.1.

The Commission anticipates that the locational benefit in terms of avoided line losses will be calculated using the current feed-in-tariff methodology as outlined on Section 3.1.6.

QUESTIONS FOR CONSULTATION

Q12. Do you agree with the Commission's proposal to develop a methodology for calculating the time-of-use benefit of the electricity produced by a distributed generator? If not, why not?

Q13. Which of the two time-of-use options presented do you favour?

Q14. Are there other time-of-use options that the Commission could consider?

Q15. Are there other methodologies for calculating the locational benefit of distributed generation?

4.2 THE ENVIRONMENTAL BENEFIT OF THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION

4.2.1 THE VCEC CONCLUSIONS AND RECOMENDATIONS

The VCEC concluded that the (then) existence of a carbon price meant that the environmental cost, in terms of the carbon emissions of electricity generation, was reflected in the prevailing electricity price. This implicitly valued the use of distributed generation with lower carbon emissions and which could reduce the amount of electricity that a consumer had to purchase, lowering their exposure to the carbon price.

The VCEC concluded that feed-in tariffs were not an appropriate instrument to assign to reducing greenhouse gas emissions. They believed that the (then) current Commonwealth programs[3], combined with improvements to the connection processes for distributed generation, would provide sufficient incentives to invest in distributed generation and as a result reduce greenhouse gas emissions.

4.2.2 COMMISSION'S INITIAL VIEWS

The removal of the Commonwealth government's carbon price policy means that there is now no mechanism to reflect the direct environmental cost of electricity generation, in terms of the impact of carbon emissions, in electricity prices. It could therefore be

[3] These were the Carbon Price and the Renewable Energy Target.

argued that distributed generation is not rewarded for any environmental benefit, in terms of reduced carbon emissions, that it may provide.

However, the existence of the RET scheme complicates this argument. As outlined in Chapter 3 a formal object of the RET is to reduce emissions of greenhouse gases in the electricity sector. The payment a generator receives under the RET is based on the MWh of electricity generated. It is not linked in any way to the emissions that may be reduced as a result of the generation of renewable electricity.

Further, emission reduction is not the only purpose of the RET; it has a number of other objectives, both formal and informal, including industry development.

Given the multiple objectives of the RET, it is impossible to put a specific value on each objective, and certainly a carbon value cannot be directly determined from the RET, but the RET payment clearly reflects an element of the environmental value of renewable energy.

Based on this evidence the Commission's initial view is that the environmental benefit of distributed generation from renewable sources may be sufficiently reflected in the payments available under the RET.

But some other forms of distributed generation, such as that powered by natural gas, are not eligible for the RET scheme and are therefore not rewarded for any environmental benefit they provide. As outlined below the benefit of any reduced emissions attributable to a distributed generator can be calculated.

A MWh of distributed generation supplied to the grid offsets a MWh of supply from the NEM. If the electricity supplied by the distributed generator is of lower carbon intensity than the NEM supply it is replacing, then the emissions associated with supplying that MWh of electricity will be lower. By using the carbon intensity of the distributed generation, comparing this to the carbon intensity of the NEM and applying a carbon price the value of the reduced emissions from the distributed generator can be calculated.

QUESTIONS FOR CONSULTATION

Q16. Do you agree with the Commission's view that the environmental benefit of distributed generation may be sufficiently reflected in the payments available under the RET? If not, can you provide evidence to detail what environmental benefits of distributed generation are not already captured by the RET scheme and how they can be valued?

Q17. Are there other methodologies that the Commission could consider for calculating the carbon benefit of distributed generation technologies that are not covered by the RET?

4.3 OTHER BENEFITS RELATED TO THE ELECTRICITY PRODUCED BY DISTRIBUTED GENERATION

4.3.1 THE VCEC CONCLUSIONS AND RECCOMENDATIONS

The VCEC did not look explicitly at what could be considered as the social (or other) benefit of distributed generation. They did consider whether it was appropriate to use feed-in tariffs to provide industry support which could lead to increased economic activity and jobs in the sector. They concluded that industry assistance, through regulated feed-in tariffs, is not the most appropriate way to support the establishment of a sustainable industry.

4.3.2 COMMISSION'S INITIAL VIEW

As outlined in Chapter 1 defining the Commission is seeking views from stakeholders as to what public benefits in addition to economic and environment could be attributed to the electricity produced by distributed generation.

4.4 THE ECONOMIC BENEFIT OF DISTRIBUTED GENERATION TO DISTRIBUTION NETWORKS

4.4.1 VCEC CONCLUSIONS AND RECCOMENDATIONS

The key findings of the VCEC inquiry were:

- The VCEC concluded that recovering the network value and paying it to the proponents of distributed generation is important to ensure there are incentives for the efficient incorporation of distributed generation into Victoria's electricity system. However, recovering this value is not easy. The size of the network value is difficult to determine because it will be both time and location specific, but in constrained areas of the network it is likely to be large.
- The VCEC took the view that the network value of distributed generation is appropriately dealt with outside any feed-in-tariff payment.
- The VCEC recommended that the Victorian Government investigate whether and how the AER's price reset process could be used to:
  - Identify the network value of distributed generation
  - Require distribution businesses to make available payments based on that value.
- The VCEC suggested that in the event that a workable solution, under the current rules, is not identified, that the Victorian Government takes forward a rule change proposal so it could be considered by the AEMC prior to the next price reset process in 2015.
- The VCEC noted that at the time of the report (2012), while the installation of smart meters across Victoria allowed for peak demand (or the maximum electricity consumed in any half hour interval), to be measured, there was a moratorium on the information collected by these meters being used in retail electricity pricing.

4.4.2 COMMISSION'S INITIAL VIEW

It is clear that the economic benefit of distributed generation to the distribution networks depends on the time and location of the generation.

Since the VCEC inquiry, a number of changes to the NER have been implemented with the aim of further facilitating the deployment and valuation of distributed generation. These changes are outlined in Chapter 3 of this report and include:

- The 2013 introduction of a Regulatory Investment Test for Distribution (RIT-D).
- The 2014 introduction of the Electricity Distribution Network Planning and Expansion Framework.
- The 2014 changes to the NER Chapter 5 process for connecting distributed generation above 5MW.
- The 2014 introduction of Chapter 5A to the NER that outlines connection process for sub 5 MW distributed generation[4].
- The 2014 introduction of a revised process for the setting of network tariffs and prices for the 2016 – 2020 price determination period.
- The 2015 revision of the Demand Management Incentive Scheme (DMIS).

There have been a number of changes to the NER to support distributed generation and there are mechanisms for recognising the economic benefit of distributed generation to the distribution networks; specifically: Network Support Payments, Avoided TUOS and the RIT-D mechanisms, however these are unlikely to be accessible to the smaller distributed generators that are the focus of this inquiry. This is because smaller distributed generators are unlikely to have the knowledge or expertise to get access to these mechanisms, and the costs associated with calculating the necessary payments may outweigh the benefits.

Through this inquiry we are seeking evidence from distributed generation proponents and distribution businesses as to how these mechanisms operate in practice.

Further, recent developments suggest that it is possible for the economic benefit of distributed generation to distribution networks to be calculated to a more granular level.

These developments include:

[4] As has been noted, the Victorian government brought forward legislation in December 2015 to implement Chapter 5A of the NER

1. The continued roll out of smart meters that means distribution businesses have access to more detailed usage data.
2. The Tariff Structure Statements published by the Victorian distribution businesses. As outlined in Chapter 3, network tariffs are becoming more cost reflective and focussed on the cost of using the network at specific times. These tariff structure statements may provide an indication of the benefit of reduced network demand (that can be provided by distributed generation) at specific times of the day.
3. The Local Generation Network Credit rule change currently being considered by the AEMC.
4. The analysis by EY looking at the value of small-scale generation to networks.

Based on these developments the Commission believes that there is merit in further examining the economic benefit of distributed generation to distribution networks, and whether an appropriate methodology can be developed to identify and calculate any benefit. We are proposing to focus this analysis on:

- The 2016 - 2020 Regulatory Determinations and Tariff Structure Statements published by the Victorian distribution businesses.
- The methodology being developed to support the LGNC rule change.
- The EY analysis into the value of small-scale generation to networks.

QUESTIONS FOR CONSULTATION

Q18. Do you agree with the Commission's proposal to undertake further analysis into the economic benefit of distributed generation to distribution networks? If not, why not?

Q19. Do you agree with the proposal to focus this analysis on the three pieces of analysis highlighted? If not, why not?

Q20. Is there other analysis that might be helpful to the Commission in considering the economic benefit of distributed generation to distribution networks?

5 REGULATORY CHANGES

With one exception, the Commission has not considered if or how the regulatory framework for distributed generation needs to change.

The exception is in relation to the ability for more than one feed-in tariff rates to be set. As outlined in Chapter 4, the legislation underpinning the Victorian Feed-in Tariff prohibits the setting of more than one feed-in tariff rate. It is clear that if it is desirable to have the ability to set more than one feed-in tariff rate, then the relevant section of the EIA will need to be amended.

The Commission's views in relation to other regulatory changes will be informed by our conclusions as to the methodology(s) that should be used to calculate the value of distributed generation going forward.

6 NEXT STEPS

6.1 CONSULTATION

Readers are invited to makes submissions to this Proposed Approach Paper. A full list of the questions being asked is below. Submissions do not have to address every question.

Submissions should be made by **5pm 12 February 2016**.

Submissions, preferably in electronic format, and marked Submission to True Value of Distributed Generation Inquiry should be sent

By email to: energy.submissions@esc.vic.gov.au

By mail to: Essential Services Commission
Level 37, 2 Lonsdale Street
Melbourne, Victoria 3000

Submissions will be made available on the Commission's website, except for any information that is commercially sensitive or confidential. Submissions should clearly identify which information is sensitive or confidential.

6.2 CONSULTATION QUESTIONS

COMMISSION'S APPROACH

Q1. Do you agree with how the Commission is proposing to define true value? If not, why not? Are there other definitions the Commission could use?

Q2. Do you agree with the Commission's view that this Inquiry is focussed on identifying the public benefit of distributed generation? If not, why not?

Q3. Do you agree with how the Commission is proposing to define public benefit as it relates to distributed generation?

Q4. Is the Commission's understanding of how the costs, to network businesses and consumers, of connecting distributed generation are calculated and recovered correct? If not, why not?

Q5. Do you agree with the Commission's proposed approach to the inquiry? If not, why not, and what alternative approach would you propose?

DEFINITION OF DISTRIBUTED GENERATION

Q6. Do you agree with how the Commission is proposing to define distributed generation? If not, why not?

Q7. Are there other definitions of distributed generation the Commission could consider?

WHAT VALUES CAN BE ATTRIBUTED TO DISTRIBUTED GENERATION

Q8. Are there other public benefits that the electricity generated by a distributed generator provides? How can these identified benefits be quantified?

Q9. Are there any environmental or other public benefits that a distributed

generator provides to the distribution network? How can these identified benefits be quantified?

REGULATORY FRAMEWORK

Q10. Are there other aspects of the current regulatory framework outlined in this paper that the Commission should consider when evaluating the adequacy of the current Victorian policy and regulatory frameworks governing the remuneration of distributed generation

Q11. What is the impact of the current regulatory framework on the valuation of distributed generation in Victoria? In particular, what has been the scale and scope of support provided to distributed generators by: avoided TUOS payments, avoided DUOS payments, Network Support Payments, the Distribution Network Pricing and Assessment Framework, and the RIT-D??

KEY ISSUES FOR THE INQUIRY

Q12. Do you agree with the Commission's proposal to develop a methodology for calculating the time-of-use benefit of the electricity produced by a distributed generator? If not, why not?

Q13. Which of the two time-of-use options presented do you favour?

Q14. Are there other time-of-use options that the Commission could consider?

Q15. Are there other methodologies for calculating the locational benefit of distributed generation?

Q16. Do you agree with the Commission's view that the environmental benefit of distributed generation may be sufficiently reflected in the payments available under the RET? If not, can you provide evidence to detail what environmental benefits of distributed generation are not already captured by

the RET scheme and how they can be valued?

Q17. Are there other methodologies that the Commission could consider for calculating the carbon benefit of distributed generation technologies that are not covered by the RET?

Q18. Do you agree with the Commission's proposal to undertake further analysis into the economic benefit of distributed generation to distribution networks? If not, why not?

Q19. Do you agree with the proposal to focus this analysis on the three pieces of analysis highlighted? If not, why not?

Q20. Is there other analysis that might be helpful to the Commission in considering the economic benefit of distributed generation to distribution networks?

APPENDIX A - LOCAL GENERATION NETWORK CREDIT RULE CHANGE

In July 2015 the Local Generation Network Credit (LGNC) Rule change was submitted to the AEMC. The rule change has been proposed by the City of Sydney, The Property Council of Australia and the Total Environment Centre. It is supported by analysis by the Institute of Sustainable Futures and Oakley Greenwood[1].

The proponents contend that the current incentives for local generation in the current NER do not provide adequate recognition of the benefits that local generation can provide, and/or may not be readily accessible to small-scale local generators. They argue that the current framework for network pricing (outlined above) only focusses on electricity consumption; it does not explicitly address the export of electricity from an end-use customer. They also argue that the current mechanisms in the NER for recognising the network benefits of distributed generation, specifically the Network Support Payment, Avoided TUOS and RIT-D mechanisms, are unlikely to be accessible to many small-scale distributed generators.

Key features of the Rule change are:

- It reflects the long-term economic benefits (in the form of capacity support and avoided energy transportation costs) that the export of energy from a local generator provides to a distribution business, including reduced or avoided transmission costs that would otherwise be passed through to end users.
- The LGNC would be signalled to customers in the form of a posted credit that would be able to be adjusted yearly as part of the distribution businesses broader Annual Pricing Submission process.

[1] The full Rule change proposal can be found on the AEMC website: http://www.aemc.gov.au/Rule-Changes/Local-Generation-Network-Credits

- The detail of the credit would be developed by individual distribution businesses, based on guidelines to be prepared by the Australian Energy Regulator. The credit could vary by voltage level (and potentially by location) where the allocative efficiency benefits of that greater level of disaggregation exceed the administrative costs of developing and administering it.
- The credit would be available to local generators of any size (not just to larger local generators) as:
  - This overcomes the gap in the Rules whereby small -scale local generators are unable to monetise the benefits that they collectively provide to the grid, and
  - By not limiting size, the credit can assist in enabling localised groups of embedded generators of sufficient aggregate size and scale to be treated as a diversified portfolio, as opposed to being treated as individual generators (which in turn overcomes the need for an individual generator to provide a 'firm' guarantee of capacity support).
- The credit would not be allowed to revert to a charge in situations where the cost of catering for bi-directional flows is deemed to exceed the benefits of the exported electricity to the network. This is based on the assumption that distribution businesses will use other means for managing this issue, should it arise. These include (a) disallowing any further connections in an area where this situation arises, or (b) smearing any such additional costs across all applicable tariff classes.