



# Exemplary Advances

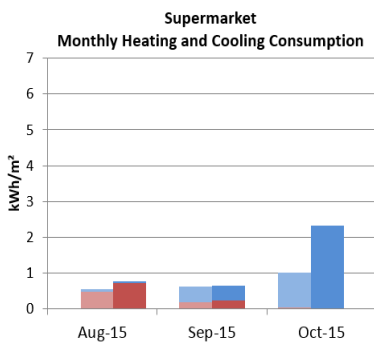
2015 November "Exemplary Advances" is the newsletter for Exemplary Energy Partners, Canberra. Feel free to forward it to friends and colleagues. Click here to [subscribe](#) or [unsubscribe](#). Feedback is most welcome.

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

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

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

2015 October	Canberra		Perth		Sydney	
	Heat	Cool	Heat	Cool	Heat	Cool
10-Storey	-71%	12%	-	12%	-	12%
3-Storey	-82%	20%	-	18%	-	20%
Supermarket	-84%	136%	-	108%	-	146%
Solar PV	-2.6%		0.4%		-2.7%	



**Canberra** was warmer and cloudier than the average in October. The mean average and minimum temperatures are higher by 3.2°C and 3.0°C respectively. Only the mean maximum is lower, by 0.4°C. It was also less windy than the average, which is a disadvantage to the PV panel efficiency. The PV model had an energy yield that was 2.6% lower in this weather. The heating consumptions of all our commercial building models are lower than the October averages by over 70% to 84%. However, the actual values are all small. Cooling consumptions are all higher than the averages, especially the longer trading hour supermarket.

**Perth** had a warmer than average October. The mean maximum is higher by 0.7°C, the average and minimum temperatures are each higher by 2.7°C. The cooling consumptions of the 10-storey office North and West perimeter zones are over 28% and 16% higher respectively. The South facing perimeter zone also has significant increase in cooling consumption, by almost 45% due to the warmer air temperature. The supermarket model had a cooling consumption double the average.

**Sydney** has been warmer than average since May and the warm weather has continued through October. Although the mean maximum is lower by 1.4°C, the mean minimum and average temperatures are higher by 3.2°C and 2.4°C respectively. The PV model had an energy yield 2.7% lower than the October average due to the warmer and cloudier weather. The cooling consumptions of the 10-storey office North and West perimeter zones are over 34% and 26% higher, respectively, and almost 40% higher in the South facing perimeter zones due to the warmer air temperature. The supermarket model had a cooling consumption that was more than double the average.

## Sydney Solar Data Issues Resolved

Technical issues are no longer plaguing the Macquarie University (MQ) weather station and its data collection and dissemination: humidity, pressure and wind were all recorded from the start of October but solar and dry bulb temperature recording did not resume until 10 November. 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. Assuming that all remains sound at MQ from now on, we will complete our comparison of the five weather data sources for Sydney in early January using the full month of December as our summer comparison.

## New Engineering Intern from ANU

Final year Engineering/Arts student from the Australian National University (ANU), **Maria Salazar**, began work with us in October this year. After induction and familiarisation tasks, she has begun to take over from **Joshua de Botton**, in the refinement of Real Time Year (RTY) normalisation techniques. Joshua is completing Macquarie University Environmental Science intern. Normalisation is the technique through which we convert measurements taken at MQ into most likely coincident weather occurring in the Sydney CBD and other key nodes within the metropolitan area. We will be reporting on their progress in future issues of *“Exemplary Advances”*.



## Quarter Century of Solar and Coincident Weather Measurements

The publication of solar irradiation data estimated by the Bureau of Meteorology (BOM) based on its steadily improving algorithms for inferring it from the cloud cover observed by a series of geostationary satellites began in the 1980s. In recent years, this work was refined from the original daily Global Horizontal Irradiation (GHI) data to be published as Gridded hourly data for both GHI and the much harder to estimate Direct Normal Irradiation (DNI). Data is now published for almost 270,000 Australian locations starting from 1 January 1990 so that the data base covered a quarter century (25 years) at the end of 2014. The BOM publishes this data about three months in arrears but Exemplary has now completed the recalculation of the Reference Meteorological Years (RMYS) for its core 100 sites and these are now available for purchase from Exemplary or ACADS-BSG.

Prior purchasers of climate or weather data based on 23 or 24 years are entitled to a 25% or 50% discount respectively.

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

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.



## Visit to Masdar Institute, United Arab Emirates

On 5 November, 2015, Exemplary Director (Buildings) **Trevor Lee**, visited the UAE’s premier solar research institution, the [Masdar Institute](#), located in the new satellite town of Masdar City near the Abu Dhabi International Airport. There, for Hosni Ghedira and his team including Yehia Eissa and Naseema Shyju in the Research Center for Renewable Energy Mapping and Assessment, he presented an [update](#) on Exemplary’s work on transient cloud and its shadows as estimated from satellite-based cloud cover observations. While also of interest to the UAE, the focus there has been on the shifting patterns of dust haze and its graduated transient effects especially on focusing solar energy systems. The UAE’s solar resource research has accordingly been more concentrated on aerosol optical depth ([AOD](#)) than on the more-or-less binary function of beam solar radiation being available or obscured by cloud in our relatively clean air climates. The Exemplary/Masdar liaison is planned to continue in the New Year.

The Masdar Institute campus incorporates an innovative outdoor cooling tower where air that is evaporatively cooled by fine mist sprays falls to ground level as a passive personal cooling point.

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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.