

Victoria hospital energy storage

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Hospitals have large energy demands due to continuous operation, primarily from heating, ventilation and air conditioning (5). The demand is so large that public hospitals consume over half of public-sector energy in most Australian states and territories (6, 7). Hospitals should therefore be key stakeholders in Australian state/territory decarbonisation efforts.

Internationally, healthcare institutions have recognised and are acting on their energy choices, signing on to 100% renewable electricity targets for their healthcare facilities (5).

It remains unclear, however, how rapidly Australian hospitals are moving towards renewable energy alternatives. We aimed to evaluate the total energy use, electricity use, fossil (natural) gas use, and renewable electricity generation/purchase by Australian public hospitals and compare this to international healthcare leaders and the Australian university sector.

We examined Australian state/territory public hospital direct energy data for the decade 2010-19, obtaining prospective ethics approval (Western Health QA2019.41). Although we sought 10 years of data, we were only able to obtain complete data for all states/territories for three consecutive years 2016/17 - 2018/19. There were 693 public hospitals in Australia in 2018/19 (Australian Institute of Health and Welfare data) (8).

The following Australian public hospital data were requested for 2010-2019: total energy use, fossil/natural gas use, renewable and non-renewable electricity (produced or purchased, e.g. rooftop solar photovoltaic (PV), GreenPower (purchased renewable electricity) in kilowatt-hours (kWh), natural gas (gigajoules, GJ), Liquefied Petroleum Gas (LPG) (kilolitres, kL), co/tri-generation (kWh).

In order to establish the active contribution of the healthcare industry to reducing fossil fuel use, we focused upon renewable electricity generated/purchased by the healthcare sector. Only health sector purchased GreenPower was attributed to hospital renewable energy calculations. That is, we only included production/purchase of renewable electricity beyond the state's/territory's grid electricity. We did not include diesel fuel use (used either for transport, back-up power or in smaller rural hospitals for electricity generation) due to poor data access.

From November 2019 to February 2020 we received responses from all state/territory Health Departments and from metropolitan Western Australian health services. Data were robust for the three consecutive years from

2016/17 to 2018/19 inclusive. Data prior to 2016/17 were: unavailable, unreliable or not inclusive of all hospitals. Data supplied under NGER (the Clean Energy Regulator) were not reliable (high energy reporting thresholds, and heavily redacted due to concerns about revealing individual hospitals).

Total Australian public hospital energy use was stable for the three years (2016/17 to 2018/19) (Table 1 available in PDF). Renewable energy production/purchase increased from 14/ 4,132 GWh to 94/ 4,122 GWh (from 0.3% to 2.3% of power consumed). Australian renewable grid electricity uptake grew by 8.3% (from 15.7% in 2016/17 to 24% in 2018/19).

On a national level, grid electricity use was the majority of total hospital energy consumed (range 2,495-2,507 GWh [59-61% of total energy]), incorporating GreenPower certificates (range 1-72 GWh [0.02-2%]). Natural gas use was also large (range 1,444-1,522 GWh [35-36%]), followed by liquid propane gas (range 95-107 GWh [2%]), co/tri-generation (range 62-74 GWh [1.5-2%]), and rooftop solar PV (range 13-21 GWh [0.3-0.5%]). No biofuels were used according to discussions with state health representatives, nor was feedback that renewable electricity supply may be a limiting factor.

The large increase in renewable energy in 2018/19 was a result of Queensland Health being a benefactor of a whole-of-government GreenPower purchase (71.4 GWh purchased by Queensland Health). Renewable energy uptake by healthcare elsewhere was small (range 0 - 1.2%, 2018-19).

Our study shows that just 2.3% (14-94 GWh/yr) of Australian public hospital energy use was sourced from renewables between 2016/17 to 2018/19. The vast majority of hospital efforts over-and-above national grid renewable electricity supply arose from a single state, Queensland Health's GreenPower purchase in 2018/19 which contributed 3/4 of all Australian public hospital renewable electricity. Over the same period, public hospitals consumed 4,122-4,132 GWh/yr of energy, enough to power 630,000 average Australian homes each year.

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