

# EnergyWatch

*The Journal of the Sustainable Energy Forum Inc.*

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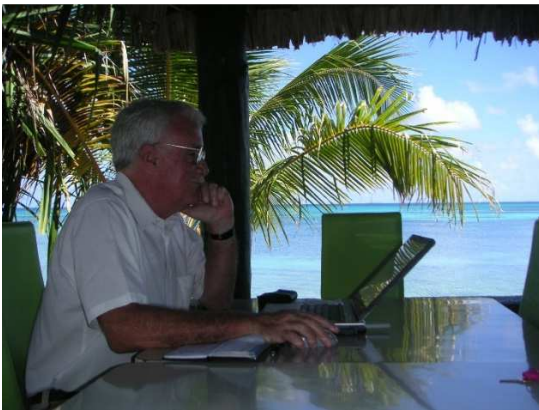
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## EDITORIAL

### How the Power Industry Mistreats its Consumers



**By John Irving, Guest Editor**

With an election looming in 2017 readers of this EnergyWatch (EW77) have an opportunity to consider proposals that address issues of concern to electricity consumers who, after all, pay about 92% [\$5.5bn/\$6bn] of the ever increasing national electricity bill<sup>1</sup> and make up the majority of voters. Moreover as self-appointed independent guardians of consumer interests in the energy sector, SEF members in particular need to walk their talk so they can be more influential in developing consumer friendly government policies.

<sup>1</sup> According to the EA commercial and residential consumers pay about \$5.5bn in annual power bills with the balance of \$0.5bn from direct large wholesale consumers: See <https://www.ea.govt.nz/consumers/my-electricity-bill/>

As guest editor for EW77, I have assembled a series of related articles that examine the current status of NZ power sector issues from a consumer viewpoint in order to identify more consumer-friendly changes in the way the power sector is governed. Much of the subject matter herein incorporates ideas from SEF members extracted from submissions to other agencies, emailed comments between SEF members and specially written articles for this publication. Key contributors include Steve Goldthorpe, Molly Melhuish, Stephan Heubeck, Alastair Barnett, Frank Pool, and Tom Adson. Information from other sources is referenced in in the numbered footnotes.

The scope of this review includes (i) a summary of the issues that concern retail consumers; (ii) a retrospective view of how the power sector reform process has been manipulated by industry incumbents over time; (iii) an understanding of the environmental, geographical and weather related issues in NZ that may be seen to constrain future sector reforms; (iv) an explanation of significant technological changes that have occurred worldwide in the last few years impacting both the transport and distributed generation sectors; (v) new initiatives to support consumer participation.

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## GLOSSARY

**This electricity sector, and hence this issue of EnergyWatch, abounds with acronyms etc. so here is a glossary to help readers.**

ACOT	Avoided COst of Transmission
CC	Commerce Commission
COP21	21 <sup>st</sup> Conference of the Parties to the Framework Convention in Climate Change held in Paris in December 2015
DEUN	Domestic Electricity Users Network
DG	Distributed Generation
DSM	Demand Side Management
EA	Electricity Authority
EECA	Energy Efficiency and Conservation Authority
EW	EnergyWatch
EVs	Electric Vehicles
EU	European Union
Gentailers	Electricity Generating and retailing companies
GHG	Greenhouse Gases
HVDC	High Voltage Direct Current electricity transmission system
IEA	International Energy Agency
LCs	Lines Companies that distribute electricity
LCOE	Levelised COst of Electricity
LG	Labour-Greens
MEUG	Major Electricity Users Group
PHEV	Plug-in Hybrid Electric Vehicles
PMV	Personal Motor Vehicle
PV	Photovoltaic power generation
RE	Renewable Energy
SEF	Sustainable Energy Forum
STE	Solar Thermal Electricity
TransPower	The company responsible for high voltage transmission and the operation and management of the NZ electricity system
V2G	Vehicle to Grid

## BACKGROUND

We may recall that the 2014 election included a debate of a Labour-Greens (LG) proposal to reform the NZ electricity market – mainly by re-introducing a single buyer market to reduce costs of generation. Many commentators thought it was a half-baked scheme largely promoted by diverse group of voters, frustrated by the behaviour of the quasi-monopsony of incumbent NZ Gentaillers<sup>2</sup> and Line Companies (LCs). However it was evident retail consumers were particularly concerned by having to pay an apparently unfair share electricity costs that were increasing inexorably faster than inflation – even during a period of falling electricity demand. Consequently the LG proposal attracted so much ridicule by power industry “experts” that it was used to champion the National Government’s controversial plan for the partial sales of the remaining State Owned Gentailler assets. Although the sales of state owned assets that occurred in 2015 made “mum and dad” investors happy, there was no attempt by the government to deal with the underlying issues of real concern to the general public.

There is still a perception that cartels exist in the NZ gentailler market and that price gouging by the electricity industry incumbents is exacerbating energy poverty issues, discouraging all forms of demand side participation in the market and failing to deal with NZ’s environmental issues. Moreover given that most of the power sector infrastructure was built and paid for many years ago, one might ask how did these largely public institutions manage to hoodwink retail consumers into paying artificially high “market prices” for the use of “old” assets most of which generate power from free hydro and other renewable resources?

There is also a view that regulatory involvement in the NZ power sector functions protects the

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<sup>2</sup> Gentaillers (Generator/Retailer Companies) – a peculiarity of the NZ Power Market where ad-hoc sector reform unintendedly led to electricity generating companies buying locally owned electricity retail businesses as a means of hedging their pricing structures.

hegemony (dominance of one group over others) of the power market incumbents - primarily by allowing the artificial inflation of gentailler and network asset values to justify self-perpetuating higher returns on investment. For example, in recent years NZ regulatory institutions have allowed power sector incumbents to deploy “not-so-smart” metering that won’t allow data sharing with consumers; and currently appears to be fostering the obstruction of consumer participation in demand side management (DSM). These institutions, largely charged with protecting consumer interests include the Commerce Commission (CC), the Electricity Authority (EA) and to a lesser extent the Energy Efficiency and the Conservation Authority (EECA). Both the EA and the EECA are responsible for implementing energy sector policy and ironically are funded from levies on the power industry that are passed through directly to electricity consumers.

The situation has, of course, long suited the governments of the day that have benefited from a regular flow of dividends and taxes. The government even claims that the high level of consumer switching between electricity retailers indicates that there is a strong competition in the power market. [If this is so, then why does the public need to be encouraged to switch retailers with TV advertising?] This argument is hard to swallow today as prices keep rising even as demand keeps falling. It is also evident that power sector asset valuations no longer represent their current economic worth and there should be no justification for price rises. Even the respective Ministers of Finance and Energy<sup>3</sup> now appear to recognise the situation. They have both warned LCs that their network assets are in danger of being devalued to reflect their declining monopoly position in relation to the potential for significant growth of the DSM market.

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<sup>3</sup>[http://www.nzherald.co.nz/business/news/article.cfm?c\\_id=3&objectid=11642315](http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=11642315)

## **Times Are A-Changing**

The signing the Paris climate conference (COP21) in December 2015, by 195 countries (including NZ) set GHG emissions reduction obligations for all countries, following on from Kyoto in 1997, which set the scene for Paris with Kyoto establishing GHG targets for developed countries, voluntary participation by developing countries, and establishing inventory and reporting requirements for all countries. The agreement sets out a global action plan intended to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C.

The Paris agreement is due to enter into force in 2020 and should change the game in the NZ energy sector over the next decade. Indeed over the last few months both government and industry appears to be taking a more serious view about meeting NZ obligations under COP21. The recent appointment of a more active (Paula Bennet) Minister of Environment suggests that the government is trying to be seen to be doing something positive (rather than continue with the obfuscation policies of the past). Likewise it appears the appointment of the youthful Simon Bridges as Minister of Energy and Transport indicates that old guard may be taking a serious look at how these two important sectors are interdependent.

Co-incidentally over the last few years there have been dramatic developments in new technologies that offer hope of the world meeting these goals with greater energy consumer participation. The highly conservative International Energy Agency (IEA) predicts the cost of solar energy will continue to fall in coming decades as the sun becomes the dominant source of world power generation.

The IEA now expects solar to become the biggest single source of energy by 2050 and has now doubled its forecast capacity for solar PV. Rooftop solar, it says, will now account for one half of the world's solar PV installations, because as a distributed energy source the technology is "unbeatable".

On costs, the IEA says all solar technologies will fall dramatically in coming decades with solar PV falling to as low as 4c/kWh. *[Note that recent PV auctions in the Middle East have already achieved this price level, which shows just how conservative and backward looking the IEA actually is.* Frank Pool]

The IEA also estimates that solar thermal electricity (STE) could fall to 6.4c/kWh.

On May 31<sup>st</sup> many NZ industry participants, with the notable exception of the NZ power industry, sponsored "Yes-We-Can" symposium, which is reported on Page 18.

Notably on May 5<sup>th</sup> there was also a significant policy change announced by the NZ government to support the growth of electric vehicles. The policy aims to get an impressive 64,000 Electric Vehicles (EVs) on our roads by 2021 by using a number of incentives to popularise the uptake of EVs (including Plugin Hybrids - PHEVs). The EECA recent noted "Changing 300,000 light vehicles to electric vehicles (10% of our current fleet) could save a million tonnes of CO<sub>2</sub> a year."

The rationale for the program is based on Waikato University studies that show the personal motor vehicle (PMV) fleet is by far and away the biggest contributor to GHG emission in the transport sector. Surprisingly, aside from Mighty River Power (retailing as Mercury Energy) which has promoting electric cars for the last year, the response by the rest of the power industry appears to be a big yawn.

Accordingly, a year ahead of the 2017 election, it is timely for SEF members to come to grips with the predicament of residential and commercial customers, bearing in mind the past record of voter indifference to the single buyer power market model, the increasing use of obstructive tactics by the power industry and its regulators to preserve the status quo, and the potential of exciting new developments in renewable and battery technologies that will reform the power sector and help address NZ's climate change obligations.

# ARE CONSUMERS FRUSTRATED?

There is ample evidence to suggest that the outcome of electricity reform, pioneered by the Lange-Douglas Government in the 1980s, has not resulted in happy retail consumers.

On the other hand because of their larger economic lobbying power, notably the 16 member Major Electricity Users Group (MEUG) and other large electricity users (e.g. the Tiwai Point Aluminium smelter) appear to be generally happy with the way the power sector has developed. They have a well organised lobby, which can afford to participate in power industry discussions and are well represented on EA standing committees. They have benefited from a steady transfer of power sector costs to retail consumers over the last 20 years.

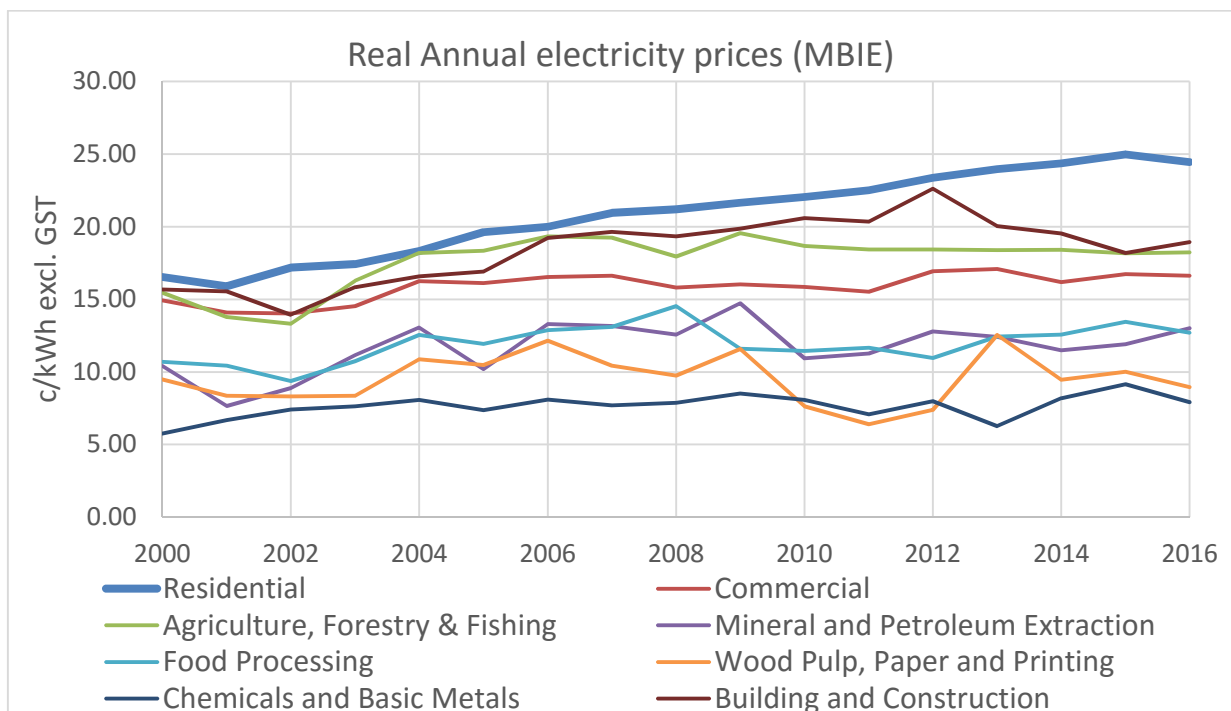
In contrast, consumer organisations such as SEF, DEUN (Domestic Energy Users Group) and GreyPower don't have the financial resources and even though there is considerable expertise in their respective memberships, they generally do not enjoy the same degree of respect from the electricity industry. Over time it appears the public have become increasingly frustrated by the inexorably rising electricity prices, the publication of confusing explanations by the power industry and ordinary consumers' inability to do anything about it.

It is difficult to make comparisons with retail prices in the rest of the world although NZ retail prices are up with the most expensive in the EU and way higher than the US and Canada.

## How are NZ Electricity Prices Constructed?

According to the EA homepage, prices paid by electricity consumers are on average made up of: 35% generation; 11.5% transmission; 30% network assets; 18.5% retail; 4% metering; 1% market governance and services; plus, of course 15% GST. In comparison to the situation in 2004, when the average retail prices was about 12c/kWh the proportions of cost of each component have not changed significantly.

The current average retail prices in Auckland around 30c/kWh suggests that price rises over the last 15 years are across the board and that no particular sector of the power industry is responsible for the increase over the last 10 years. However these retail prices can be compared with Tiwai Point being charged 4c/kWh, MEUG customers at 7c/kWh and retail domestic customers (excl. about 5c/kWh for fixed network charges) about 25c/kWh on average for essentially the same service, as illustrated in this chart of MBIE data.



Notably when, in 2006, the EA forced generators to offer dry season hedging prices for independent retailers about 15 new, albeit small retailers entered the market. They appear to be taking an increasingly large share of the market and perhaps are responsible for the 1% drop in prices in 2016. Several observers have commented that by simply switching to independent stand-alone retailer such as Flick, consumers can saved as much as 20% for over a year.

The main cause of the continuing distortion appears to lie with the retailers who have been overcharging domestic consumers from the beginning of 2000 as explained by Molly Melhuish.

**Why are power prices rising?**

*Why are power prices rising? Today, it is to support a failed business growth model, driven by shareholder expectations and supported by regulation. Price rises do not for the most part reflect increasing costs of generation (or power lines).*



*Instead they reflect the continuing narrative – “power prices must rise.” This however is applied only to domestic consumers, whose submissions on pricing and pricing methodologies have had no influence on EA decisions.*

*Power prices have been controversial since the end of a price freeze in the early 1970s, when demand had been growing around 7% per year. By 1975 there were plans to build two Huntly-sized power stations in Auckland, and a nuclear power station somewhere, to provide for that demand growth. Actually, growth rates had fallen to 4-5% per year by 1977, and fell to a mere 2% from 1978 onwards, driven partly by Muldoon’s two big price hikes.*

*Building electricity infrastructure is considered an essential part of national development. Before corporatization, this was funded through a classical accounting model but with generous taxpayer subsidies thrown in especially during the era of the Think Big energy projects of the 1980s – for example, the Clyde Dam.*

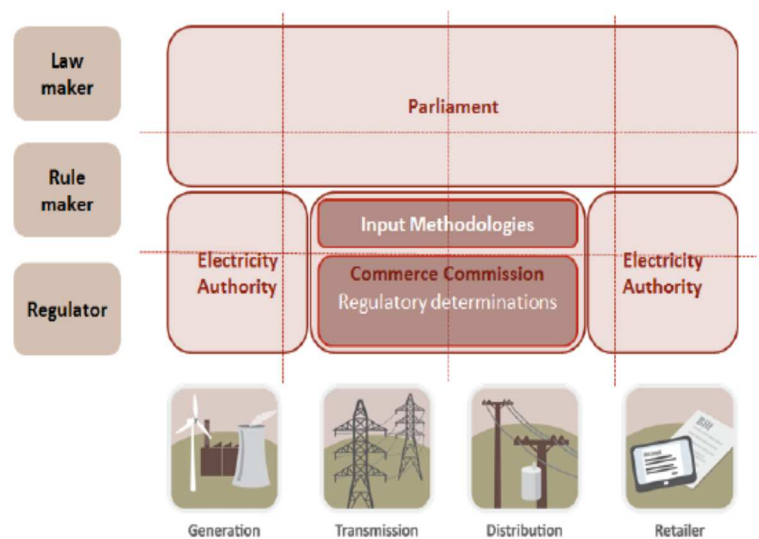
*A new narrative began in the mid-1980s, beginning with a July 1984 Officials’ Committee report that said that power prices must rise to reflect real costs including the cost of capital. The report said that the necessary price rise should be spread over around five years, to avoid price shock. (Actually, the rising price trend has lasted 30 years!)*

*The nominal price trends tell a simple story: high commercial power prices cross-subsidized residential prices until about 1986; this subsidy was progressively removed until about 2000, when power prices for all three consumer groups began to rise. From about 2000 onwards, residential prices rose relentlessly, by 1c/kWh in nominal terms right through 2015. Commercial and industrial prices rose at only about half the rate of residential, and both clearly varied with market conditions.*

*Which group is subsidizing who? The key is the definition of “subsidy”, which is far removed from the common understanding of the word. Consumers who put solar panels on their rooftops are now said to be subsidized by those who cannot afford solar. The Authority warns that prices could rise by 10% in a decade if today’s pricing is not changed to make solar panels uneconomic.*

*Prices must rise” is the core of the narrative.*

Molly Melhuish



**Are Our Regulators Any Help?**

NZ electricity/energy regulation can be characterised by its fragmentation, with each regulatory agency (EA, EECA and CC) sticking

to its own agenda making decisions often in isolation from the other. In the power sector, as shown in the figure above, in general terms the government makes the laws, the EA establishes market rules and the CC regulates monopolistic pricing issues (affecting only TransPower and Distribution Lines Companies).

It is worth recalling that ever since the 1990s when generating and retail sectors were broken up, the gentailer incumbents have had fractious relationships with each other (even though they were given freedom to resolve their commercial differences through “light handed” regulation).

To bring some order to the sector in 2003 the (Labour) Government established the Electricity Commission (EC) with a strong mandate to impose fair and reasonable behavior on the warring largely government or publically owned parties.

But when the EC began to question the way in which the NZ power market was run to the disadvantage of consumers, the resulting hue and cry by the gentailer and transmission and distribution companies led to even more intense confrontations and political lobbying. Eventually in 2010 the incumbents won over the (National) Government, which disbanded the EC and replaced it by a more industry friendly organization in the form of the EA with “fair” and “sustainable” removed from its objectives.

Today the three energy sector regulators tend to observe internationally accepted transparent procedural processes in making rule changes as industry problems arise. Rule changes, however, have become increasingly technical with the sophisticated arguments to resolve commercial differences between parties. Since the level of detailed discussions are beyond the competence (or resource capability) of the casual electricity consumer, consumers were obliged to accept whatever outcome the regulators chose to enforce to keep the peace.

This situation prevails today. For example, in response to recent decision by the Electricity Authority (EA) to force North Island residential consumers to pay more for the costs of TransPower’s grid, economic journalist Rod

Oram<sup>4</sup> observed *“The Government is favoring shareholders over consumers in the electricity sector”* His article, which refers to a history of anti-consumer decisions concludes *“It is another example of the incumbents and their regulator standing shoulder to shoulder, Canute-like against transformation of technology and economics sweeping the electricity sector worldwide”*.

A similar comment by economist Geoff Bertram<sup>5</sup> with regard to an EA proposal to stem the growth of rooftop PV to protect the interest of Line Companies *“...Under the electricity sector restructuring of the 1990s, the economic function assigned to distribution line networks was to “wheel” electricity from suppliers to consumers, whoever may be the suppliers and consumers involved, on a competitively-neutral basis. For them to price their backup service as the Authority suggests, to dissuade consumers from installing solar panels and other new technologies behind the meter, may involve price increases on a scale that would be in breach of section 36 of the Commerce Act...”*

In response to a recent SEF enquiry about the legality of Unison’s recent “tax” on rooftop PV the CC rationale for not taking a position was paraphrased by Steve Goldthorpe as follows:



*“Thank you for your inquiry to the sport governing body. We are aware of the game strategy you refer to, which is currently being used by a team in the field of play. We are reviewing our rules at present and will produce a draft in June.*

*The strategy you refer to falls within the remit of the Referees Association. The Governing body of the sport is only concerned with the overall sportsmanship of the participants and their demonstration of good behavior.*

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<sup>4</sup> See Sunday Star Times May 22 2016 – “Business Viewpoint – Charging is Changing”

<sup>5</sup> See EA website: Submission on Electricity Authority consultation paper on “Implications of Evolving Technologies for Pricing of Distribution Services”

*The Referees Association has carefully reviewed the strategy being employed and has ruled that, although in conflict with the spirit of the game, it is not in conflict with the rules of the game. Therefore the referee of the game is unable to take action against teams employing the new strategy.*

*We have also considered whether the new strategy is one that any team could employ and have found that that is the case, so it does not give an unfair advantage. Furthermore, we have identified that the use of the new strategy in a game has the effect of rectifying a previously existing unfairness.*

*We therefore do not intend to pursue the matter further at this time”*

SHG pp “The Commerce Commission”

### **Are the Issues Unique to NZ?**

It’s no secret that around the world electricity customers have increasing expectations for customer service. International utilities – in regulated and competitive markets – are now focusing on how they can connect with customers wherever they are to provide a seamless customer experience that not only boosts customer engagement but also reduces costs.

## **DOMINATION OF POWER SECTOR BY INCUMBENTS**

### **A Brief History of NZ Electricity Reform**

The NZ electricity reform process has been in a process of continuing evolution since 1985 when local distribution and supply were the responsibility of 61 electricity supply authorities (ESAs). These were electorally oriented, statutory monopolies where inefficiency, lack of customer choice and cross- subsidies were reportedly the norm. There was also extensive political involvement in generation investment decisions, project management was not accorded the attention that met current standards, wholesale pricing was (at least in part) determined by political factors, and some supply shortages emerged.

This set of circumstances coincided with increasing concern about New Zealand’s overall economic performance. In turn, this led to

On the other hand utilities worldwide are also confronting the perfect storm. Demand is flattening. DG is rising and new regulations are hitting the generation stack. All while new competitors are entering the marketplace.

### **Commentary by Rocky Mountain Institute**

A broad-brush take on recent survey findings among Americans by the Rocky Mountain Institute revealed: -

- *Consumers do not fully equate electricity usage with its environmental impacts.*
- *More than two-thirds of customers say they know how to optimize electricity use, only one-third know of programs to do so.*
- *Most consumers identify their electric utility as the preferred source for such programs, but few trust them.*
- *Consumers will manage use only if that saves money.*
- *American consumers can be grouped into one of six demographic groups: skeptical (31%), pragmatic (25%), cost-conscious (13%), proactive and indifferent (12% each) and eco-rational (7%)*

introduction of wide-ranging micro-economic reforms, more predictable macro-economic policy formation and strengthened public sector accountability arrangements. Outcomes sought included economic growth through efficient resource use, driven by clearer price signals and, where possible, by competitive markets.

Since that time there have been 123 events, chronicled in an MBIE paper<sup>6</sup> to explain the rationale for changes in the sector. Most of the earlier events dealt with disestablishment of the previous industry structure and establishing a regulator regime to manage the behaviour of networks companies. The current power sector

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<sup>6</sup> See CHRONOLOGY OF NEW ZEALAND ELECTRICITY last updated in August 2015 and published on the MBIE website <http://www.mbie.govt.nz/>



structure comprises unregulated generation and retail entities and regulated distribution network monopolies including TransPower – the national grid owner and operator. Most of the local network or line companies (LCs) are owned by public trusts that have little interest in promoting policies to reduce the cost of power in their networks.

From about 1998, power sector reform has developed largely in response to fractious power industry behaviour designed to protect their turf. Regulatory changes were designed to resolve commercial arguments by power market participants; and meanwhile consumers, lacking resources to participate in complex financial/economic arguments, were largely disenfranchised from any involvement in the consultation process.

## REGULATORY INTERVENTION

### Does NZ discourage consumer initiatives?

The rise of consumer owned distributed generation (DG) and DSM initiatives has long been stymied by the NZ power industry and its regulators often for spurious reasons. Currently there is also a feeling that multiple government agencies and regulators are undermining individual household owned photovoltaics (PV) with specious arguments and economic penalties. By its own admission<sup>7</sup> the EA commented on a recent investigation “*One conclusion of the study is that we will need to remove barriers to participation by consumers providing the various services available from demand management, batteries and distributed generation. We will have to consider how the market arrangements can accommodate participation of more diverse and small-scale participants*”

The EA’s acceptance of the barriers confirm a long held view of similar pattern of obfuscation used by the EECA in purportedly “killing off” NZ’s solar water heater (SWH) market that was growing by 20% per year.

As noted by SEF member Frank Pool “*there are numerous examples of government policy being*

The three major droughts in 1992, 2001 and 2003, when consumers were asked to effect demand side actions, spurred Treasury to propose more ad-hoc changes to mitigate the lack of competition in the market. The most important of these was the abandoning of the light handed regulation; and later the imprudent purchase of a reserve power plant at Whirinaki.

Since 2006 about 40 legal or regulatory interventions have been initiated under the current government. Many have the effect of protecting the taxes and dividends from inflated valuations that provide Government with strong cash flows, but that have not been used to increase sector efficiency.

*used in the past to discourage consumer investments in efficiency improvements: e.g.*

+ *Small fuel-efficient European diesel cars are kept out of NZ by extortionate RUCs for lighter weight vehicles.*

+ *Wellington Regional Councillors wishing to replace the 80% RE grid electricity Wellington trolley bus system with inefficient gas turbines and unproven batteries that will inevitably lead to diesel buses replacing the trolleys.*

+ *Clean wood burners are being killed off by unscientific “clean air” rules - which result in the government owned and the electricity cartel selling more electricity for heat pumps instead”.*

*Frank Pool*

### Is the Power Industry Stifling Rooftop PV?

The main arguments used to date by the power industry to convince the EA to regulate against DG have been (i) that DG plants were uneconomic compared to centralised generation; and (ii) that there were insurmountable safety issues for LC maintenance staff. Although the power companies didn’t manage to stop industry



<sup>7</sup> Letter from EA to CC dated June 1 2016 on CC website.

owned DG plants being installed to make full use of combined heat and power, some installations were often discouraged by LCs by charging exorbitant back-up charges.

In recent years, as Photo Voltaic (PV) DG prices have fallen dramatically and with battery prices appearing to be following a similar trend<sup>8</sup> the industry has upped the game of obstructionism. As indicated the EA's newly proposed changes to ACOT and PDP, the regulators have again proven that they are incapable of embracing any such forward looking concepts:

### **Actions to Deter the Proliferation of DG**

The changes to transmission pricing, including the planned axing of ACOT<sup>9</sup> payments for DG, announced by the EA on 17 May 2016, leave the future of distributed generation in NZ in a peculiar situation.

SEF member Stephan Heubeck writes:

*“Labelling existing ACOT payments an unjustifiable cross-subsidy, the EA confirmed its long standing resistance to a future electricity system that is more decentralised, resilient and fairer to all participants; despite this goal being actively perused in most advanced overseas countries. The EA's conclusion is reached via an apples with potatoes comparison, which ignores DG system benefits like enhanced security of supply through spatial and source diversification, and the positive effects of reducing distribution loss factors in local networks, proving real savings for end users and the environment.*

*The proposed changes to ACOT would either fully ignore the systems benefit provided by DG, or make them available only at TransPower's discretion. This includes the situation of a distributed generator (which by its very nature is*



*not using the HV transmission system) being denied ACOT benefits, due to TransPower having forecast transmission demand growth incorrectly in a specific area in the past, resulting in ample spare HV transmission capacity.*

*The expanded scope of the prudent discount policy (PDP) also announced on 17 May 2016, can however turn DG into a powerful bluff card with blackmailing potential in the hands of large electricity consumers. Changes to the existing policy will not only allow for transmission discounts being available to business that threaten to shut down production in NZ, but also to businesses threatening to establish own generation. It goes without saying that the use of such double standards by the EA is unlikely to improve the reputation of either DG as a technology, nor that of the authority as a guardian of NZ interests.*

*The EA's own figures show that that the proposed changes to the transmission pricing methodology in conjunction with the expanded scope for PDP will reduce costs for large central generators and large electricity users, while increasing costs for distributed generators as well as residential, commercial and small industrial electricity users. The changes furthermore cement an outdated unbundled electricity market with little coordination and forward planning, and do nothing to prepare New Zealand for the coming technology changes around DG, smart grids, battery storage and electric mobility.*

*As such the New Zealand electricity system may be seen accelerating down a dead end road, which will eventually result in dysfunction, stranded assets, waste of financial and natural capital and a furious public. The utility “death spiral”, currently taking its first turns in the US and Australia, cannot be avoided for NZ by religiously clinging on to failed 1980's ideas and corporate welfare, but only through a coordinated cross sector approach that takes long term environmental and societal aspects as well as economic concerns of players outside the electricity industry into consideration.”*

*Stephan Heubeck*

<sup>8</sup> Solar PV panel costs have fallen 80% since 2008 and the first battery cells wholesale prices are priced at about \$150/kWh capacity, indicating something around \$300/kWh for a plug and play consumer battery pack.

<sup>9</sup> ACOT – avoided cost of transmission

## MYTHS OF THE MARKET

It is important to understand some of the commonly used technical arguments to perpetuate the dominance in the power market by the incumbents. We are constantly regaled by the power industry about the uniqueness of the NZ power market apparently as a basis for the preserving the status quo. We are told that NZ is a long skinny country with a low population density, and moderate climate conditions that result in peak demands occurring mostly during winter evenings. But many countries around the world have similar characteristics (think Chile, Argentina, Italy, Norway etc.) with their governments apparently committed to using new technologies while dealing with the associated problems of supply and demand without claiming to be unique. The Myths are generally grouped along both technical and instructional lines as follows:

### Generation Supply Constraints

Consumers are constantly admonished that the NZ hydro dams have very little capacity for seasonal energy storage – that has in the past been primarily provided by stockpiling coal in Huntly. Their concern is that when Huntly shuts down NZ will not have adequate capacity when the lakes run dry. On the other hand within the next year or so, assuming the Tiwai Point Aluminium smelter closes, NZ may well have the 600MW Manapouri hydro project in the generation mix and, if present trends continue, national electricity demand may well continue to fall.

The mythical winter storage capacity problem is based on the energy mix situation that prevailed some years ago. Today, in addition to the extra 600MW of new geothermal capacity we now have an extra 600MW capacity from Wind and considerably increased two way capacity of HVDC link.

If the enabling environment was in place, there are also several measures that can be taken to optimise the use of existing and new generation plant.

Alastair Barnett suggests that in order of technical ease of achievement, the low hanging fruit to optimise the operation of existing generation plant by 2022 could involve following changes

1. *Convert four Arapuni turbines to pump/turbines*
2. *Double the 240MW capacity of Tokaanu using pump/ turbines*
3. *Add a 100MW pump/turbine at the neck between Hawea and Wanaka*



4. *Convert the Tekapo A and B station to pump/ turbines*

*Nos 2 and 3, add 340MW of peaking capacity, while Nos 1 and 4 would extend storage cover in dry years.*

*As shown by the 2001 re-machining at Arapuni, existing powerhouses often have enough spare space for additional generators. If this was found possible for Tokaanu, the generator expansion job there might even be finished by 2018, although the efficiency of the operation would be reduced at peak loads until the penstocks and tunnels could be enlarged. This accelerated shift to renewable storage would allow Huntly to close as originally scheduled.*

*However, all four face financial barriers because the power companies are not allowed to deal with dry years by any kind of cooperative financing agreement: such pragmatic facilitation is evidently restricted to carbon emitting stations such as Huntly. Nos 2 and 4 also require co-management of the dry year storage, which is apparently against government policy.*

*No 3 would also trip over legislation protecting Lake Wanaka, which might take years to change to allow the temporary storage of small quantities of Lake Hawea water in Lake Wanaka.*

*If Government took urgency they could clear such legal/financial problems in good time for*

*the work to finish by 2022, but it seems they prefer the lazy “do nothing” approach to construction acceleration when it comes to honouring their Climate Change promises.*

*Alastair Barnett*

### **Water Storage Pricing**

Clearly the new wind and geothermal renewables will run during droughts and with proper pricing for storage and reserve capacity there are many alternatives that can help conserve hydro power including (i) demand side management; (ii) better coordinated reservoir management, and (iii) coordinated use of distributed grid battery storage.

There is an ongoing public debate about the need for water pricing in NZ (as it is in many countries). A recent RNZ discussion between Katheryn Ryan and David Parker suggested water should be priced according to its “quality”. Done properly this would enable the market to establish a price of water that is extracted for export and establish cost penalties to polluters (e.g. farmers, industries, power generators etc.) requiring them to take remedial measures to return their water to its original state after it is used.

For power companies, it may be inferred that water would be priced according to the value of the potential energy at the time it is extracted to produce power. This would help set a value on stored energy in reservoirs so as to incentivise power companies to use the water’s potential energy in coordination with other renewables sources of power (e.g. wind and solar). As David Parker pointed out it would not affect bulk power pricing since this is set by the most costly generation at any time of the day.

Accordingly, the definition of a “quality” could be amended to include both measures of water purity along with its potential value for delivery of energy (i.e. its height above sea level which determines both pumping requirements for irrigation purposes and its power generation capability) with different prices set according to the degradation of either measure.

Thus the pricing of water would be made up of (i) the “quality” of water at source; (ii) the cost of purification of the water; (ii) the cost of

delivery including pumping. For Auckland for example the value of water from the Waikato would be quite low, whereas the value for cleaner water from the Hunuas or Waitakeres would be much higher.

### **Network Asset Valuation**

The recent move by the lines company (LC) Unison to “tax” PV rooftop owners is in effect a knee jerk reaction to the challenge of new consumer driven technologies. Unison presumably perceives if it does not take action to stop PV, its aggregate kWh volume will decrease - thereby impacting unfavourably on the value of its assets. One has to question how the uptake of PV is any different in terms of impact on the computation of the LCs valuation methodology from similar situations where consumers install conventional solar hot water systems, convert their stoves or hot water to gas, buy more efficient fridges, or change light bulbs to LEDs.

On the other hand the LC Vector response is far more cooperative in developing policies that attempt to integrate consumer PV and grid batteries into its network - as a way of avoiding the cost of having to make reinforcements to its lines and substations.

Another quote from Geoff Bertram’s paper (ref 2) makes the point very clearly. *“The “costs” of network capacity service, of which much is made in both the EA paper and the NZIER report, are for the most part not genuine economic costs. They are simply capital charges levied from consumers to support inflated asset values that have been given the status of Regulatory Asset Bases by the CC. They may be defended on the basis that the valuations are entrenched and that the accompanying level of charges is supported by the regulator, but they cannot reasonably be characterised as economic “costs”, and there is no economic case for their recovery via increased fixed charges”*

### **Not-so-Smart Metering**

Smart metering in NZ was touted in 2006 as promising revolution in consumer relationships – that in reality has done nothing to help them consumers minimise the cost of their electricity services. The only visible efficiency has been the lack of periodic meter readers but the

promised interface arrangements with the internet of things seems a long way off.

First, is that smart meters on their own, even improved genuinely smart ones, cannot provide the benefits we are all looking for. This requires the full smart grid development and the benefits will not come until the whole system is operating. The full smart grid can provide a lot of other benefits to match the costs, although it

does imply a lengthy delay. The main problem is not the need for much greater investment. More significant is that major structural changes are required. The smart grid concept has been worked up within the context of a vertically integrated regulated monopoly utility. It cannot work in a context of disaggregated competing businesses where energy and transport are not only separated but culturally diverse.

## INSTITUTIONAL OBFUSCATION

### Electricity Trusts

To maintain the pretense that consumers still owned the Line Company assets, Treasury established Electricity Trusts with the sole purpose of ensuring dividends flowed back to their owners. Aside from the opportunity to vote in meaningless elections for trustees consumers had no role in developing policies to encourage line companies to be involved in the reform process. Trusts were even discouraged from aggregating their dividends to investments in any way that would disturb the status quo of the supply side market.

Trust owners really need to decide what their consumer-shareholders want them to do. Should they set aside some of their profits (otherwise allocated for dividends) and: (i) diversify their activities by investing in non-core ventures such as vineyards to preserve their capital; or (ii) require their LC businesses to adapt to change by supporting private sector investment in DSM, PV, grid batteries etc. that will reduce the cost of having to replace or upgrade networks; or (iii) amalgamate with other LCs in the hope of surviving for a little longer with their outdated business model?

### Merchants of Doubt

Climate Deniers and other Merchants of Doubt<sup>10</sup> also play an important part in supporting the foot-dragging by the NZ power industry. Such groups often use well established techniques to create public confusion about the viability of alternative business models. Many of the older power engineers appear to be proponents of neo-

luddite<sup>11</sup> philosophies stuck in the past defending the continued use of “proven” technologies. In NZ, despite international evidence to the contrary, our own home-grown “merchants of doubt” take advantage of public ignorance to decry the use of wind, solar power, batteries, smart meters and so forth as unproven or uneconomic technologies.

Others appear to be representing the vested interests of established industries; in other cases they appear to have a determined antagonism to the introduction of new technologies. The 2006 documentary movie “Who Killed the Electric Car” is a prime example of how far a major US manufacturer was prepared to go to protect established business models. Likewise an amusing history of a notorious anti-Tesla troll – a Mr B.S. - can be found in the reference below<sup>12</sup>.

Some of their arguments are subtle, but spurious. For example the suggestion that an uptake of PV/Batteries by the rich will result in higher costs for the poor is used to persuade regulators to restrict their use. The same argument could have been used to discourage consumers’ investment in insulation, fuel switching or other economic investments in efficiency improvements. This logic ignores the counter argument that the use of DG/Battery storage techniques will help avoid the high costs of

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<sup>10</sup>[https://en.wikipedia.org/wiki/Merchants\\_of\\_Doubt](https://en.wikipedia.org/wiki/Merchants_of_Doubt)

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<sup>11</sup> <https://en.wikipedia.org/wiki/Neo-Luddism>

<sup>12</sup> [http://cleantechnica.com/2016/05/06/beware-forbes-anti-tesla-troll-sir-b-s-lives/?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+IM-cleantechnica+%28CleanTechnica%29](http://cleantechnica.com/2016/05/06/beware-forbes-anti-tesla-troll-sir-b-s-lives/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+IM-cleantechnica+%28CleanTechnica%29)

expanding existing networks and can minimise the high cost of peaking power from conventional GTs and thereby give those who remain on the grid access to cheaper power.

### **Language of Confusion**

Regular readers of SEFnews emails will have seen the frequent postings by Dave McArthur discussing how the root cause of many of the problems with global and individual energy use can be attributed to the natural human psyche operating at both an individual and tribal level. Steve Goldthorpe has summarised some of Dave's thinking as the absence of "Civics" in the energy policy field as follows:

*"One can define "Civics" as giving preference to benefits for the whole community over benefits to the individual. In a civilised community most people tend to delegate civics to the governing bodies so that they feel relieved of the duty to "think of others before yourself" and can act selfishly. A tribal ethic has evolved whereby individual self-interest is the social norm. Hence the local and state regulations, which protect community best interests, are designed on the premise that individuals and businesses will act only in a self-interested way. At a local, or even national, level that can sort of work, albeit imperfectly.*

*However, the same principle allowing players to operate only in self-interest doesn't work when applied globally to the supply and demand of an*

*essential commodity such as oil. That is because there is no global governance mechanism to apply "Civics" to the activities of multi-national corporations.*

*The publicised oil price (see page 19) is completely disconnected from the various costs of production of oil. Investment in oil production is focussed exclusively on making large returns due to the typically large excess of selling price over production cost. Such investments are made regardless of need for oil. In the mid-2000s the seemingly unconstrained upward trend in oil price was accelerated by talk of Peak Oil. This oil price increase encouraged massive investment in oil production facilities on the expectation of non-elastic demand. However, in 2008 the oil price rose rapidly beyond the ability of the global consumer to pay, which was one of the causes of the Global Financial Crisis. The resulting reduction in demand, combined with excess production capacity coming on stream, gave rise to a glut of oil and hence a rapid drop in the oil price.*

*Without some mechanism for the application of "Civics" at a global level to the oil supply scene, this boom and bust cycle will doubtless continue indefinitely, moderated only by a gradual reduction in demand for oil as the world transitions away from fossil fuels in response to Climate Change."*

*Steve Goldthorpe*

## **TECHNOLOGY & CLIMATE CHANGE**

### **Is NZ a Technology Follower?**

The international power industry is renowned for using proven technologies to maintain its high level of reliability and low costs. As a consequence most utilities have been slow to adopt new technologies and often caught flat footed when called on to do so.

The NZ power industry was once an exception and even a pioneer in developing technologies such as HVDC, ripple relay controlled DSM, geothermal power and CNG powered cars. Along with the UK (under Thatcher) and Chile (under Pinochet), NZ (under Douglas) was also a leader of power sector restructuring. This model was taken up by the International Financial

Institutions (World Bank, ADB etc.) and used to justify greater private sector participation of what had been a mainly public funded sector.

After the NZ power sector became dominated by financiers and accountants, the industry appears to have lost its desire to be an early adopter of new technologies. This was largely due to resistance to change in their business models by the Line and Retail Companies (LCs). The Generators have also been slow to depart from conventional centralised power development projects. In the latter case Generators have been slow to implement wind generation projects; and reluctant to invest in innovative solar projects

such as floating PV arrays on hydro lakes to take advantage of existing infrastructure.

They are however ignoring a world-wide a paradigm-change in the power sector that is taking place and inevitably it will also develop in the NZ power market<sup>13</sup>. Thus it is better for the NZ economy if power sector incumbents are incentivised to adapt sooner rather than later and when they will be abruptly forced to deal with stranded investments made with the approval of outdated regulation.

It is also evident that technologically driven changes in the energy/power sector will have benefits in (a) supporting Gov'ts initiatives to meet new Climate Change targets, (b) attracting private sector investment (i.e. by consumers for PV systems and batteries) into the energy market; (c) reducing the need for imported fossil fuels for transport - by supporting the greater use of electric vehicles and concurrent development of V2G technologies<sup>14</sup>; and (d) increasing competition to help drive down electricity charges.

### **International Activities**

The most comprehensive annual overview of the state of renewable energy in the world can be found in REN21: *The Renewables 2016 Global Status Report*. This reveals that renewables are now firmly established as competitive, mainstream sources of energy in many countries around the world. It also showed that 2015 was a record year for renewable energy installations. Christine Lins, Executive Secretary of REN21, said, *“What is truly remarkable about these results is that they were achieved at a time when fossil fuel prices were at historic lows, and renewables remained at a significant disadvantage in terms of government subsidies. For every dollar spent boosting renewables, nearly four dollars were spent to maintain our dependence on fossil fuels.”*

Renewable power generating capacity saw its largest increase ever, with an estimated 147

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<sup>13</sup><http://www.theenergycollective.com/slontoh/431336/utility-future-paradigm-shift-meet-more-distributed-consumer-focused-energy-system-21>

<sup>14</sup><http://www.edison.com/home/innovation/electric-transportation/vehicle-to-grid-technology.html>

gigawatts (GW) added in 2015. Modern renewable heat capacity also continued to rise, and renewables use expanded in the transport sector. Distributed renewable energy is advancing rapidly to close the gap between the energy ‘haves’ and the ‘have-nots’. These results were driven by several factors. First and foremost, renewables are now cost competitive with fossil fuels in many markets.

In addition, REN21 points out that government leadership continues to play a key role in driving the growth of renewables, particularly wind and solar, in the power sector. As of early 2016, 173 countries had renewable energy targets in place and 146 countries had support policies. Cities, communities and companies are leading the rapidly expanding “100% renewable” movement, playing a vital role in advancing the global energy transition. Additional growth factors include better access to financing, concerns about energy security and the environment and the growing demand for modern energy services in developing and emerging economies.

The SunShot initiative by the US DOE created with the goal to reduce the cost of solar energy technologies by 75 percent within a decade across the residential, commercial, and utility-scale sectors. These reports, which are a part of the ‘On the Path’ to SunShot series, serve as a follow-up to the 2012 SunShot Vision Study, which analysed the economic and environmental benefits that would result from achieving SunShot's 2020 goals.

Since the SunShot Initiative was launched, solar technologies, solar markets, and the solar industry itself have changed dramatically. Cumulative U.S. solar energy deployment has increased more than tenfold, while the cost of electricity from solar has dropped by as much as 65%.

### **Developing Countries**

As a member of the OECD, NZ has been slow to adopt new renewables or take steps to reduce its carbon footprint. Meanwhile in developing countries, driven increasingly by market economics, supported by (or at least not sabotaged by) relevant government agencies, and

supported by donors, consumer focussed RE is being steadily deployed.

Frank Pool as one of SEF members working in in developing countries reports that

*“PV panels are appearing on apartments in Pyongyang DPRK (North Korea), and the DPRK government has asked the UN for assistance with developing natural hot spring geothermal heating buildings. Nearly every household in Vanuatu has already replaced kerosene for lighting with unsubsidised solar lanterns. Rwanda is now deploying more SWHs than NZ - using an electricity utility-run interest-free revolving fund. China makes and installs 85% of the world’s SWHs – without subsidies, and accounting for similar amounts of RE worldwide as wind power.*

*SWHs in India have been so successfully scaled up that subsidies are no longer needed. PV powered water pumps are being mass deployed across India to replace the tens of millions of diesel powered pumps. Indonesia is rolling out human waste biogas systems for cooking fuel and organic fertiliser and pollution clean-up in Islamic Boarding Schools. India is the world’s leading market for concentrating solar heat that is used for low-medium temperature industrial process heat. Mongolia is trialling SWHs for*

*local government building heating. Tonga’s net metering policy has successfully mobilised household PV. SWHs are being rolled out across Palau. These are all real examples that I have worked on personally. It’s fun to work in countries where expertise is valued, logic prevails, and the focus is on results not ideology or protecting the crony capitalist grid electricity cartel.*

Frank further notes that the key difference is that RE in these developing countries are not being undermined by government inaction. Instead they implement:

- (1) Real result-oriented policies, -not just a vague unfunded desires without tangible actions*
- (2) Real and consistent funding and support from government*
- (3) Professional program/project design and evaluations - by experienced international professionals, not by new graduates or bureaucrats or consultants with no prior relevant experience*
- (4) Independent evaluations - that are publicly available and are used to inform improved program/project implementation mid-project, to capture real results at project end and to learn lessons for follow-on programs/projects*

*Frank Pool*

## RECENT NZ INITIATIVES

NZ’s historic hydropower development program is often cited as a reason why successive governments have dragged their feet in addressing climate change issues. While it is true that about 80% of NZ’s electric power generation is sourced from renewables this represents less than 25% of the NZ energy market. The power sector also accounts for about 8% of our CO<sub>2</sub> emissions the bulk of which come from the heat, transport and agriculture sectors. However it is also true to note that fuel substitution for example in the transport sector will have a direct impact on demand the electricity sector.

### **Pressure for Reform driven by Consumers**

For the last few years electricity demand has been falling in many regions and nationwide is largely static. The reasons are not fully

understood but could well be due to the impact energy efficiency activities both with home insulation and improved consumer appliances.

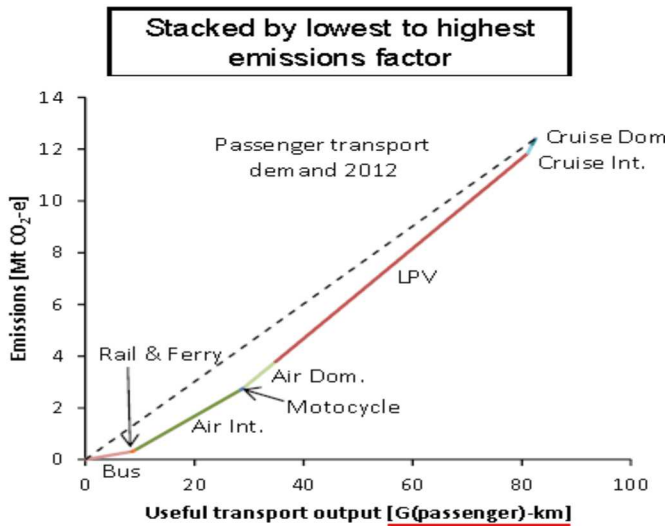
Consequently NZ Gentailers, now all privatized entities (albeit 50% owned by the Government), have stopped investing in new renewables and are facing increased competition for the retail market by new entrants. Lines Companies are also facing financial pressure from new technologies such as rooftop PV systems that are threatening to force changes on their existing business models.

International pressure on NZ to do more with regard to effecting climate mitigation policies, and the rapid development of new technologies are likely to result in more electricity sector changes, hopefully with consumers taking a more active role in promoting reform.



## Electrification of Cars

As shown in the figure below the Waikato university studies have demonstrated that the conversion of personal electrical vehicles are to EVs are the best way to reduce the substantial contribution to carbon emissions from the transport industry.



It is unclear why the industry has been so sceptical of the introduction of electric cars. One might expect gentailers would welcome the potential increase in demand estimated to be as much as 20% by 2030 if the government new policy was successful. On the other hand there is a concern that EVs might well lead the potential introduction of Vehicle to Grid (V2G) applications, where consumers could enter the market by buying power at off peak periods and selling it back during peak periods when cars are home and parked.

## Public Education

The NZ Power Industry is largely a closed shop spending large on expensive in-house conferences that preach to the converted. The conference costs are of course passed onto consumers. For example, a review of the subjects in the EEA conference on 22-23 June 2016 indicates LC are mainly preoccupied with business as usual subject matter and don't appear to recognise the threat to their industry.

However there are newly emerging initiatives such as the "Smart Grid Technology Mission" funded by the Callaghan fund which is designed to inform power companies what is really

happening in the rest of the world<sup>15</sup>. The mission from September 5-9<sup>th</sup> 2016 will provide an opportunity for NZ [power] companies to:

- Learn about key "smart grid" technology and market trends;
- Validate their technologies and business innovation strategies;
- Network and meet potential investors, partners and customers;
- Build productive relationships for ongoing collaboration with other New Zealand participants.

With the increasing use of the internet, the public has access to a lot of information about the revolution that is taking place overseas. One of the better sites for up-to-date information on renewable and associated technological developments is "<http://cleantechnica.com/>". The site is focused on solar power, clean transport, wind power, energy efficiency, and energy storage.

Sooner or later the NZ power industry will have to join the rest of the world and embrace new technologies even if it requires a paradigm change in their business models. Some well-known independent agencies whose sites are worth visiting include:

- EPRI: Electric Power Research Institute;
- IRENA International Renewable Energy Agency;
- AREA Australian Renewable Energy Agency;
- WEC World Energy Council;
- RMI Rocky Mountain Institute;

## The Yes-We-Can Symposium

On May 31<sup>st</sup> NZ industry participants sponsored a "Yes-We-Can" symposium<sup>16</sup> to identify opportunities in the heat, power, and transport sectors that can be exploited to meet NZ obligations for reducing emissions as agreed in Paris COP21. The conference was held at the Intercontinental in Wellington with keynote speeches by the Mayor of Wellington, The

<sup>15</sup>[https://gallery.mailchimp.com/7c460eef2e4986f8d6cb4aec6/files/Smart\\_Grid\\_Mission\\_Flyer\\_June\\_2016.pdf](https://gallery.mailchimp.com/7c460eef2e4986f8d6cb4aec6/files/Smart_Grid_Mission_Flyer_June_2016.pdf)

<sup>16</sup> For copies of the reports, including the Waikato studies, see webpage: <http://www.yeswecan.nz/>

Minister of Energy, and Robert Tromop an International consultant who specialises in the business benefits of greenhouse gas reductions and opportunities in NZ.

During the morning session these were followed by sector overviews that described the various business initiatives that have already taken place since the Paris Agreement was signed, an excellent paper by the University of Waikato that identified high level priorities for action and a panel discussion on what was needed to increase the uptake of opportunities.

During the afternoon the participants were asked to split into three groups: Heat; Transport and Electricity and asked to identify priority area for early action. This was followed by a useful presentation by Mike Underhill, CEO EECA who explained the intricacies how to get government support and/or funding for implementation.

The organising committee then agreed to consolidate the proposals for further consideration by the participants before discussion them with the Minister to determine an appropriate action plan. Hopefully a more detailed outline will be cover in the next Energy Watch report which will deal with the various activities the NZ can do to meet its obligations under the Paris agreement.

### **Current CC Consultation**

The Commerce Commission is currently in a process of reviewing its methodology for regulating lines companies taking into account the impact that consumer owned DSM technologies need to be recognised as a viable part of the power system. Even the EA appears to be reconsidering its processes in terms of the following quote from its letter to the CC:

*“We want to better understand the incentive effects of the cost allocation approach on efficiency and competition in the broader electricity market. Specifically, we want to make sure we have the optimal regulatory settings to: promote efficient investment in emerging technologies, including batteries, across the electricity sector, to achieve long-term benefits for consumers facilitate competition in wholesale and ancillary services markets by removing*

*barriers to entry and providing a level playing field for participation”*

The CC review is ongoing and has already issued a summary of draft changes to regulations in relation to this topic. It notes

*“There is an exciting range of developing and emerging technologies which have the potential to shape the electricity networks of tomorrow. These technologies, variously described as emerging, evolving, developing, or edge technologies, include, for example, distributed and grid electricity storage, distributed electricity generation including solar photovoltaic (PV) and wind, electric vehicles, and home automation systems. Their broad deployment will contribute to the evolution towards a smart grid. These developing technologies will enable new business models, and seem destined to enjoy consumer acceptance both by giving consumers greater options and choice over how they use energy (and how much) and as they facilitate continued global moves to greater use of renewable energy.”*

*Commerce Commission*

Thus it is important for SEF members to join the conversation and make submissions to ensure their voices are heard.

### **The Future of Work**

The widespread adoption of consumer owned DG and DSM facilities will require new sets of skills by private contractors. This is an issue being addressed by the Labour Party’s “Future of Work Commission”<sup>17</sup> initiative that is expected to be part of its policy platform for the next election. The Commission’s initial findings note that:

*“Technology is transforming vast numbers of New Zealand jobs. Work done in entirely new technology businesses, the huge range of knowledge and media endeavors, the factory floor, and even family businesses have been reshaped by new pathways to information and new ways of selling goods and services. For most office workers now, life on the job means life online.*

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<sup>17</sup> <http://www.futureofwork.nz/>

However, New Zealand lacks a comprehensive vision for how we deal with technology. This means New Zealand isn't properly managing the opportunities and issues around the reduction in the tyranny of distance; international labour markets; delay in developments; capital costs; uptake in technology and the policies to support new forms of working.

The Government will need to tackle the challenges of an on-demand economy, accessibility, big data, changing social habits, and defining work to develop a vision. This gives New Zealand the opportunity to shape and sustain the technology sector to build higher value jobs and create opportunities.

There is a vast array of policy options to tackle these including: a Chief Technology Officer, expansion of free Wi-Fi, a framework for big data use, teaching coding in all schools, digital work hub communities, protecting software from patent restrictions, freeing up more venture capital and crowdfunding, investing in start-ups, and migration policy changes.

We have the opportunity to be extraordinarily successful at "riding the tiger" of innovation to create decent work with higher wages, but, only if the vision, strategy and investment exist."

*The Future of Work Commission*

SEF member Tom Adson also comments

"What exists now will eventually wear out, but it must be replaced with services and systems that will cater for the distant future. They must be smart, they must be cost effective; and they must be constructed, and then operated and maintained; and then effectively recycled if objectives are to be met..."

Finding work will not be a problem because there will be an awful lot to do... Dexterity will be important, and so will imagination and innovation applied on the spot in order to keep things safe, or promptly fix an unforeseen problem at the point of a practical output in the field. Such people originate from training and education schemes that are broad based and require a combination of intellectual and practical ability.

Training and educating apprenticeship is expensive. Small companies' budgets are stretched. The budgets of many parents are stretched at times when mortgage repayments are likely to increase significantly. University education is often promoted above everything else, as the popular belief is that that is where one gets the prestige and the entitlement to high paid job. A life of gloss and glamour to most young people is much more attractive than a pair of overalls, and the very modest income in the short term, against a long term worthwhile investment in what can be a very satisfactory and rewarding career in a non-professional role."

*Tom Adson*

## Neil's Oil Price Chart



# Join our sustainable energy news & discussion group

SEF Membership provides a copy of our quarterly Energy Watch magazine. In addition, many members find the SEFnews email news and discussion facility an easy way to keep up to date with news as it happens and views of members. The discussion by the group of sustainable energy “experts” who have joined the SEFnews service offers an interesting perspective.

Non-members are invited to join the SEFnews email news service for a trial. To do this send a blank email to: <SEFnews-subscribe@yahoo.com>. To help us stop spammers, non-members need to supply a name and contact details, and a brief statement of their interest and/or involvement in sustainable energy issues, before their trial is approved.

As with all Yahoo groups, SEFnews emails can be received “individually” (as they are sent) or as a “daily digest” (grouped into one email per day). If you have a Yahoo ID you can also switch emails on and off, or read the news on the web – a handy option for travelling Kiwis. YahooGroups saves all of our text emails for later reference, and there is a search function so that you can review the thousands already stored over the last 6 years.

Some busy people using a work address prefer to use the Rules function in their email software to automatically save SEFnews emails to a separate folder for later reading. If you do not want a Yahoo ID, the administrator <office@sef.org.nz> can select the ‘daily-digest’ option for you.

## EnergyWatch

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Publication is now quarterly, and EnergyWatch is posted on the SEF website ([www.energywatch.org.nz](http://www.energywatch.org.nz)) as a PDF file, shortly after individual distribution to SEF members.

## Contributions Welcomed

Readers are invited to submit material for consideration for publication.

Contributions can be either in the form of Letters to the Editor or short articles addressing any energy-related matter (and especially on any topics which have recently been covered in EnergyWatch or SEFnews).

Material can be sent to the SEF Office, PO Box 11-152, Wellington 6142, or by email to [editor@sef.org.nz](mailto:editor@sef.org.nz), or by directly contacting the editor, Steve Goldthorpe, at PO Box 96, Waipu 0545.

## SEF membership

Memberships are for twelve months and include four copies of EnergyWatch.

Membership rates are:

Low income/student	\$30
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Overseas	\$60
Library	\$65
Corporate	\$250

Mail the form below, with your payment or order, to The Sustainable Energy Forum Inc., P O Box 11-152, Wellington 6142. Bank transfers, with your name, can be sent to the SEF account at 03-1538-0008754-00, with a confirming email to [office@sef.org.nz](mailto:office@sef.org.nz). A receipt will be sent on request.

Name: .....

Organisation:.....

Address: .....

.....

Home Phone:.....

Work Phone:.....

Mobile Phone:.....

E-mail:.....

Membership type:.....

Amount enclosed: \$.....