

ENERGY BUILDING REGULATIONS, STANDARDS AND POLICIES

Internationally, the potential for energy efficiency and emissions reductions from the buildings sector is well recognised. For example, a survey of eighty international studies found that there is a global potential to cost-effectively reduce around 29% of the projected baseline emissions in the residential and commercial sectors by 2020¹.

To date, Australia has not adopted world-best practice in energy efficiency policy in the building sector. While many countries are addressing both the energy efficiency 'floor' and the 'ceiling' — improving the minimum acceptable efficiency standard and extending the maximum — Australian measures have generally focused on the floor alone. The 2010 report of the Prime Minister's Task Group on Energy Efficiency stated that "although.. difficult to measure with precision, it seems clear that the level and the rate of improvement of energy efficiency in Australia lag behind those of much of the rest of the world"². Many countries have started adopting long-term strategies which set a pathway towards zero-energy or zero-emissions buildings. The following is a summary of relevant international targets and policy aims which illustrate the proactive approach taken by various other countries in transforming the emissions profile of the building sector.

United Kingdom

The UK Government has committed to net zero carbon emissions for new homes by 2016, for public sector buildings by 2018 and commercial premises by 2019³.

These targets are to be achieved via a steady escalation of building regulations, enabling all new buildings to be zero carbon by the target dates. Since October 2010, building regulations have required a flat 25% carbon reduction in new domestic buildings (based on 2006 standards) and an aggregate 25% carbon reduction in non-domestic buildings⁴. Planned updates to the Building Regulations include a reduction of 60% for new homes by 2013 to meet the net zero target by 2016⁵.

To encourage continuous sustainability improvement of new homes and to support emissions targets, the Government also introduced the Code for Sustainable Homes as a national standard in 2007. The Code sets levels of performance for all key Government sustainability targets, measuring impacts such as energy and CO₂ emissions, pollution, water, waste, materials, health and well being, management, surface water run-off and ecology. Every new home built must contain a rating against the Code. The Code increasingly underpins the Building Regulations and provides the basis for future changes to the regulations⁶.

Europe

In 2010, the EU adopted the Energy Performance of Buildings Directive 2010/31/EU (EPBD) which requires Member States to "establish and apply minimum energy performance requirements for new and existing buildings, ensure the certification of building energy performance and require the regular inspection of boilers and air conditioning systems in buildings"⁷. This built on the original 2002 EU directive and subsequent 2008 recast showing the EU's continuing commitment to energy efficiency. Additionally under the Directive, by 2021 all new buildings in Member States are required to be 'nearly zero-energy buildings'. In 2013 the Commission published a study including residential and commercial buildings that shows a positive economic impact on sales and rental prices of the Energy Performance Certificate under the EPBD. The study shows that better energy efficiency is rewarded in the market⁸.

United States of America

The '2030 Challenge' is a strategy which has been widely adopted across the United States by numerous professional and industry organisations, as well as numerous cities, counties, and states. The challenge sets emissions targets for all new buildings, developments and major renovations. It proposes that performance of new buildings be increased progressively to be carbon-neutral by 2030⁹.

Governments in the USA at all levels have also adopted the 2030 Challenge targets. At the federal level, the Energy Independence and Security Act 2007 (EISA) was passed which requires that all new federal buildings and major renovations reduce their fossil fuel energy use to 55% (relative to the 2003 level) by 2010 and be eliminated by 2030¹⁰. EISA 2007 also included a mandate to develop and disseminate technologies, practices, and policies to reach the goals of achieving zero net energy use for new commercial buildings after 2025 and retrofitting all pre-2025 buildings to zero net energy use by 2050.

In 2009, Sec. 201 of the American Clean Energy and Security Act of 2009 (H.R. 2454) passed by the House of Representatives called for national building code energy reduction targets which are derived from the 2030 Challenge. These targets were amended in 2010. This Bill also authorizes the Secretary to set further energy savings targets on a path to achieving zero net energy or "carbon neutral" buildings.

State Governments adopting 2030 Challenge Targets (or 2030 inspired targets) include the states of California, Washington, Illinois, Minnesota and New Mexico. In 2007, the U.S. Conference of Mayors passed resolution #50 which called for all new buildings and renovations in the cities to meet the 2030 Challenge Targets⁹.

Canada

In Canada, both federal and provincial standards govern the minimum efficiency of home heating, cooling, refrigeration, and other equipment that can be installed in homes.

Canada has a long-standing voluntary national programme (now called ecoENERGY) to promote residential efficiency retrofits, based on the use of national, standard audit and incentives for recommended measures¹¹. The program offered CAD 300 million over two years and has a GHG reduction target of 1.66 Mt by 2011¹². This program is built upon by provincial government and utility programmes, typically by including additional financial incentives.

Of the numerous policies implemented at multiple levels of government, an example which can provide a model for Australian cities is Vancouver City which in 2008 set a target of a citywide reduction of 33% of current GHG emissions by 2020 and an 80% reduction by 2050, with carbon neutrality for all new buildings by 2030¹³. To achieve these goals, the Vancouver Council commenced a major EcoDensity initiative.

Japan

Japan's Strategic Energy Plan (latest revision June 2010) proposes targets such as doubling the energy self-sufficiency ratio (18% at present) and self-developed fossil fuel supply ratio (26% at present) resulting in an increase of its "energy independence ratio" to about 70% (38% at present). Other targets include raising the zero-emission power source ratio to about 70% (34% at present), halving CO₂ emissions from the residential sector, maintaining and enhancing energy efficiency in the industrial sector at the highest level in the world and maintaining or obtaining top-class shares of global markets for energy-related products and systems¹⁴.

As part of these targets, measures are proposed for the residential and commercial building sectors including moving towards zero net energy buildings, setting energy-saving standards and replacing old equipment.

Japan's Top Runner programme¹⁵ is an electrical appliance rating program that determines the most efficient model on the market and makes that model's level of efficiency the new baseline. The legal framework for the Top Runner Program is covered under the Energy Conservation Law and has led to dramatic advances since the program's inception in 1998.

Top Runner standards have required rates of energy efficiency improvement of between 16% and 80%. So far there has been a 100% compliance rate with some products achieving a higher improvement in efficiency.

TABLE 2.1

Japanese energy efficiency improvement of major products with Top Runner Standards

Product	Estimated improvement with Top Runner Standards	Result
	*	
Standards Room air conditioners	66.1% increase in COP (FY 1997 vs FY 2004)	67.8%
Refrigerators	30.5% decrease in kWh/annum (FY 1998 vs FY 2004)	55.2%
TV receivers	16.4% decrease in kWh/annum (FY 1997 vs FY 2003)	25.7%
Computers	83.0% decrease in kWh/annum (FY 1997 vs FY 2005)	99.1%
Fluorescent lights	16.6% increase in lumen/W (FY 1997 vs FY 2005)	78.0%

Source: ECCJ (2008). FY: fiscal year

* **Estimated improvement of weighted average energy**

efficiency of all categories within each product group

Figure 2.1 shows the effects of the program on the efficiency of air conditioners sold in Japan during the first seven years of the program.

The blue dotted line shows when the Top Runner target was set (1998), with the blue circle at the top showing the target level of efficiency. Air conditioners at the top of the market improve gradually, but air conditioners at the bottom end of the market don't improve much at all. However, during 2003 the efficiency of air conditioners at the lower end of the market improves dramatically as producers work to reach targets by the 2004 deadline.

Australia

In April 2009, as a first step to improve the energy efficiency of residential and commercial buildings across Australia, the Council of Australian Governments (COAG) agreed to the introduction of key measures through the National Strategy on Energy Efficiency (NSEE). In brief, COAG increased energy efficiency provisions for building by:

1. An increase to a six star energy rating, or equivalent, for new residential buildings
2. A significant increase in the energy efficiency requirements for all new commercial buildings
3. Phase in of mandatory disclosure of building energy efficiency

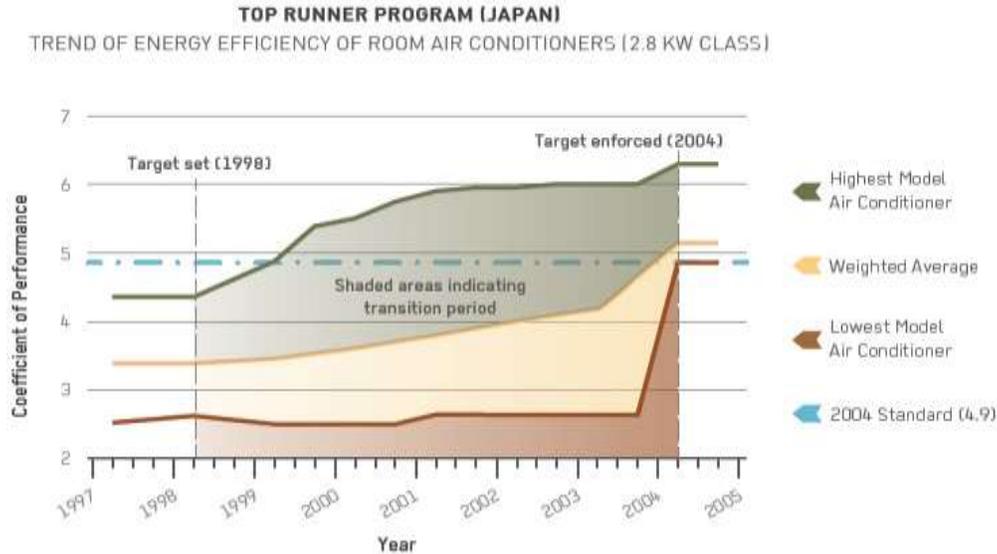


FIGURE 2.1 Trend of energy efficiency of room air conditioners (2.8 kW class)

The provisions for increased energy efficiency requirements were introduced in the 2010 version of the Building Code of Australia (BCA, now part of the National Construction Code) and enacted in State and Territory legislation from 1st of May, 2010¹⁶.

In July 2009, COAG agreed to the final measures for the NSEE, which is designed to substantially improve the levels of energy efficiency across the Australian economy. A major section of the NSEE is devoted to improving the energy efficiency of Australia's building stock. Measure 3.1.1 of the NSEE sets out the key elements of the outcomes-based national building energy standard-setting, assessment and rating framework ('the Framework') that jurisdictions have committed to developing.

The Framework has three key components:

1. Providing a pathway, implemented primarily through the Building Code of Australia (BCA), for increasing the stringency of the minimum performance requirements for new buildings and renovations;
2. Providing consistent, accurate and understandable methodologies for assessing and for publicly communicating the energy efficiency (and other sustainability elements over time) of new and existing buildings
3. Enhancing governance arrangements for building energy assessments, ratings and standards setting.

These COAG initiatives, operating in parallel with other interventions at different levels of government, are aimed at addressing other barriers through innovation. In total, there are around fifty individual measures aimed at improving sustainability in the built environment which are contained in the National Strategy on Energy Efficiency or delivered by the Australian Government. Separate state, territory and local government measures add to this figure.

Despite this proliferation of measures, planned or in place, barriers to action remain and further opportunities to encourage energy efficiency in buildings exist.

In particular, the lack of a building emissions reduction target over time, or a zero energy building target akin to those set by other countries to frame the implementation of these measures, will result in Australia falling behind the rest of the world in terms of the performance of its building stock. The long-awaited mandatory disclosure of energy performance for residential premises is currently on the back burner.

Source: <http://decarboni.se/publications/zero-carbon-australia-buildings-plan/2-energy-building-regulations-standards-and-policies>