Exemplary Advances

2019 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.

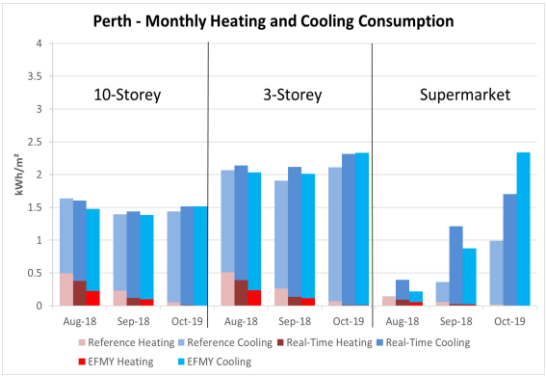
Exemplary Weather and Energy (EWE) Index[i] - October 2019

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

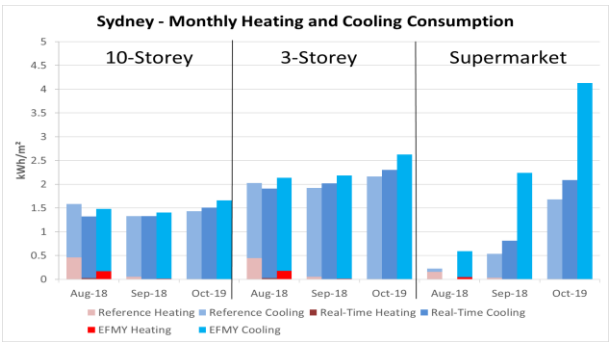
2019 October	Canberra		Perth		Sydney	
	Heat	Cool	Heat	Cool	Heat	Cool
10-Storey	-21%	4%	N.A.	9%	N.A.	5.1%
3-Storey	-28%	7%	N.A.	13%	N.A.	6.5%
Supermarket	-14%	140%	N.A.	75%	N.A.	24%
Solar PV	6.7%		-2.1%		16.3%	

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 October. The mean average and minimum temperature were higher by 1.3°C and 0.1°C respectively. Only the mean maximum was lower by 0.3°C. It was sunnier as well, therefore, the solar PV array had an energy yield of 6.7% higher. Cooling consumptions of all the three commercial buildings were higher than the averages. The 10-Storey office South facing zone had close to 30% higher cooling consumption than the norm due primarily to the warmer air temperature. North facing zones also had around 18.5% higher cooling consumption due to the warmer and sunnier weather. West facing zones also had higher cooling consumption but with a relatively lower 4.4% due to an overall less sunny weather in the late afternoon.



Perth had warmer than average weather in October. The mean average, maximum and minimum temperatures were higher by 1.2°C, 2.1°C and 2.2°C respectively. All three commercial building models had cooling consumptions higher than the averages. The supermarket had relatively higher increase in cooling consumption due to its longer operating hour and warmer air temperature after sunset. The 10-Storey office West facing zones had around 10% higher cooling consumption. The East facing zone had relatively higher increase in cooling consumption – close to 34% higher than the norm due to the warmer air temperature and generally sunnier morning. However, it was overall cloudier and therefore, the solar PV array had an energy yield of 2.1% lower in this weather.



Sydney also had warmer than average weather in October. The mean average and minimum temperatures were higher by 0.6°C and 0.3°C respectively. Only the mean maximum was lower by 0.1°C. It was sunnier. The cooling consumption of all three building models were higher than the norm. The cooling consumption of the 10-storey office South facing zone was

close to 12% higher than the norm due primarily to the higher air temperatures. Both the East and North facing zone also had around 12% higher in cooling consumption due to the warmer and sunnier weather. The solar PV array had an energy yield of 16.3% higher in this sunnier weather.

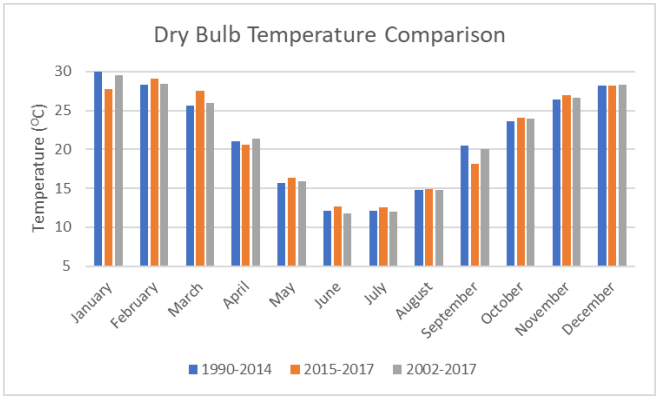
Temporal Analysis of Weather Data – Alice Springs

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 Alice Springs.

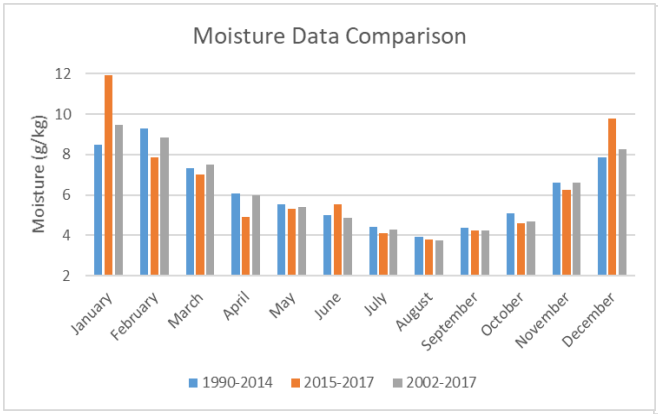
The new batch of processed data caused significant changes to the RMY months, with 9 of the months getting changed each for P10 and P90 data. However, for P90 data none of the months changed to a year from the 2015-2017 year period. P10 saw only one month change to a recent year which was November and it changed from 2010 to 2015.

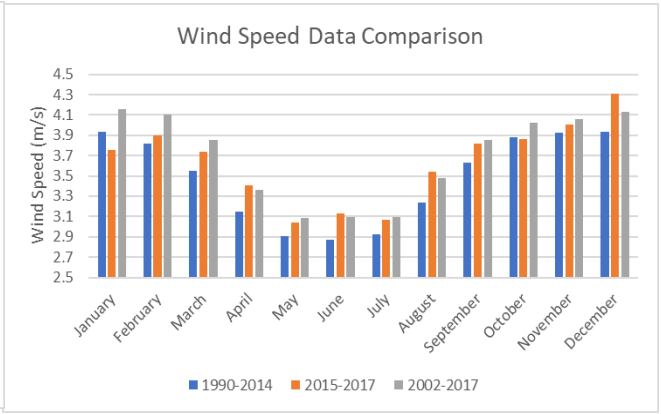
All RMYs had some changes, as well as changes to new months. Overall, RMY-A and RMY-B had four changes, while RMY-C had two. Interestingly, all 4 changes to new months were to 2015, which occurred in June for all RMYs, as well as August for RMY-B.



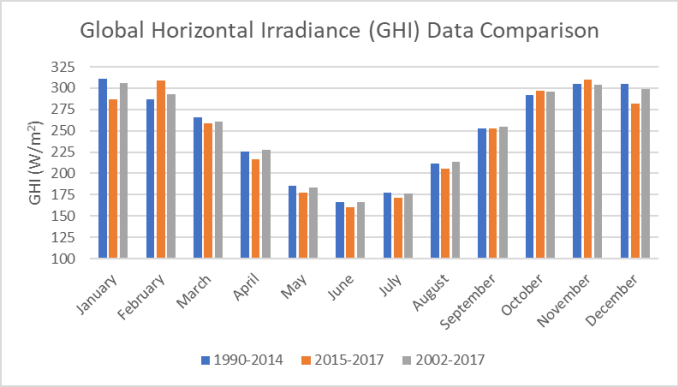
The four changes to RMY-A had a mean temperature increase of 0.11 degrees, with decreases to moisture of 5.41%, wind speed 2.22%, GHI 1.54% and DNI 2.28%.

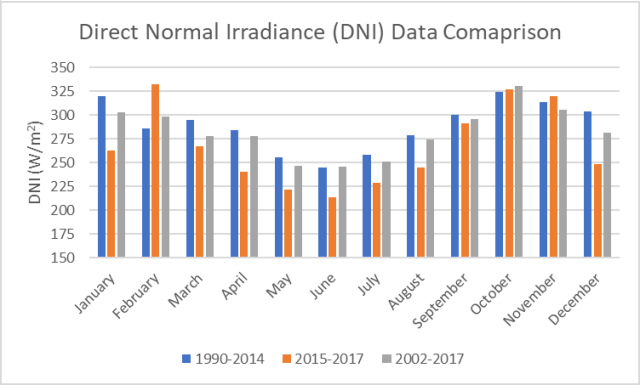
Comparing 1990-2014 data with that of 2015-2017 showed an increase in mean temperature of only 0.044 degrees, which is much smaller than other cities compared. Other changes were slightly more significant, with an increase in moisture of 2.13%, an increase in wind speed of 4.34%, and a decrease to GHI and DNI of 1.93% and 7.89% respectively.





1990-2014 data with respect to 2002-2017 data showed small differences for all the weather parameters except for wind speed. The increase to mean temperature was just 0.018 degrees, moisture remained virtually the same with a decrease of 0.07%, wind speed increased by 6.07% and GHI and DNI both decreased by 0.14% and 2.25%.





Further to this temporal analysis of weather data for **Alice Springs** 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.