Exemplary Advances

2015 April "**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[i]

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

2015 March	Canberra		Perth		Sydney	
	Heat	Cool	Heat	Cool	Heat	Cool
10-Storey	-	-4%	-	-13%	-	-20%
3-Storey	-	-4%	-	-14%	-	-23%
Supermarket	+92%	-6%	-	-11%	-	-15%
Solar PV	+1.3%		+1.4%		-4.4%	

Canberra had a near average March in terms of air temperature. Only the mean maximum is slightly higher by 1.2°C. The weather was marginally sunnier and our PV model has an energy yield 1.3% higher. However all our three commercial buildings have a lower cooling consumption by 4% to 6%. The 10-storey office cooling consumptions in the West and North facing zones are 7.3% and 4.6% respectively lower. Further analysis shows that this lower cooling energy consumption is due to drier weather, where the average relative humidity is lower by a factor of about 16%.

Perth had a cooler but slightly sunnier than average March – the mean maximum, average and minimum temperatures are lower by 5.0°C, 1.5°C and 2.3°C respectively. This is reflected in all our building models which have significantly lower cooling consumptions. The relative humidity is about average so, given the lower temperatures, the air was drier in absolute terms. The energy yield of the PV model is 1.4% higher than average, however **o**ur 10-storey office cooling consumptions in the Western and Northern zones are 17.5% and 11.3% lower respectively.

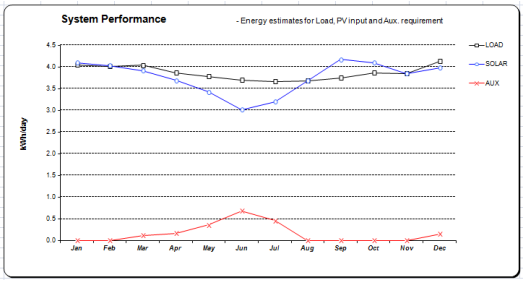
Sydney had a cooler and also cloudier March – the mean maximum, average and minimum temperatures are lower by 4.6°C, 2.0°C and 1.3°C respectively. The cooling consumptions from our building models are accordingly significantly lower by 15% to 23%. Our PV model has an energy yield 4.4% lower. The relative humidity is higher by a factor of about 18% yet the slight increase in absolute humidity had only a very minor impact on the building cooling energy consumption due to the cooler weather. Our 10-storey office cooling consumptions in the Western and Northern zones are 33.5% and 32.2% lower.

Latest Real Time Year (RTY)

RTYs to the end of March 2015 are now available for CBR, PER and SYD. Click here for details. Superseded RTYs are available at a discount of 10% per month past publication date, with up to a 50% total discount available (20% per month past publication date for student, academic and other non-commercial use). So please enquire about formats and delivery times.

Solar Radiation Data for 100 Locations for 24 Years

The data for the Australian Solar Radiation Data Handbook has recently been expanded and updated to cover 100 locations for 24 years (1990-2013). While not yet published in the traditional format, this data has been incorporated in the recently released edition of the popular professional software for solar PV system design: PV-SPS for Stand-alone Power Systems ($115.50 per region incl. GST) and PV-GC for Grid-Connected power systems ($77.00 per region incl. GST).



These Microsoft Excel spreadsheets are provided as 5 separate regions (NSW-ACT, QLD, SA-NT, VIC-TAS and WA) and are only available to appropriately trained PV systems designers. Knowledge of the relevant Australian Standards is essential for obtaining a reliable system performance prediction with this software; so, accordingly, it is not made available to unqualified purchasers. Contact JP Energy Technology for details.

Hidden cost of dodgy ductwork

"Climate Control News" (CCN) has published an article by Exemplary Energy Partners Buildings Director **Trevor Lee** on the financial and environmental pitfalls of substandard duct selection or installation in heating and air conditioning systems. The article, as published, includes footnote markers but omits their content. For readers wanting the extra detail, they are i, ii and iii.

Normalising weather data during MQ weather-station shutdown

In addition to the Global ~ Diffuse data issue noted last October, the Macquarie University (MQ) weather-station had a power failure around noon on 9 January and it did not resume reading until around 12:45 PM on 20 February so we needed almost 6 weeks of data to fill the gap completely.

With the help of Dr Angus Gentle and Drew Edwards from UTS we accessed the data stream from the weather station on the new UTS Engineering Building which incorporates leading edge solar and wind energy systems for research and demonstration purposes. Its solar data needed to be scaled up as it was reading low - peaking at around 600 W/m². So we also accessed the promptly published daily Global energy totals estimated from satellite imagery of clouds from the Bureau of Meteorology (BOM) to scale the UTS hourly data to match the BOM daily total. We also used the BOM half-hourly pressure, temperature and humidity data from Observatory Hill (near the southern end of the Harbour Bridge) and the wind data from Fort Denison (in the Harbour near the Bridge) to build a continuous data set suitable for simulating buildings and systems in the Sydney CBD.

The MQ weather-station is now working to its earlier high standards of accuracy and reliability so our March data has again come from that traditional measurement source.

Ersatz Future Meteorological Years

As cited in *"EDG News"*, 2014 was the warmest on record, for the whole planet, according to (the US National Oceanic and Atmospheric Administration (NOAA) and the Japan Meteorological Agency (JMA). For Australia, 2014 was its third-warmest year on record, with the past spring the warmest ever recorded. (Australia's warmest year on record is 2013.) Accordingly, readers may be interested to learn how our Ersatz Future Meteorological Years (EFMYs) were made from the CSIRO's Projected Change Values (PCVs) cited in our March edition. Our new brochure summarises this and cites the relevant papers in full.

---

[i] 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_{peak} 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.