



# Exemplary Advances

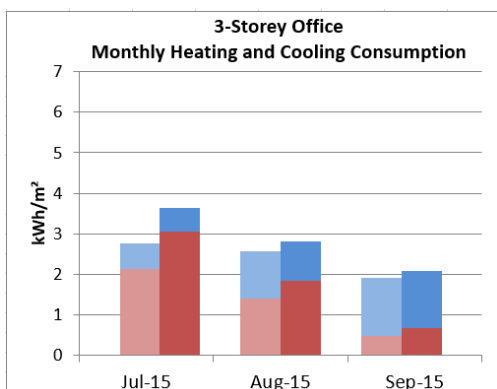
2015 October **“Exemplary Advances”** is the newsletter for Exemplary Energy Partners, Canberra. Feel free to forward it to friends and colleagues. Click here to [subscribe](#) or [unsubscribe](#). Feedback is most welcome.

Past editions of **“Exemplary Advances”** are available on our [website](#).

## Exemplary Weather and Energy (EWE) Index<sup>i</sup> - September 2015

Monthly tabulation and commentary relative to the climatic norm – the Reference Meteorological Years

2015 September	Canberra		Perth		Sydney	
	Heat	Cool	Heat	Cool	Heat	Cool
10-Storey	26%	1%	-20%	8%	-99%	5%
3-Storey	37%	-1%	-18%	11%	-100%	7%
Supermarket	23%	-2%	-20%	66%	-100%	213%
Solar PV	11.7%		19.9%		-16.2%	



**Canberra** was cooler and sunnier than the average in September.

The mean maximum, average and minimum temperatures are lower by 3.5°C, 0.6°C and 1.0°C respectively. The PV model was benefiting from this weather and gave an energy yield 11.7% higher than the long term September average. The heating consumptions are all higher than the averages by 23% to 37%. The 10-storey office heating consumptions in the East, North and West facing perimeter zones are about 115%, 39% and 31% higher respectively; however, the actual values are all small.

**Perth** had a warmer and sunnier than average September. The mean maximum, average and minimum temperatures are higher by 1.6°C, 1.1°C and 1.3°C respectively. The cooling consumptions of our three commercial building models are all higher than the September averages, especially so in our supermarket model which was 66% higher due to its longer business hours relative to the offices. The PV model delivered an energy yield 19.9% higher than the norm.

**Sydney** has been warmer than average since May and the warm weather has continued through September. The mean maximum, minimum and average temperatures are higher by 1.2°C, 2.6°C and 2.5°C respectively. The PV model had an energy yield 16.2% lower than the September average due to the warmer and cloudier weather. The cooling consumptions of the 10-storey office North and West perimeter zones are over 16% and 42% higher respectively; and almost 30% higher in the South facing perimeter zone due to the warmer air temperature. The supermarket model had a cooling consumption over 3 times greater than the average due to its longer business hours. Consistent with that, the heating demand was almost eliminated.

### Sydney Solar Data Issues

Technical issues are still plaguing the Macquarie University weather station and its data collection and dissemination. We are again indebted to the co-operative folk at UNSW and UTS for their contribution to span this break in our data flow. Their solar radiation data is of particular value to us because there are very few sites at which this weather element is reliably measured.

## Satellite Observations of Cloud Cover – Proposed Improvement

The Bureau of Meteorology currently publishes gridded hourly solar data which it estimates from satellite observations of cloud cover which it does not publish. Exemplary Energy recently put the case for the Bureau to routinely publish this cloud cover data as well:

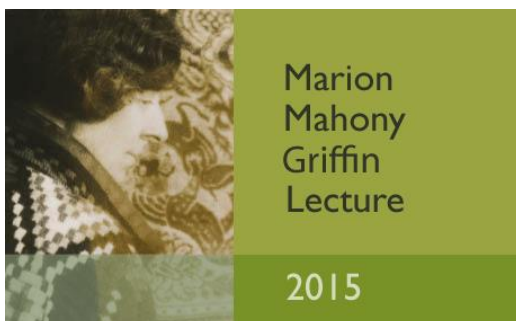
- For solar technologies and buildings, the cloud cover data is required to simulate 2nd order thermal effects.
- Cloud cover affects infra-red radiation exchange with the sky and deep space and thus affects the temperatures of upward facing surfaces, especially in low wind conditions.
- Surface temperatures affect thermal losses/gains from buildings and solar thermal technologies.
- Surface temperatures affect the solar-to-electric efficiency of photovoltaic solar cells.
- The Bureau used to publish cloud cover data in oktas on a 3-hourly basis from trained manual observations on the ground. This is still incorporated in weather data file formats.
- For building and solar system simulation, cloud cover must be inferred or reverse-engineered from the gridded solar data for inclusion in the standard weather and climate file formats.
- The data is usually in oktas (ACDB format) or in 10ths-of-the-sky (TMY2 and EPW formats) and so must currently be estimated statistically and stochastically from the hourly relative strength of the Bureau's estimated Direct Normal beam radiation (DNI).
- This is substantially inferior in speed and reliability to getting the cloud cover data directly and also inferior to the historically-provided service.

This issue has again been canvassed by our Director (Buildings), **Trevor Lee**, who is giving an update to the [Canberra ATA](#) on 28 October and a full presentation at [APVIC](#) in Brisbane in early December.

## Home Energy Rating OptiMizer – HERO - available for free trial

The Home Energy Rating OptiMizer – [HERO](#) – is now available in beta release for free trial by accredited energy assessors anywhere in Australia. The service analyses for NatHERS (BCA 6 stars) and BASIX (heating and cooling caps for Thermal Comfort) at the user's discretion. The assessor nominates a series of alternative constructions and modest design changes from [our menu](#) and our "batch processor" simulates the design with all possible combinations of those alternatives and sorts the results in order of performance merit. The client can then interrogate the results in graphical format (view a [sample here](#)) to identify the most cost effective complying combination or the best performing solution within the client's budget.

The service is now available for AccuRate and BERS Pro files with a version to handle FirstRate5 files under advanced development. [Contact us](#) for your free trial.



### Marion Mahony Griffin Lecture

At the [National Archives](#) Building on 21 October, our Director (Buildings), **Trevor Lee**, gave an overview of his research into Marion's esoteric reading in the later stages of her life, having returned to Chicago as a widow in 1938. Marion, with her husband Walter Burley Griffin, was a co-designer of Canberra, having won the world-wide competition of 1912 to design our Federal Capital. Trevor gave a brief overview of how he found 14 of her annotated personal books, 7 of

them in German (which she learned as a student), in the library of the Chicago Branch of the [Anthroposophical Society](#). The talk was recorded and is expected to be podcast by the [Walter Burley Griffin Society](#).

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<sup>i</sup> Exemplary publishes the [EWE](#) for three archetypical buildings and a residential solar PV system each month; applying the RTYs to [EnergyPlus](#) models developed using [DesignBuilder](#) for a 10-storey office, a 3-storey office and a single level supermarket as well as an [SAM](#) model of a typical 3 kW<sub>peak</sub> solar PV system designed by [GSES](#). All values are % increase/decrease of energy demand/output relative to climatically typical weather. Especially during the mild seasons, large % changes can occur from small absolute differences.