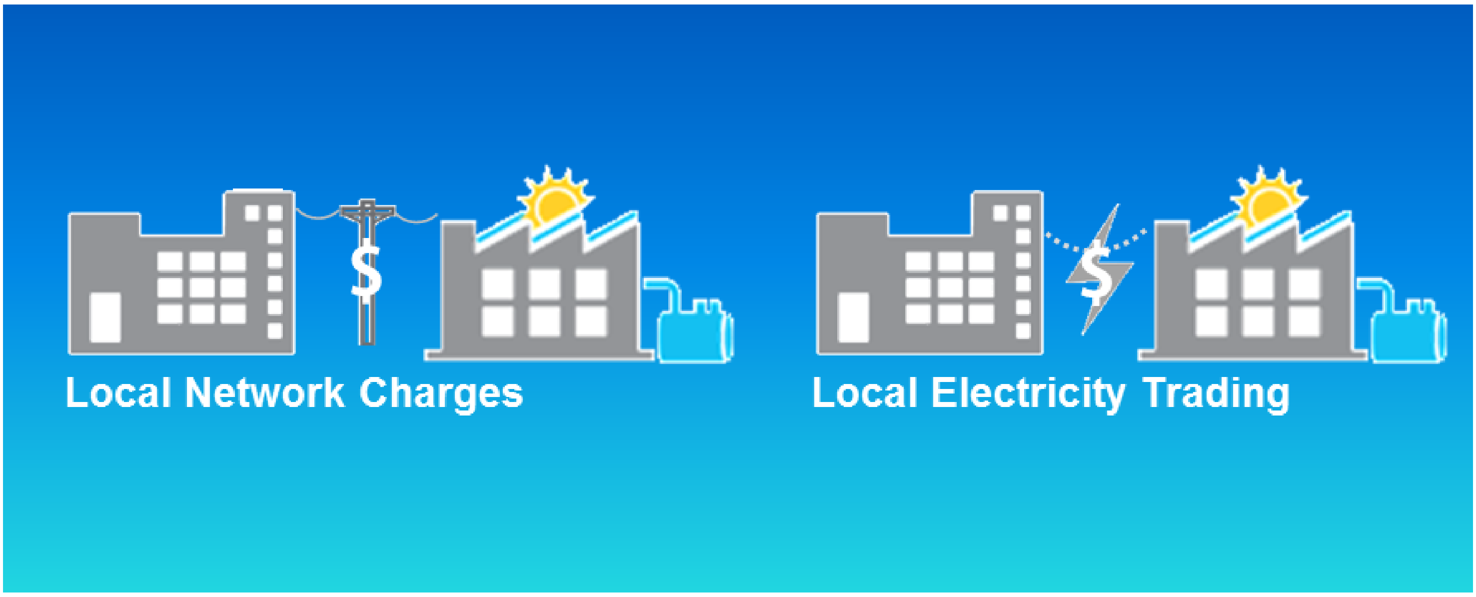


UTS: INSTITUTE FOR SUSTAINABLE FUTURES

BUILDNG A LEVEL PLAYING FIELD FOR LOCAL ENERGY

Local Network Charges and Local Electricity Trading Explained

Briefing Paper 3: September 2015

UTS:ISF
INSTITUTE FOR SUSTAINABLE FUTURES

2015

ABOUT THE AUTHORS

The University of Technology Sydney established the Institute for Sustainable Futures (ISF) in 1996 to work with industry, government and the community to develop sustainable futures through research and consultancy. Our mission is to create change toward sustainable futures that protect and enhance the environment, human well-being and social equity. We seek to adopt an inter-disciplinary approach to our work and engage our partner organisations in a collaborative process that emphasises strategic decision-making.

Authors: Jay Rutovitz, Edward Langham, Alison Atherton and Lawrence McIntosh.

CITATION

Please cite this report as: Rutovitz, J., Langham, E., Atherton, A. & McIntosh, L. (2015) *Building a Level Playing Field for Local Energy: Local Network Charges and Local Electricity Trading Explained*. Institute for Sustainable Futures, UTS.

This paper is prepared as part of the ARENA funded project 'Facilitating Local Network Charges and Virtual Net Metering'.

ACKNOWLEDGEMENTS

This paper draws material from two previous reports prepared by the Institute for Sustainable Futures:

Rutovitz, J., Langham, E. & Downes, J. (2014) *A level playing field for local energy.* Issues paper prepared for the City of Sydney by the Institute for Sustainable Futures, UTS.

Langham, E., Cooper, C. and Ison, N. (2013) *Virtual net metering in Australia: Opportunities and barriers*. Prepared for Total Environment Centre by the Institute for Sustainable Futures, UTS.

DISCLAIMER

For further information visit: **www.isf.uts.edu.au**

Contact: Alison Atherton, E: Alison.Atherton@uts.edu.au, T: +612 9514 4909

Institute for Sustainable Futures
University of Technology Sydney
PO Box 123
Broadway NSW 2007
www.isf.edu.au

EXECUTIVE SUMMARY

This briefing paper is produced as part of a one year research project, *Facilitating Local Network Charges and Virtual Net Metering.* The project is led by the Institute for Sustainable Futures (ISF), and is investigating two measures aimed at making local energy more economically viable:

- local network charges for partial use of the electricity network
- Local Electricity Trading (LET) (previously referred to as Virtual Net Metering or VNM) between associated customers and generators in the same local distribution area.

The project includes five 'virtual trials' of the two measures in New South Wales, Victoria and Queensland. The project is due to be completed by August 2016 and results and papers will be publicly available on the project webpage: http://bit.do/Local-Energy

Changing times and the advent of 'prosumers'

The traditional model of one-way flows of electricity from large centralised energy generators to consumers is changing. Over the past decade, electricity prices have doubled, solar PV costs have more than halved, and policy mechanisms have supported renewable energy and energy efficiency measures. Well over a million small residential customers in Australia now have solar photovoltaic (PV) installed on their homes. This has created a significant and growing class of consumer – the *pro*ducer and con*sumer* or 'prosumer' – who both draw electricity from the grid, and export electricity to it.

The current charging structure in the National Energy Market (NEM) in Australia reflects the historic reality of one-way flows via the transmission and distribution networks to the customer. This model has little flexibility to cater for today's prosumer, who is interested in partial use of the distribution system, or to incentivise behaviour that can reduce electricity costs for everyone. The potential benefits of local energy generation may not be realised unless charging structures are modified to suit new technologies and customer expectations.

Dropping demand and the 'death spiral'

After nearly 30 years of continuous growth in Australia, electricity consumption and demand are dropping. Energy efficiency, local energy, varying economic times, and electricity price rises, have resulted in changing patterns of both energy consumption and peak demand.

This downward trend in centralised grid electricity consumption could increase prices further, pushing consumers to reduce consumption even more or disconnect from the grid entirely. This self-perpetuating pattern of upward pressure on prices and downward pressure on consumption is known as the 'death spiral' for electricity networks. It could lead to socially inequitable outcomes as those consumers remaining dependent on centralised electricity sources pay higher and higher prices. This will be exacerbated as disruptive technologies become available to prosumers, in particular battery storage and electric vehicles.

Enabling local energy benefits customers and networks

Enabling local energy could help to reduce load defection, i.e. reducing consumption of grid electricity by generating entirely behind the meter, and grid disconnection. Prosumers with their own generation and/or energy storage who may otherwise find it economic to leave the grid could instead trade energy and services to others on the grid and in the local area. This would benefit electricity consumers as prices remain lower because more customers remain on the network, local generators and prosumers as the network continues to provide regulation and back-up services, and network businesses as their customer and revenue base is maintained, and the long term need for augmentation is reduced. Local network charges and local electricity trading are intended to make local energy projects more economically viable, incentivise prosumers to stay connected to the grid, and incentivise the provision of useful grid services from local generation.

Local Network Charges

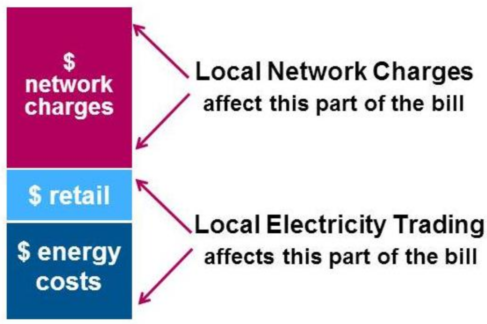
Local network charges are reduced network tariffs for electricity generation used within a defined local network area. This recognises that the generator is using only part of the electricity network and reduces the network charge accordingly. The rationale for a local network charge is to address inequitable network charges levied on a generator/consumer pair; dis-incentivise duplication of infrastructure (private wires) set up to avoid network charges altogether; and maintain use of the electricity network.

Local Electricity Trading (LET)

LET is an arrangement whereby generation at one site is “netted off” at another site on a time-of-use basis, so that Site 1 can ‘sell’ or transfer generation to nearby Site 2. The exported electricity is sold or assigned to another site for billing purposes. LET can be applied in a number of different ways:

- A single generator-customer can transfer generation to another meter(s) owned by the same entity (e.g. a Council has space for solar PV at one site and demand for renewable energy at a nearby facility);
- A generator-customer can transfer or sell exported generation to another nearby site;
- Community-owned renewable energy generators can transfer generation to local community member shareholders; and
- Community retailers can aggregate exported electricity generation from generator-customers within a local area and resell it to local customers.

The interaction of local network charges and local electricity trading



Local Network Charges and LET are independent but complementary concepts with different effects on a consumer’s energy bills. In most cases, the Local Network Charge will reduce the network charge portion of electricity bills, while Local electricity trading may reduce the combined energy and retail portion of bills for local generation.

Local Generation Network Credit Rule Change Proposal

In July 2015, the City of Sydney, Total Environment Centre (TEC) and the Property Council of Australia, submitted a rule change request to the Australian Energy Market Commission (AEMC) for the Local Generation Network Credit. The ISF project will provide case studies, methodologies and economic modelling to inform and support the Rule Change proposal.

CONTENTS

FIGURES AND TABLES

LIST OF ABBREVIATIONS

AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
ISF	Institute for Sustainable Futures
kW	kilowatt
LET	Local Electricity Trading
LGNC	Local Generation Network Credit (note this is the term used in the rule change proposal discussed in Section 4)
LNC	Local network charge
LRMC	Long run marginal cost
NEM	National Electricity Market
PV	Photovoltaic
TEC	Total Environment Centre
TOU	Time of use
UTS	University of Technology Sydney
VNM	Virtual Net Metering

1 INTRODUCTION

The paper has been prepared as part of an ARENA funded research project led by the Institute for Sustainable Futures (ISF) at the University of Technology Sydney (UTS). It provides the context for the project and explains the concepts of local electricity trading (LET) (previously referred to as Virtual Net Metering or VNM) and local network charges.

1.1 The project

The one year research project *Facilitating Local Network Charges and Virtual Net Metering* (the ISF project) started in June 2015, and investigates two measures aimed at making local energy generation more economically viable: local network charges for partial use of the electricity network, and local electricity trading (LET) between associated customers and generators in the same local distribution area. The project brings together a partnership of consumers, researchers, electricity providers and government to help level the playing field for local energy and prepare for the electricity grid of the future.

The project is due to be completed in August 2016 and the results and papers will be publicly available on the project webpage at http://bit.do/Local-Energy. ISF will publish reports and briefing papers and an open-source 'Business Case' spreadsheet tool that will be freely available for use by anyone interested in how local network charges and LET affect the economics of local generation projects.

1.2 Aims and outputs

The objective of the project is to create a level playing field for local energy, by facilitating the introduction of local network charges and local electricity trading. The key outputs are:

a. Improved stakeholder understanding of the concepts of local network charges and Local Electricity Trading;

b. Five 'virtual trials' of local network charges and Local Electricity Trading in New South Wales, Victoria, and Queensland (see Figure 1);

c. Economic modelling of the benefits and impacts of local network charges and Local Electricity Trading;

d. A recommended methodology for calculating local network charges;

e. An assessment of the metering requirements and indicative costs for the introduction of Local Electricity Trading, and consideration of whether a second rule change proposal is required to facilitate its introduction; and

f. Support for the rule change proposal for the introduction of a Local Generation Network Credit submitted by the City of Sydney, the Total Environment Centre, and the Property Council of Australia (see Section 6).

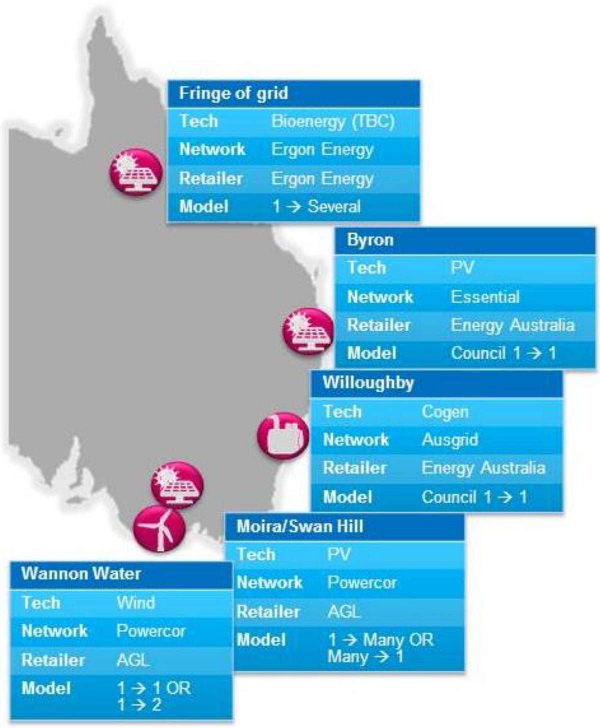


Figure 1 The virtual trials

2 CONTEXT: CHANGING TIMES

This section sets out the context and the need for local network charges and Local Electricity Trading in Australia.

2.1 The NEM economic framework is sub-optimal

The current charging structure in the NEM reflects the historic model of one-way flows from large, remote generators via the transmission and distribution systems, to the customer. In this model, everyone except very large customers, who may be connected directly to the transmission network, use all (or nearly all) network levels.

Most network charges are levied on volume, particularly for small customers, and costs are smeared across all consumers according to the volume of energy and the class of customer. However, volume charges do not deliver appropriate price signals and can result in cross-subsidies between consumers.

In fact, the cost of the network is almost entirely determined by peak capacity requirements rather than by the volume of electricity used. An increase in electricity use at peak time in a constrained part of the network increases costs dramatically, as the network cannot supply that additional demand without augmentation. Therefore, current charges reflect the historic investment to supply peak capacity. But with changing electricity use patterns, this investment may now be underused.

Network businesses are currently unable to offer a tariff to reflect partial use of the network and retailers do not currently offer a 'netting off' service for multiple sites as standard. For example, small to medium businesses (such as local councils or universities) may want to generate electricity at one site and use it at another site nearby. Lack of flexibility to do this has stopped the implementation of numerous projects.

In order to minimize grid exports, local generation is currently sized to match the lowest onsite electrical load. Despite the fact that generation at particular times may alleviate congestion caused by other nearby customers, little financial benefit accrues to the generator exporting electricity. The result is down-sizing of generation which affects economies of scale and operating efficiency for local generators.

The current charging structure does not produce optimal outcomes for local generation because:

- there is little incentive to reduce peak loads
- there is no flexibility to cater for partial use of the distribution system
- small-scale generators are not incentivised to export excess energy to the grid as they do not receive any benefit for the network services they provide.

This results in customer operating "behind the meter" to offset retail electricity prices by limiting generator size or constructing private wires. Behind the meter options will be significantly enhanced by the advent of storage, potentially resulting in further load defection or grid disconnection.

2.2 Changing economics

The NEM in Australia is undergoing a transformation as the traditional model of one-way flows from large remote generators to consumers is changing.

Over the past decade, electricity prices have doubled, largely due to investment in electricity networks – the poles and wires. This, combined with decreasing costs for solar PV and policy mechanisms to support renewable energy such as feed-in tariffs and the Renewable Energy Target, has prompted a remarkable uptake in domestic solar PV(well over a million small customers now have solar PV). In addition, commercial and industrial scale renewables and cogeneration systems are a small but significant part of the Australian energy supply system.

This has created a significant and growing class of consumer – the *pro*ducer and con*sumer* or 'prosumer' – who both draws electricity from, and exports to, the grid. Further disruptive change is anticipated as battery storage becomes more economically attractive and as electric vehicles increase their market share. In July 2015 for example, the Queensland Government announced that Townsville could soon have the first service station in Australia where drivers can charge their electric vehicles from solar energy.[1]

Under current charging structures, prosumers receive the most value from generation that is consumed on-site. As network operators introduce cost reflective pricing structures, charges will shift from volume (based on the amount of electricity units sold (kWh)), to capacity payments (which are made on the peak supply that is provided). While behind the meter generation always reduces the volume of grid electricity consumed, it may not reduce the peak capacity required, so cost reflective pricing may accelerate grid defection and make matters worse for networks in the long run.

The introduction of Local Network Charges aims to remove some of the incentive for local generators to go entirely behind the meter by making limited use of the network more attractive.

2.3 Changing energy consumption and demand

The traditional business model for networks was designed when the customer base remained the same or increased, and there was steadily increasing capacity requirements. Network investment was partly driven by forecasts for strong growth in both demand and consumption and, up until 2012, the market forecasts in Australia assumed a steep upward trend.

Instead, after nearly 30 years of growth, both consumption and demand have dropped. Contrary to expectations, electricity consumption from the grid declined significantly for the five years between 2008-09 and 2013-14, although it increased again very slightly in 2014-15[2]. Up to one third of the recent $45 billion network investment was to meet peak demand growth forecasts that have not eventuated.

Energy efficiency, local energy, changing economic times, and electricity price signals themselves have resulted in changing expectations of both energy consumption and peak demand.

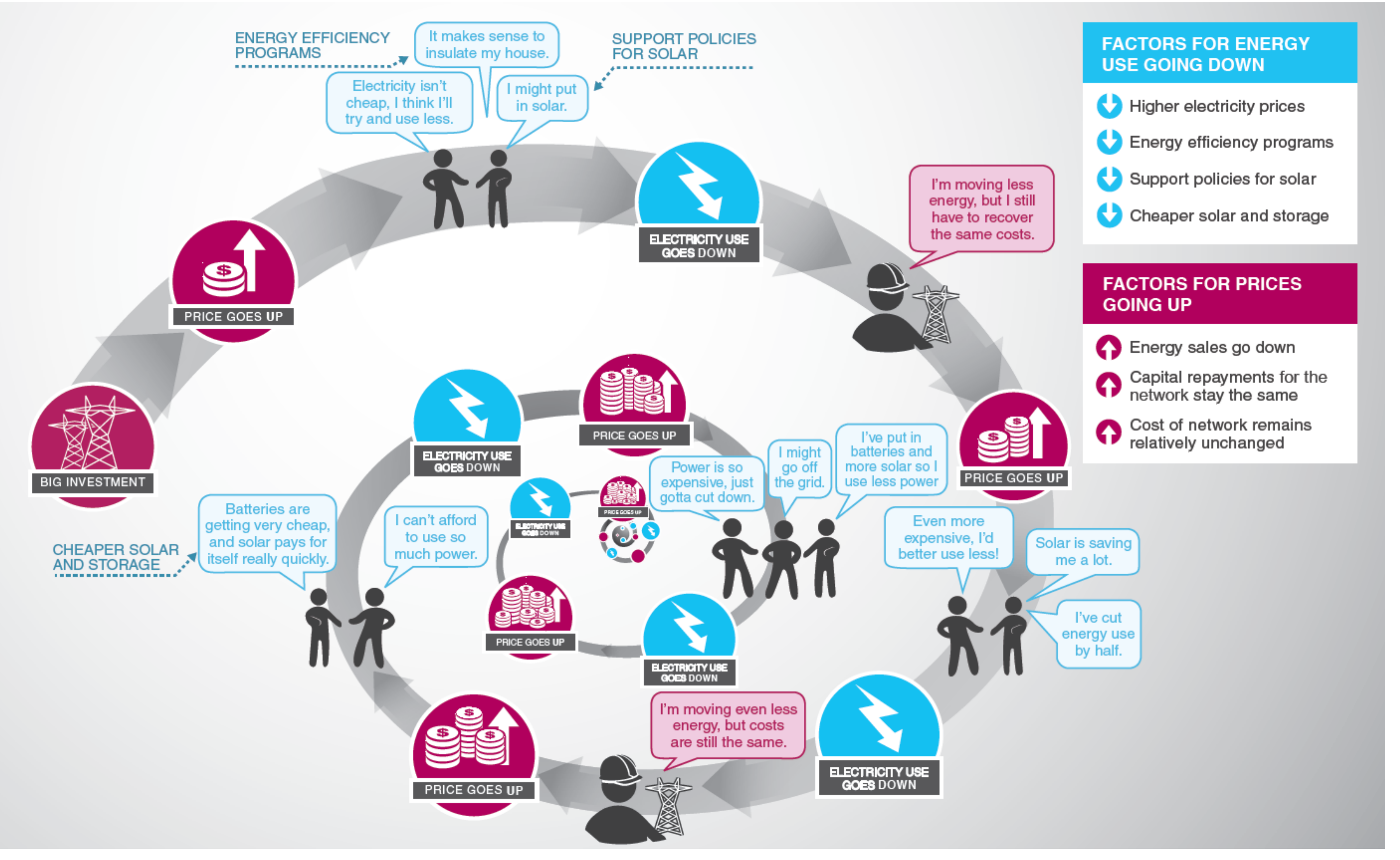
2.4 Challenges and opportunities

Downward pressures on centralised grid electricity consumption and resultant increasing prices could push consumers to further reduce their consumption or disconnect from the grid entirely. This could further increase prices for the customers without their own generation, and place further downward pressure on consumption. This self-perpetuating pattern of downward pressure on consumption and upward pressure on pricesis known as the 'death spiral' for electricity networks.

[1] Queensland Government media release, July 25th 2015 Townsville first stop on the electric super highway.

[2] National Electricity Market electricity consumption data, AER, AEMO, https://www.aer.gov.au/node/9765

Figure 2 The 'death spiral' - upward pressure on prices and downward pressure on consumption



This could lead to socially inequitable and sub-optimal outcomes, in which a shrinking number of grid electricity consumers, who may be unable to afford individual electricity supply systems, would be left to meet the costs of legacy infrastructure, Society could be left with an underused grid infrastructure asset, built to serve a larger customer base.

Customers leaving the grid may have insufficient expertise to manage technical issues such as voltage support and supply balancing, leading to safety concerns. It is clear that network operators are facing significant changes to their business model, the technical services they provide, and their customer base. They are experiencing the dual pressures of reduced revenues and opposition to further price rises.

Faced with such disruptive change, business as usual may not be an option. Enabling local energy can help to reduce load defection and grid disconnection, benefitting electricity consumers, local generators and network operators.

2.5 Enabling local energy can benefit customers

Enabling local energy by modifying the structure of the market to recognise the benefits that it provides will increase the number of local energy options including generation, efficiency and load management. Provided price signals reward technology and behaviour that flatten load or decrease peak load locally or across the system, local energy could decrease the need for additional network infrastructure in the long term.

Providing a level playing field for local energy may also de-incentivise customers from disconnecting from the grid, which has multiple benefits. Firstly, it will prevent the upward pressure on electricity prices for customers remaining on the grid. Secondly, grid electricity services are likely to be more reliable than stand-alone systems in terms of maintenance down time, voltage, and power quality. Finally, grid connection allows customers the ability to sell exported energy (‘local exports’) or provide other services such as voltage regulation.

Local energy can benefit customers in Australia by reducing:

- energy prices
- the need for additional network infrastructure in the long term
- the take up of entirely off-grid solutions, keeping cost sharing for the network more equitable
- greenhouse gas emissions.

2.6 Enabling local energy can benefit network businesses

Demand-side participation was an important recommendation from the 2012 Power of Choice review by the Australian Energy Market Commission (AEMC)[3]. Encouraging local energy generation helps achieve demand side participation. Providing a robust framework means this generation can be built into system forecasts to optimise future network investment.

A standardised, cost reflective framework for valuing local exports creates price signals to weight generation towards the times of day and seasons when the network needs it. Developing appropriate local charges and payments will enable network operators to start ‘shaping’ local energy to deliver effective network support.

[3] Australian Energy Market Commission (2012). *Power of choice review - giving consumers options in the way they use electricity.*

While battery storage presents a risk for network businesses, it can also be seen as an opportunity because it would allow customers to actively manage their load profile and offer network services when needed. This could help to reduce network costs in the long term.

The most important benefits for network operators from enabling local energy are likely to be in the medium to long term by 'future proofing' their business model.

Local energy can benefit network operators by promoting:

- cost structures that suit the grid of the future
- continued customer participation (less risk from grid defection)
- reliable demand-side participation in local network
- improved accuracy of system forecasts.

2.7 The role of Local Network Charges and Local Electricity Trading

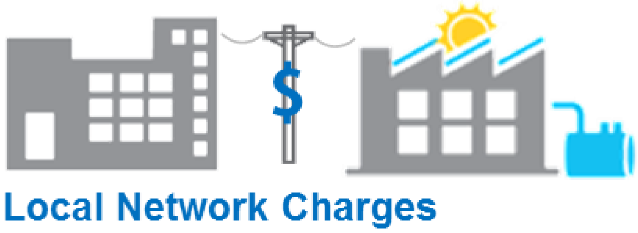
In light of the potential multiple benefits of local energy it is important to explore mechanisms that make local energy projects more economically viable and address inequitable charging arrangements. The combination of Local Network Charges and LET aims to offer desirable alternatives to customers who might otherwise choose to disconnect from the grid altogether or keep their generation "behind the meter", substantially reducing the amount of electricity they take from the grid.

The introduction of LET and Local Network Charges is expected to unlock substantial new local energy resources, including additional renewable energy potential. These mechanisms are explained in more detail in the following section.

3 VALUING LOCAL GENERATION: LOCAL NETWORK CHARGES

Local network charges are reduced network tariffs for electricity generation used within a defined local network area. This recognises that the generator is using only part of the electricity network and reduces the network charge accordingly.

To date reduced network tariffs have been applied systematically in the UK, and to a limited extent in the US.



3.1 The rationale for a Local Network Charge

A local network charge is intended to redress the fact that a local generator/ consumer combination is charged the same for network use, regardless of whether they are using 100 metres of network to cross a road, or 200 km of network to transmit electricity from a centralised generator. Thus the rationale for a local network charge is:

- To address inequitable network charges currently levied on a generator/consumer pair;
- To provide a reasonable and fair alternative to duplication of infrastructure (private wires); and
- To maintain use of the electricity network by customers otherwise incentivised to leave.

This project is researching local network charges that are applied as a credit paid to local generators. The credit is paid according to how much the generator exports and what time of day and is unrelated to whether a local customer is identified.

Customers can still benefit as credits paid to local generators are likely to be passed on by way of lower energy charges. Electricity exported to the network will always be used by the nearest energy user, so unless a situation arises where local energy generation exceeds local demand, exported energy will be used within the local distribution system.

Technical solutions may be needed to ensure the credit is only paid when justified i.e. when the electricity is in fact being used locally so that only a limited part of the network is utilised. For example, credits may be restricted to times when exports are used within the generator's local network area or at least adjusted to account for the reduced benefit. Technical solutions could include remote disconnection of PV or other local energy or extra metering to ensure the credit only occurs when there is no upstream export.

3.2 Proposed methodologies for calculating local network charges

This section explores how a local network charge may be calculated.

Among other issues, a pragmatic and economically efficient Local Network Credit calculation methodology needs to address the following:

1. Value Calculation
    a. A framework for calculating the value of local generation
    b. Calculation by location, network level and customer class
2. Tariff Creation
    a. Allocating value to local generation by volume, capacity, or both
    b. Allocating value to local generation by time.

Value calculation

For the purpose of the trials, ISF has proposed using network Long Run Marginal Costs (LRMC) as the basis of the value calculation for the local network charge. This is practical because networks already calculate LRMC. However, there is a concern that using LRMC will not deliver the appropriate value to the local network charge in the current investment environment. If the project budget allows, alternatives for value calculation will be investigated.

Tariff creation

Once the overall value of the local network charge has been calculated, the next step is to allocate the value to customer classes via a specific tariff. A fundamental decision is how the tariff is calculated with the three options being volumetric, capacity, and both volumetric and capacity.

- **Volumetric payment alone:** This method credits all local energy exports on a volumetric basis, with no separate component for capacity payment. A volumetric payment may be applied as flat rate or Time of Use (TOU). This is the model used in both cases where a systematic network credit has been paid, namely the UK and Minnesota.
- **Capacity payment alone:** A capacity payment is given for the provision of capacity during defined periods with many options for defining the period.
- **Combined volumetric and capacity payments:** Combining both types of payment may address many concerns with the individual approaches alone.

The allocation of value between volumetric and capacity payment and the choices regarding how to reward capacity can be made from the “bottom up”, as any tariff is determined, or could use the results of the calculations undertaken for the existing tariff for the customer. This is described as a “mirror” tariff as it reflects the decisions made when setting network charges for non-generator customers.

- **“Bottom up”:** This method allocates a percentage of the calculated value to capacity and volumetric payments and then determines how the peak kW should be rewarded, including the periods and the method.
- “**Mirror”:** In this method the decisions on the allocation of value between volumetric and capacity and the periods for capacity payments would be set according to the network tariff that applies to that customer class. The capacity payment would simply “mirror” the demand charge, so that the minimum kW availability during the relevant period is rewarded at the same rate as demand payments.

ISF has decided to trial both the volumetric tariff and a volume-capacity tariff calculated as a hybrid of the “bottom-up” and “mirror” tariffs. The key elements of volumetric, bottom-up, and mirror tariffs are listed in Table 1

The trials will help to determine whether the value outcome for the generator is substantially different for a volumetric and volume-capacity tariff.

Table 1: Summary of local network charge calculation methods proposed for trials

	1) VOLUMETRIC	COMBINED VOLUMETRIC + CAPACITY 3a) BOTTOM UP	 3b) MIRROR
Determine LNC value	LRMC of augmentation and replacement CAPEX and OPEX (standard cost reflective tariff approach) with: • AIC / perturbation LRMC chosen as per CC & network level • include LRMC of downsizing	Same as volumetric method	Same as volumetric method
Locational allocation of LNC value	Allocate by network level and customer class, as per standard cost reflective tariff approach	Same as volumetric method	Same as volumetric method
Allocate between volume and capacity	All volumetric	To be determined	Mirrors LG customer tariff
Availability adjustment	To be determined	Capacity payment rewards availability, adjustment not required	Capacity payment rewards availability, adjustment not required
Time Allocation	Peak, shoulder and off peak by network level (option of 2 tier system with system peak at HV levels & network level/ CC peak at LV levels)	Same as volumetric method	Mirrors LG customer tariff
Include additional values/ costs	**Additional values:** Avoided Transmission Use Of System payments, volumetric losses	Same as volumetric method	Same as volumetric method

4 VALUING LOCAL GENERATION: LOCAL ELECTRICITY TRADING

Local electricity trading is an independent concept to local network charges but the two are complementary. The existence of a local network charge in a local area would make LET more economically attractive for that area, and vice versa.

LET is an arrangement whereby generation at one site is "netted off" at another site on a time-of-use basis, so that Site 1 can 'sell' or transfer generation to nearby Site 2.

The exported electricity can be sold or assigned to another site owned by the generator or other electricity customers. The exported electricity is not physically transferred to the consumer, but rather transferred for billing reconciliation purposes.[4]

LET can be applied in a number of ways with a number of different participants. For example:

- A single generator-customer can transfer generation to another meter(s) owned by the same entity (e.g. a Council has space for solar PV at one site and demand at a nearby facility);
- A Generator-customer can transfer or sell exported generation to another nearby site;
- Community-owned renewable energy generators can transfer generation to local community member shareholders; and
- Community retailers can aggregate exported electricity generation from generator-customers within a local area and resell it to local customers.

4.1 Four types of Local Electricity Trading

Table 2 below outlines four types of LET, differentiated by the relationship between the generator and the consumer. Thus "single entity" LET means that the generator and consumer are the same entity, although they may have multiple sites and/or multiple meters.

It is important to note these LET arrangements have no theoretical geographic limits on the location of the electricity consumer relative to generator.

Table 2 also lists whether the electricity is 'sold' or 'transferred' from the generator to the consumer. The electricity will be 'transferred' to the consumer(s) billing account when the consuming entity has a stake in the generator (ownership, financial or otherwise). The electricity will be 'sold' to the consumer(s) when the consumer is a third party with no stake in the generator.

[4] The physical electricity that is generated is unlikely to be transported specifically from Site A to Site B – it is impossible to track the flow of electricity through the network. However, assuming the demand at the zone-substation or feeder level is still flowing 'downstream' towards the customers, the physical unit of electricity coming from Site A will be used at nearby sites.

Table 2 Four types of Local Electricity Trading (LET)

Type of LET	Description	Generator	Consumer	Electricity sale or transfer?	Potential Generators and Consumers
1. Single entity LET **also called** **1 to 1 LET**	An entity transfers exported generation from one site to offset electricity demand at its other site(s)	Entity A Meter A	Entity A *Meter B, C etc*	Transfer	Organisations with multiple meters such as: • Councils • Universities • Multi-site companies • Large landholders with multiple supply points
2. **1 to several LET** **also called** **Third Party LET**	An entity sells exported generation to separate entities	Entity A Meter A	Entity B, C, D etc *Meter B, C, D etc*	Sale	Could be open to any generator and consumer: • Solar farm/small wind farm • Landlord of multi-tenant sites sells to tenants (shopping mall, multi-unit dwelling)
3. **One to many** **also called** **Community Group LET**	A collectively owned generator transfers exported generation to shareholders	Entity A Meter A (i.e. generator owned by core group of investors	Entity B, C, D etc *Meter B, C, D etc (shareholders in core group)*	Transfer	Generators whose equity is split and electricity output is transferred to the meters/accounts of shareholders require this type of LET: • Community funded generators • Occupant funded generators on multi-unit dwellings
4. Many to one **also called** **Virtual Power Station** **OR** **Retail aggregation LET**	Multiple entities sell exported generation to retailer for resale to multiple consumers.	Entity A, B, C etc Meter A, B, C etc	Entity X Possibly via a Retailer *Meter X* *(note this can be several entities X, Y, Z)*	Sale	• Local generators with exportable electricity • Retailers including community retailers NB: if no geographical link between generator & consumer, this is similar to Small Generation Aggregator Framework

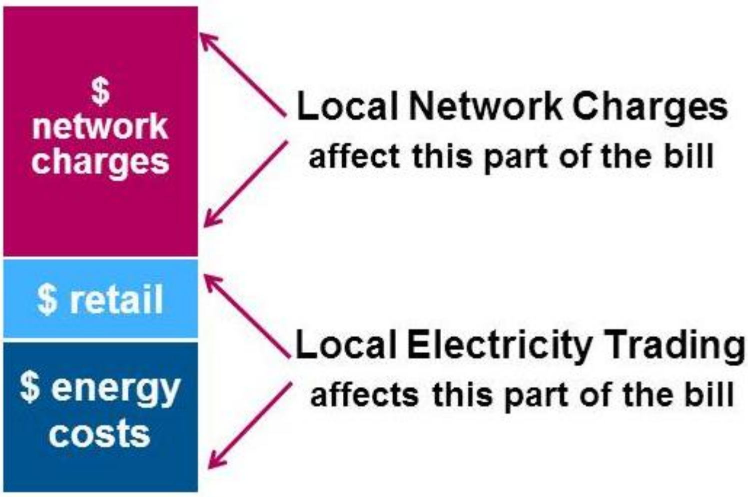
5 THE RELATIONSHIP BETWEEN LOCAL NETWORK CHARGES AND LET

Both local network charges and LET aim to overcome barriers to uptake of local electricity generation by improving the business case for local energy projects. As noted above, they are separate and different, but complementary concepts.

In summary, local network charges are reduced network tariffs that reflect partial use of the electricity network where electricity is generated and used locally, while a LET is 'netting off' on a electricity bill of locally generated electricity that is assigned to a local customer at a different nearby site. The existence of the two mechanisms together makes each more economically beneficial to the local generator and customer.

The two concepts will also have different effects on a consumer's energy bills. In most circumstances, local network charges will reduce the network charge portion of electricity bills for local generators to the extent that the generation reduces long term network costs. LET will reduce the combined energy and retail portion of electricity bills for local generation.

Figure 3 The relationship between local network charges and local electricity trading



6 REGULATORY CHANGE FOR LOCAL GENERATION

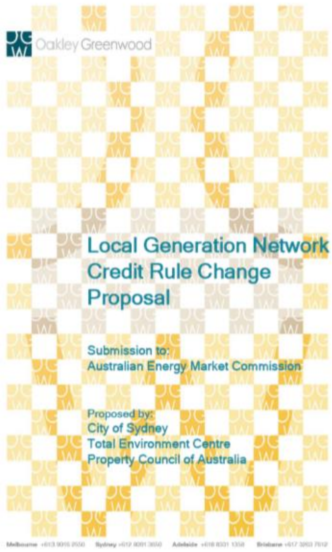
A range of regulatory changes that affect local generation are underway, primarily due to the Power of Choice Review[5].

Most of the proposed changes and those underway do not directly address the value of local use of energy, or include the introduction of local network charges, but are complementary to a rule that will enable local charging. They address specifics like metering, connection arrangements and the cost reflectivity of network pricing.

One rule change which has been recently submitted to the AEMC addresses local network charges directly. This is described in more detail in the following section.

6.1 Local Generation Network Credit Rule Change Proposal

In July 2015 the City of Sydney, Total Environment Centre (TEC) and the Property Council of Australia submitted a rule change request to the Australian Energy Market Commission (AEMC) for the Local Generation Network Credit[6]. The rule change request was informed by work previously commissioned by the proponents and conducted by ISF in 2014 on the options for calculating the benefits and costs of local generation.



During consultation undertaken by ISF in 2014, there was extensive discussion as to whether local network charges should be transactionally applied as a *reduced charge* to the electricity consumer or as a *credit* to the generator. There was a clear response that it should be a credit to the generator, primarily because of the ease of implementation. The current rule change proposal was therefore submitted on this basis for a Local Generation Network Credit. AEMC consultation on the Rule Change Proposal is likely to commence in late 2015 or early 2016.

6.2 Relationship between the rule change proposal and the ISF project

The ISF project will provide case study evidence, sample methodologies, and economic modelling to inform and support the Rule Change Proposal process. The ISF project will research local network charges on the basis of a credit paid to the generator, but will retain the terminology local network ***charge,*** as the Local Network Generation Credit is intended to

[5] Australian Energy Market Commission (2012). *Power of choice review - giving consumers options in the way they use electricity.*

[6] Local Generation Network Credit Rule Change Proposal, Submission to Australian Energy Market Commission. Prepared by Oakley Greenwood for City of Sydney, Total Environment Centre, Property Council of Australia, 14 July 2015.

be an appropriate charge for local use of network that is achieved via a credit to the generator.

If a rule change proposal is accepted, methods for determining and apportioning the local network charge within the various network price formulas and constructing network tariffs for different customer classes will be needed. The development of methodologies for calculating local network charges within this project will assist the consideration of the rule change proposal and the anticipated development of guidelines by AER.

It is assumed that the local network charge will be constructed to incentivise investment decisions with lower costs than the LRMC of the network, as this is the principle stated in the rule change proposal. As such, the local network charge will exert downward pressure on network costs over the long term.

As part of the rule change proposal submission, Oakley Greenwood prepared a statement on the likely costs and benefits of the introduction of Local Network Generation Credits for different parties. Although that preliminary work comments on the likely magnitude of impacts, the impacts are not quantified. Economic modelling undertaken for this project will build on the work done by Oakley Greenwood to quantify impacts on key stakeholders, primarily electricity consumers and will be provided to the AEMC as part of the rule change process. It is clear that providing evidence as to how the measure will promote the National Electricity Objective is essential in order for any rule change to be made. As network price trajectories for customers are important, this will be the focus of ISF's economic analysis.

UTS:ISF
INSTITUTE FOR SUSTAINABLE FUTURES