



AFFILIATED
INSULATION
INDUSTRY
COALITION

Thermal Performance for an Energy Efficient Home

THERMAL PERFORMANCE MATTERS

Millions of Australian homes are inefficient, as many were built before mandatory energy performance requirements. These homes often suffer from poor thermal performance.

Insulation acts as a barrier to heat flow, keeping heat inside during winter and outside during summer. This makes insulation and airtightness **foundational energy efficiency measures** of any home or building.

THERMAL PERFORMANCE AND ENERGY EFFICIENCY

Energy savings and emissions reduction: Well insulated homes reduce heating and cooling needs, lowering energy use and greenhouse gas emissions.

Grid support: Efficient use of reverse-cycle air conditioners can help match energy supply and demand by pre-heating and pre-cooling homes in a renewably powered energy system. Managing peak demand is especially critical during the winter where space heating is a large contributor to both gas and electricity demand.ⁱ

Double dividend: Pairing high performing thermal building shells with efficient heating and cooling reduces both energy waste and the size of infrastructure needed to maintain comfortable homes. This pairing can also help householders to maximise the benefits of rooftop solar.

REDUCING DEMAND ON THE ENERGY SYSTEM

Good quality, well installed insulation, when deployed at scale, significantly **reduces demands on energy systems**, particularly during peak periods. It does this in several ways.

Residential energy demand is often misaligned with low-cost renewable energy supply, making improved thermal performance crucial for **reducing infrastructure requirements** such as energy storage. Improved thermal performance can help to **prevent over investment** in oversized appliances and batteries and reduce the grid pressures during peak demand.

It can also help households to **maximise rooftop solar benefits**, while reducing the pressure they place on the grid.

With efficient insulation, rooftop solar energy maintains indoor temperatures more effectively, **reducing reliance on grid power during low solar production periods**. This supports lower energy costs for households and enhances **grid stability**.

LESSONS FROM WORLD LEADERS

European Union (EU): The EU prioritises energy efficiency in decision-making processes concerning or impacting energy systems. Guided by the *Energy Efficiency First* principle, it aims to ensure only the energy really needed is produced, avoid investments in stranded assets and reduce and manage energy demand in a cost-effective way.ⁱⁱ

Before expanding energy generation, transmission, or distribution infrastructure, efficiency measures are adopted to lower energy demand. This reduces emissions, minimises the need for extensive energy infrastructure, and ensures energy is used effectively. Insulation fits this principle, as a building's thermal envelope directly reduces the energy needed to maintain comfortable temperatures. Combined with good performing windows, shading, window coverings, and draught proofing, insulation in walls, ceilings, and floors minimises heat loss in winter and heat gain in summer.

Ireland: Aligned with the Energy Efficiency First principle favoured in the EU, Irish national retrofit programs prioritise thermal performance before upgrading appliances or installing solar and batteries. This ensures long term efficiency and resilience.

New York: The NYS Clean Heat Program integrates building envelope improvements with heat pump installations. The Comfort Home program provides 'heat-pump-ready' services, such as insulation upgrades,ⁱⁱⁱ recognising the relationship between thermal performance and heat pump readiness.

THERMAL PERFORMANCE IS FOUNDATIONAL TO OUR ENERGY FUTURE

Thermal performance upgrades are the cornerstone of effective energy efficiency retrofits.

Prioritising these upgrades is essential as Australia transitions to a clean energy system driven by renewables and electrifies its built environment. Improving thermal performance can:

- ✓ Improve energy efficiency and reduce home energy bills.
- ✓ Support renewables integration and decarbonisation.
- ✓ Reduce the cost of infrastructure upgrades at both the household and system level and help to maximise household benefit from rooftop solar.

Thermal performance can help Australia unlock energy efficient homes, lower emissions, and a more resilient energy system.

ⁱ ACEEE, [Building electrification: programs and best practices](#), 2022, p. 34.

ⁱⁱ European Commission, [Energy Efficiency First principle](#).

ⁱⁱⁱ New York State Energy Research and Development Authority et al., [NYS Clean Heat: Statewide Heat Pump Program Implementation Plan](#), Version 6, 2023, p.60-61.