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## **TasNetwork's revised tariff proposal**

Submission to the Australian Energy Regulator on TasNetwork's revised tariff proposal and supporting documents as listed at : <https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/tasnetworks-formerly-aurora-energy-2017-2019/revised-proposal>

Thank you for the opportunity to comment on this proposal. I will limit my comments to two issues, which I consider inadequately addressed, or not at all considered by TasNetworks.

- 1) TasNetworks proposed demand-based pricing change, more accurately known as Time-of-Use (ToU) pricing is a significant departure from the existing fixed price per kilowatt/hour to one whereby the price of power changes on an hour-to-hour basis, depending on overall power demand. Their claim that this will empower the consumer to better manage their energy consumption does not stand up to the evidence so far.
- 2) An essential part of ToU pricing is replacing thousands of existing analogue meters throughout Tasmania with advanced metering infrastructure (AMI), utilizing a smart meter. This enables two-way wireless communication between the smart meter and the electricity producer, providing the utility with real-time data about power consumption.

However in many places where smart meters have been rolled out there have been complaints from consumers who claim it has adversely affected their health, depending on the location of the meter in their homes. This possibility should be addressed and not simply ignored as an inconvenience.

### **1) Time-of-Use pricing**

As reported in the *Herald Sun* on March 13, 2015, a new analysis of approved electricity fee increases as a result of the smart meter roll-out in Victoria have increased between \$536 - \$1018 + GST depending on the supplier.<sup>1</sup> This was significantly up on earlier estimations, such as in the *Herald Sun* on December 13, 2014 when it was reported that The Australian Energy Regulator had approved charges for 2015 of \$109.40 to \$226.30, plus GST, for the

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<sup>1</sup> Smart Meters Spiral, The Herald Sun, March 13, 2015, <http://www.pressreader.com/australia/herald-sun/20150313/281938836390424/TextView>

most common type of smart meter, depending on where consumers live. The article also claimed that the Victorian rollout could add up to \$50 million more to the cost of the project. In addition the full smart meter bill for homes and small businesses could exceed \$2.4 billion, once inflation and the GST is factored in.<sup>2</sup> This was also featured on the *ABC News* on the same date.

An investigation by Ontario's auditor-general Bonnie Lysyk, published in December 2014, found that Ontario's \$2 billion smart meter program has failed to meet electricity conservation or cost-reduction goals and delivered few benefits at a hefty cost. She specifically criticised the province's energy bureaucrats for plunging into the system without proper planning, and making it impossible for consumers to understand their rising hydro bills. Her findings included:

- Smart meters were supposed to cost \$1 billion. In fact, the total cost will be double that amount.
- The energy ministry grossly over-estimated the benefits of the smart meter program.
- Energy bureaucrats have bamboozled consumers for years by hiding the true costs of energy in a catch-all fee called the "global adjustment" that now makes up the majority of the cost of energy.
- The initial cost-benefit estimate — which proved wildly inaccurate — was performed only after the energy board had approved its implementation plan.
- Costs continued to rise after the initial \$1 billion estimate. They stood at \$1.4 billion by the end of 2013, Lysyk reported.
- In addition, the Independent Electricity System Operator (IESO) — which operates the Ontario power grid minute by minute — spent \$249 million on a provincial data centre to collect the torrent of information that flows out of smart meters. That cost is billed to ratepayers.<sup>3</sup>

There were also concerns expressed in the Victorian Auditor General's 2009 report on the rollout of smart meters in that state. To quote:

There has been insufficient analysis to fully understand potential perverse outcomes, risks, and unintended consequences for consumers. This means that there is no clarity whether the distribution of costs and benefits between electricity businesses and consumers will be consistent with the intended outcomes of the program, and equitably allocated through the mandated cost recovery regime.<sup>4</sup>

It seems that not much has improved since the Victorian Auditor General's 2009 concerns.

Time-of-Use pricing is a move away from a fixed price per kilowatt/hour to real-time pricing whereby the price of power changes on an hour-to-hour basis, depending on overall power demand. In other words during those hot summer days when people have the air conditioner on, it will cost more. According to the theory, higher prices will encourage consumers to change their daily energy use habits to use their appliances during lower pricing times, thereby saving money. This is a problem as research indicates

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<sup>2</sup> Bill Shock: Smart meter charges set to cost most Victorians more in 2015, *The Herald Sun*, December 13, 2014, <http://www.heraldsun.com.au/news/victoria/bill-shock-smart-meter-charges-set-to-cost-most-victorians-more-in-2015/story-fni0fit3-1227154633835>

<sup>3</sup> Smart meters have few benefits for big costs: AG report, *The Star Business*, Dec. 9, 2014, [http://www.thestar.com/business/2014/12/09/smart\\_meters\\_have\\_few\\_benefits\\_for\\_big\\_costs\\_ag\\_report.html](http://www.thestar.com/business/2014/12/09/smart_meters_have_few_benefits_for_big_costs_ag_report.html)

<sup>4</sup> Victorian Auditor General' <http://www.audit.vic.gov.au/publications/2009-10/111109-AMI-Full-Report.pdf> (page 10)\_

that most consumers are unlikely to be able to shift their energy usage times and do their washing, cooking, watching TV or using their air-conditioner at 2am! Therefore for most consumers their electricity bills will increase unless they are insomniacs.

One of the unstated reasons for the push for real-time pricing is the only way to really take advantage of it is to get rid of many of your old appliances, such as washing machines, dryers, air conditioners, etc. and purchase new smart appliances that can be programmed to automatically operate at low power pricing times. This is acknowledged by Zealand Network Tasman Ltd where they have stated that the purported benefits of smart meters is so that "Consumers can set energy efficient appliances to interact with their advanced meter to alter usage to suit their lifestyle and manage electricity costs".<sup>5</sup>

The problem here, especially for low-income consumers is that this would require an investment of several thousands of dollars to upgrade their home appliances if they want to reduce their power bill - a fact not mentioned in the sales promotion for the advantages of TOU pricing. It's worth noting that all the major appliance manufacturers are now promoting the smart grid and TOU pricing as it is creating a global market for their new range of smart appliances.

## **2) Reported health effects after a smart meter was installed**

It is acknowledged that even in a worst-case scenario smart meter emissions are far below the allowable standard limits for exposure. This was found in an AMI Meter Electromagnetic Field Survey conducted by EMC Technologies in Melbourne. EMC found that exposure levels were well below the general public limit set by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). I generally agree with that report. However any claims that compliance with the ARPANSA radiofrequency standard therefore assures the impossibility of any health effects does not stand up to scrutiny

The standard exposure limits do assure protection from acute exposure situations (short term exposure) where actual excessive internal body heating can cause significant biological damage. However, the ARPANSA RF standard limits do **not** provide protection against lower-level chronic radiofrequency exposures such as from smart meters. Therefore, consideration of other possible biological effects unrelated to heating has not been taken into account in the actual setting of maximum exposure limits for radiofrequency exposures. Considering this, any assurance of smart meter safety based on these standards is disingenuous.

### **A new and unique human exposure situation**

In examining the anecdotal cases of ill health continued to come from Victoria (and overseas) many of the reported cases are from people who had their analogue meter replaced by a smart meter and that location was on their bedroom wall, suggesting that proximity at night may be an important factor.<sup>6</sup>

Besides proximity, it turns out that the number of smart meter transmissions is not limited to four to six per 24 hour day, as claimed by a number of industry sources, but could be many thousands of very brief 'spikes' of RF energy over that time. This is clearly seen in Table 1, taken from a document from Pacific Gas and Electric Co. where over a 24-hour

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<sup>5</sup> <http://www.networktasman.co.nz/Main.asp?ID=17>

<sup>6</sup> Smart meter case histories, [http://www.emfacts.com/download/SM\\_case\\_studies.pdf](http://www.emfacts.com/download/SM_case_studies.pdf)

period up to 190,000 transmission pulses can occur.<sup>7</sup> These are very brief but frequent transmissions, as seen in Table 2.

**Table 1**

<b>Electric System Message Type [a]</b>	<b>Transmission Frequency Per 24-Hour Period: Average [b]</b>	<b>Transmission Frequency Per 24-Hour Period: Maximum (99.9<sup>th</sup> Percentile) [c]</b>
Meter Read Data	6	6
Network Management	15	30
Time Synch	360	360
Mesh Network Message Management	9,600	190,000
<b>Weighted Average Duty Cycle</b>	<b>45.3 Seconds<sup>4</sup></b>	<b>875.0 Seconds</b>

**Table 1** presents scheduled smart meter system messages and their durations. This is only for the 900Mhz smart meter transmitter radio and represents data for all scheduled messages that are required to sustain the mesh network communications.

As for the reason for all these brief transmissions, a 2013 report by Richard Tell Associates, states the following:

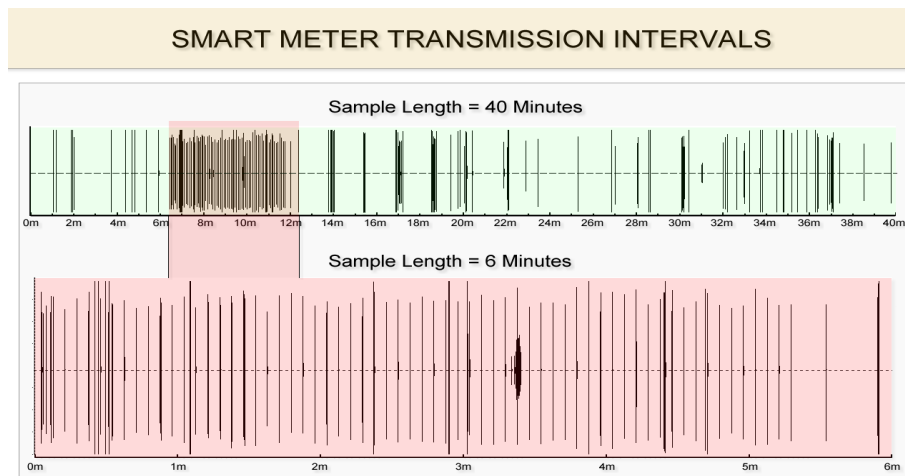
Smart meters emit short duration pulses of RF energy in their communication with other meters and data collection points. These emissions generally happen all through the day. Besides the normal three (in the case of BED) or four (in the case of GMP) times a day that electric energy consumption data are reported back to a data collection point for subsequent transmission to the company, smart meters must maintain their organization within the RF LAN to which they belong and this necessitates the transmission of beacon signals from time to time. Additionally, each meter can, when required by the mesh network, assist neighbouring smart meters by transmitting the neighbour’s data on to another meter or data collection point. Further, the HAN radio can produce pulsed fields in its search for and communication with IHDs. All of this means that most smart meters remain relatively active in terms of brief signals being transmitted.<sup>8</sup>

<sup>7</sup> Pacific Gas and Electric Co., [http://emfsafetynetwork.org/wp-content/uploads/2011/11/PGERFDataOpt-outalternatives\\_11-1-11-3pm.pdf](http://emfsafetynetwork.org/wp-content/uploads/2011/11/PGERFDataOpt-outalternatives_11-1-11-3pm.pdf)

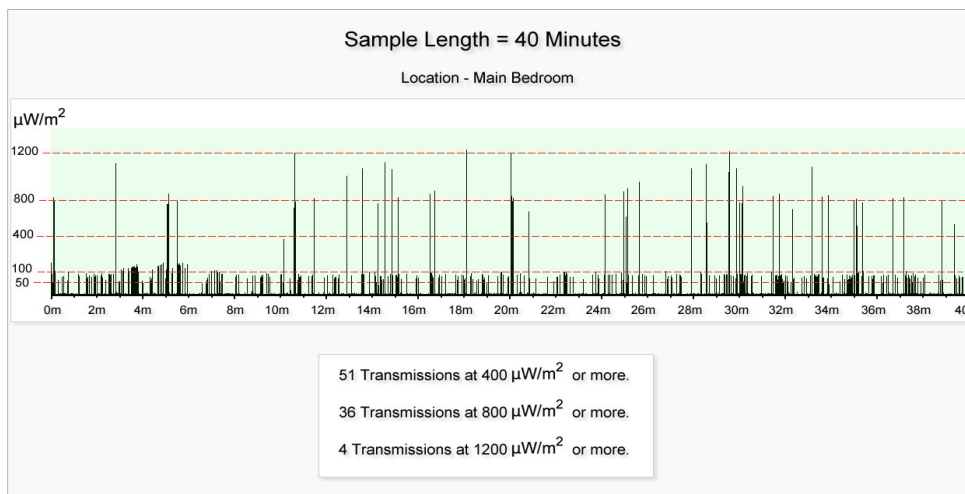
<sup>8</sup> Richard Tell Associates, An Evaluation of Radio Frequency Fields Produced by Smart Meters Deployed in Vermont, [http://publicservice.vermont.gov/sites/psd/files/Topics/Electric/Smart\\_Grid/Vermont%20DPS%20Smart%20Meter%20Measurement%20Report%20-%20Final.pdf](http://publicservice.vermont.gov/sites/psd/files/Topics/Electric/Smart_Grid/Vermont%20DPS%20Smart%20Meter%20Measurement%20Report%20-%20Final.pdf)

As for what this activity might look like in a 'real world' situation, **Table 2** shows measurements taken outside, one metre externally from a smart meter on a suburban house in Melbourne, Victoria Australia.<sup>9</sup>

**Table 2**



**Table 3**



**Table 3** shows the same house, this time with measurements taken by the bedhead in a bedroom adjacent to the smart meter. These levels are well below the Australian RF standard which is irrelevant to this situation.

### The 900 MHz frequency used by smart meters may also be an issue

Besides the constant pulsing of smart meter emissions there is the issue of the 900 MHz frequency range used. In 1976 Lin concluded that 918 MHz energy constitutes a greater health hazard to the human brain than does 2450 MHz energy for a similar incident power

<sup>9</sup> Miller, K., Using a Gigahertz Solutions HF 35C RF meter, January 2013. The surveys were recorded on video, which captured the HF35C reading plus the audio from the speaker of the HF-35C. In post production, the background noise was "gated out", and then visually checked with the HF35C readings against the audio spikes to ensure that only the actual meter output is displayed in the charts. The images are screen shots, as displayed in an audio program (Peak). They are only meant to illustrate the frequent transmission intervals of the smart meter measured.

density<sup>10</sup>. In addition studies of diathermy applications consistently show that electromagnetic energy at frequencies near and below 900 MHz is best suited for deep penetration into brain tissue.<sup>11</sup> So a possibility exists that in situations where people are in close proximity to an active smart meter, the combination of the frequent transmission bursts at around 900 MHz constitutes a new and unique human exposure situation that may have unintended biological effects, especially on sleep. **Appendix A** contains a number of case histories, which I have personally gathered from Victoria. Although these 10 cases are of little value scientifically they should raise a public health concern as they indicate that a possible health hazard may exist from the roll-out of smart meters. Further to these 10 Victorian cases, a 92-case study report by Melbourne medical practitioner Dr. Federica Lamech has been published in the Nov/Dec 2014 issue of the US clinical journal *Alternative Therapies in Health and Medicine*. The journal is a PubMed-listed, peer-reviewed publication. The Lamech paper, is titled "Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series." The paper reveals that the most commonly reported symptoms from exposure to wireless smart meters were, in this order: insomnia, headaches, tinnitus, fatigue, cognitive disturbances, dysesthesias (abnormal sensation), and dizziness. The case series also revealed that the effects of these symptoms on people's lives were significant.<sup>12</sup> The report had already gained support from the American Academy of Environmental Medicine (AAEM) with the following public statement. "It is a well-documented 92-case series that is scientifically valid. It clearly demonstrates adverse health effects in the human population from smart meter emissions."

The AAEM stated that it is critically important to note that the data in this case series indicates that the "vast majority of cases" were not electromagnetically hypersensitive until after installation of smart meters. Dr. Lamech concluded that smart meters "may have unique characteristics that lower people's threshold for symptom development."<sup>13</sup>

Although the above cases are limited to Victoria, there are two other related surveys from the U.S. The first one was conducted for the EMF Safety Network in California by Dr. Ed Halteman and included 443 responses. The top health issues since smart meters installed were: sleep problems (mentioned by 49%); stress, anxiety and irritability (43%); headaches (40%); ringing in the ears (38%) and heart problems (26%).<sup>14</sup> The symptoms reported are consistent with those reported in the Victorian Lamech survey.

The second U.S. survey, which expanded upon the initial Halteman data, was conducted about a year later by Richard Conrad and Ed Friedman of Conrad BioLogic. A prime factor in this survey was to address the possibility of a psychosomatic response to the installation of a smart meter. They found that 42% of their over 200 respondents began developing symptoms before they knew a smart meter had been installed.<sup>15</sup> This is not to

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<sup>10</sup> J.C. Lin, Interaction of Two Cross- Polarized Electromagnetic Waves with Mammalian Cranial Structures" IEEE Transactions on Biomedical Engineering BME-23, no. 5 (September 1976): 371-75

<sup>11</sup> Marko Markov, Research International, Williamsville, NY, USA & Yuri G. Grigoriev, Russian National Committee of Non-Ionizing Radiation Protection, Moscow, Russia  
<http://www.viewdocsonline.com/document/6kn1ey>

<sup>12</sup> F Lamech, 'Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series', *Alternative Therapies in Health and Medicine*, Nov. 2014.

<sup>13</sup> AAEM, Wireless Smart Meter Case Studies, <http://skyvisionsolutions.files.wordpress.com/2013/11/aaem-wireless-smart-meter-case-studies.pdf>

<sup>14</sup> E. Halteman, Wireless Utility Impacts Survey, Final Results Summary, Sept. 13, 2011, <http://emfsafetynetwork.org/wp-content/uploads/2011/09/Wireless-Utility-Meter-Safety-Impacts-Survey-Results-Final.pdf>

<sup>15</sup> Conrad Biologic, EXHIBIT D – Smart Meter Health Effects Survey and Report, <http://www.mainecoalitionstopsmartmeters.org/wp-content/uploads/2013/01/Exhibit-10-Smart-Meter-Health-Effects-Report-Survey2.pdf>

say smart meters were not responsible for new or increased symptoms in the other 58% but only that the first group was unaware of the meter installation and often unaware of the issue altogether.<sup>16</sup> This finding strongly indicates that in the first group the nocebo effect (psychological worry) was highly unlikely to be a factor in these cases.

From a public health perspective, the above information clearly suggests that with the widespread rollout of smart meters we may have a significant and new public exposure situation that lies outside the thermally protective parameters of the RF standards referred to previously.

### **Is distance from a smart meter important?**

As prolonged close<sup>17</sup> proximity to a smart meter, especially at night, seems to be an important factor in symptom reporting it is worthwhile to consider a survey report from Isotrope Wireless conducted on a number of residences in New York State in November 2014. In measuring internal smart meter emission levels they found levels diminished to background levels in more distant parts of the houses tested.<sup>18</sup> This raises the possibility that if smart meters are specifically installed well away from bedroom areas, and other areas where other people spend large amounts of time in, this may go a long way in reducing or even eliminating the reported adverse health symptoms from smart meter exposure.

### **Research is needed to determine the extent of a possible public health risk from smart meters emissions.**

From a public health perspective, the suggestive evidence that smart meter RF emissions may be having an adverse health impact calls for an urgent research effort. Even if the number of affected people is small, the sheer number of people exposed represents a potentially significant public health risk. To dismiss this possibility simply as just a nocebo effect without undertaking a serious research effort is inexcusable. Even if it were eventually found that the reported adverse effects from smart meter exposure were simply the effects of worry (nocebo) the size of the numbers affected by worry should call for research specifically to address the reality, or otherwise, of their concerns. If it could be shown by specific sleep research, for example, that there was no effect on sleep patterns (the primary reported effect) that would go a long way to resolving public concerns. If, on the other hand, an effect on sleep was found and replicated, that would be another matter and would require a serious re-evaluation, at the very least, of where smart meters are located on homes and other buildings, as indicated in the Isotrope Wireless report, mentioned above.

### **Concluding comments**

Considering the above information it is inadvisable, in my opinion, for TasNetworks to rush headlong into their revised tariff proposal while these two significant issues remain unresolved and unresearched.

### **Recommendations**

- Investigate the availability of using a smart meter that only sends actual electricity usage 4 to 6 times over the 24 hour period in brief transmissions and does not emit

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<sup>16</sup> Correspondence with Ed. Friedman, 12 Jan. 2014

<sup>17</sup> Closeness still needs to be determined and may be dependent upon individual sensitivity.

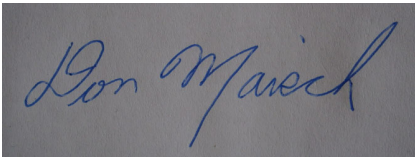
<sup>18</sup> Isotrope Wireless, 'Report on Examination of Selected Sources of Electromagnetic Fields at selected residences in Hastings-on-Hudson', Nov. 23, 2013.



- thousands of signals unrelated to usage.
- Consider using the national fibre optic NBN network for communication between the smart meter and utility.<sup>19</sup>
  - Revise building codes to ensure smart meters are placed well away from bedroom areas, including adjacent buildings.

### **My qualifications for commenting on the TasNetworks proposal**

I have been involved in the issue of standard setting for non-ionizing electromagnetic radiation (EMR) since the early 1990's as a science writer for Australian Senator Robert Bell. I have since served on government and industry EMF standard setting committees on behalf of the Consumers Federation of Australia. In 2010 I receive my PhD from the University of Wollongong, NSW . My thesis examined the historical development of Western radiofrequency and microwave exposure standards and how vested interests have influenced those standards. I have published a number of papers on standard setting and the health effects of EMR as well as numerous submissions on the smart grid and related topics. These are available online at <http://www.emfacts.com/papers/>



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<sup>19</sup> Key Considerations for the use of the NBN Infrastructure for Smart Grid Applications, Smart grid Australia, January 2010 , <http://www.smartgridaustralia.com.au/wp-content/uploads/2015/11/Key-Considerations-for-the-use-of-the-NBN-Infrastructure-of-Smart-Grid-Application>



