Exemplary Advances

2019 August ***"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.

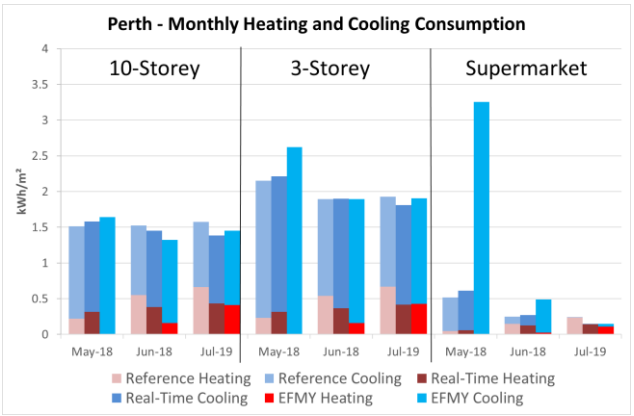
Exemplary Weather and Energy (EWE) Index[i] - July 2019

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

2019 July	Canberra		Perth		Sydney	
	Heat	Cool	Heat	Cool	Heat	Cool
10-Storey	-14%	14%	-35%	4%	-46%	18%
3-Storey	-16%	11%	-38%	11%	-47%	22%
Supermarket	-26%	N.A.	-40%	N.A.	-54%	-97%
Solar PV	20.3%		-10.9%		4.8%	

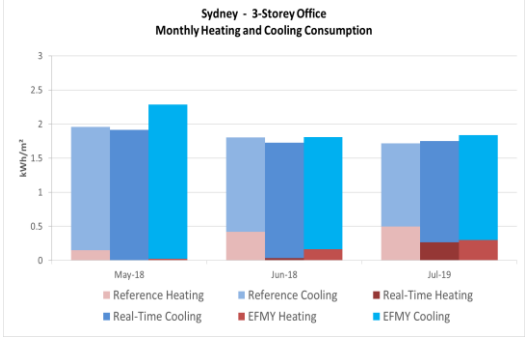
The Exemplary Real Time Year weather files (RTYs) used for these monthly simulations are available for purchase to allow clients to simulate their own designs for energy budgeting and monitoring rather than rely on analogy with the performance of these archetypical buildings and systems.

Canberra had a warmer than average weather in July in terms of the mean average air temperature. The mean average and minimum temperature were higher by 1.0°C and 2.2°C respectively. Only the mean maximum temperature was lower by 0.2°C. Heating consumptions of all the three commercial buildings were lower than the averages. It was sunnier as well, therefore, the solar PV array had an energy yield of 20.3% higher. The 10-Storey office South facing zone had over 13% lower heating consumption than the norm due to the warmer air temperature. The other three perimeter zones also had over 10% lower heating consumption in this warmer and sunnier weather.



Perth had warmer than average weather in July. The mean average, maximum and minimum temperatures were higher by 13°C, 1.2°C and 1.1°C respectively. All three commercial building models had heating consumptions lower than the averages. The 10-Storey office West facing zone had over 37% lower heating consumption than the norm. South facing zones also had heating consumption close to 37% lower due primarily to the warmer air temperature. It was cloudier as well, therefore, the solar PV array had an energy yield of 10.9% lower in this weather.

Sydney also had warmer than average weather in July. The mean average and minimum temperatures were higher than the norm by 2.1°C and 3.4°C respectively. Only the maximum was lower than the average by 0.8°C. All three commercial building models had heating consumption lower than the norm by 46% to 54% (supermarket had higher than average cooling but the actual value is insignificant). It was sunnier as well. The heating consumption of the 10-storey office North and West facing zone were lower by over 33.5% – 46.2%.



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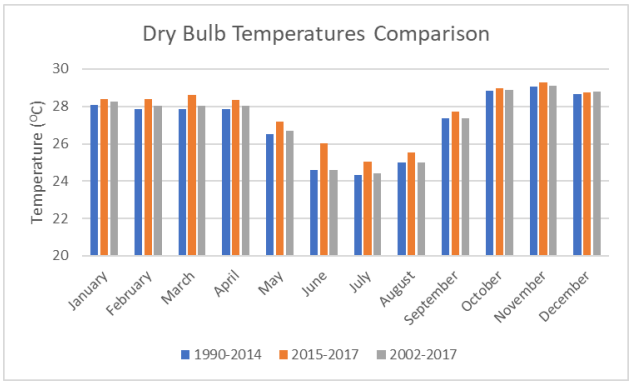
Southern perimeter zones also had heating lower than the norm by over 46% due primarily to the warmer air temperature. The solar PV array had an energy yield of 4.8% higher in this weather.

Temporal Analysis of Weather Data – Darwin

Exemplary has prepared updates to its set of 201 Australian sites most recently published for the quarter century of 1990-2014. Especially in the context of a changing climate, we are routinely processing data from subsequent years and comparing this with the prior decades. Most recently, this has been done for the three years 2015-2017 and the change analysed through the increments over time of the five key weather elements. For completeness, we have also compared the potential new climate data season of 2002-2017 (the most recent available 15-year data sets – long enough to smooth out the perturbations of the ~11-year Sunspot Cycle).

The Temporal Analysis has been carried out for the eight capital cities plus Alice Springs (Arid) and Cabramurra NSW (Alpine) so as to cover the gamut of the Climate Zones in the Building Code of Australia (BCA) - now part of the National Construction Code (NCC). This issue of Exemplary Advances brings to you the Temporal Analysis for the city of Darwin.

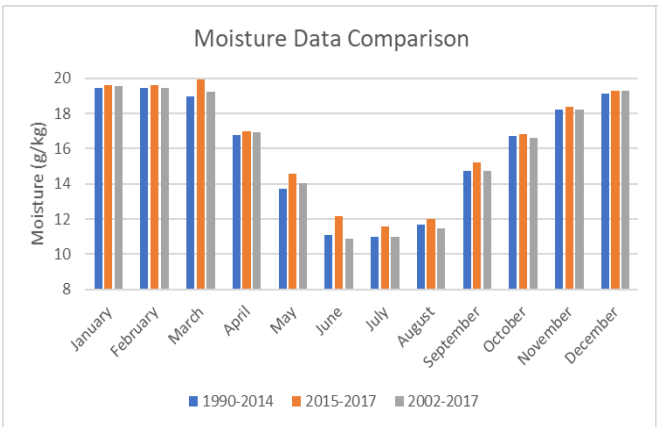


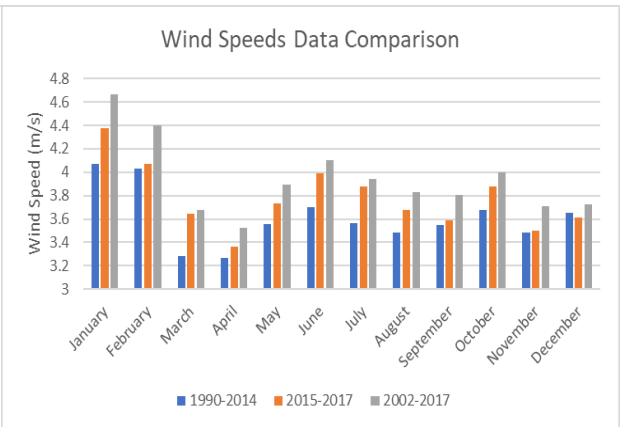
The new batch of processed data of Darwin saw many changes to the RMY months. The 3 RMY data has changes in 20 of its months, out of which 9 are having recent months from the year 2015-2017. P10 had 10 changes with 2 to recent months, while P90 had 8 changes with 1 being a new month.

RMY-A data has changes in 7 of its months but only February being the only month from the 2015 to 2017 period. RMY-B also had 7 changes, with 2 being to new months, while C had 6 changes, with 3 being to new months. It is interesting to note that February changed to 2017 for all 3 RMYs, while B and C both had August change to 2015.

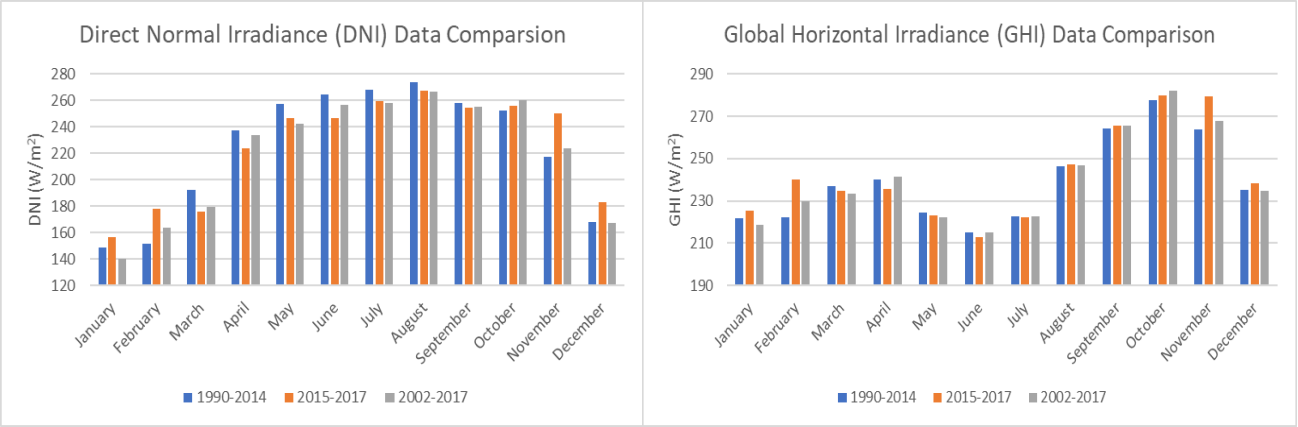
Of the 7 changes to RMY-A, there was a very negligible change to mean temperature and moisture. Wind speed decreased by 7.02%, while GHI and DNI decreased by 0.39% and 1.34% respectively.

Comparing 1990-2014 with 2015-2017 showed an increase in mean temperature of 0.52%, in increase to moisture of 2.84%, an increase to wind speed of 4.66% and small increases to GHI and DNI of 1.09% and 0.27%.





Analysing 1990-2014 data of Darwin with that of 2002-2017 showed a less significant increase of temperature by 0.1%, an increase of moisture content by 0.32%, an increase of wind speeds by 9.17%, while GHI increased by 0.27% and DNI decreased by 1.63%.



Further to this temporal analysis of weather data for **Darwin** between the widely-used current set of data (1990-2014) with the recently developed new batch of weather data (1990-2017), each issue of ***"Exemplary Advances"*** will see a similar comparison for each of the other nine sites around our country to assist readers to consider the need to update the weather and climate data they use for their simulations and other analyses. Look out for them in past and future editions of ***"Exemplary Advances"***.

[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. RTYs are available for purchase for your own simulations.