Australian Government Free Insulation Program

What is free insulation?

Firstly there is no such thing as "FREE INSULATION" even if the price is $0,
because there is the **environmental price**.

When we make financial decisions, we think of payback period. e.g $100,000 investment at 20%pa (simple interest) results in a debt for 5 years, thereafter there is a benefit of $20,000 per year.

Similarly, the world needs to think of payback periods with environmental investment. e.g. 100,000 GJ investment at 20%pa (simple interest) results in a debt for 5 years, thereafter there is a benefit of 20,000 GJ per year.

This is particularly relevant to the government's very popular home insulation rebate scheme. In particular, the scheme is only applicable to older houses that have no insulation, but because they are old, they may be demolished before the energy involved in the manufacture of the insulation is recovered by energy savings! (Furthermore, almost all insulation is non-recyclable and unfriendly.)

With the "Free insulation" of many older homes—to the total opposite of the intent (the reduction of greenhouse warming)—the embodied energy in the manufacture of insulation will never be recovered! This is particularly so for glasswool, polyester wool, and expanded polystyrene. Fortunately, **cellulose*** and **reflective foil insulations*** have low embodied energy with fast embodied energy payback.

INSULATION TYPES RATED BY EMBODIED ENERGY FOR PERFORMANCE

INSULATION	Density kg/m3	Embodied Energy MJ/kg	Conductivity k at 23°C W/(m·K)	Thickness for R2 mm	Surface density for R2 kg/sqm	Embodied Energy for R2 MJ/sqm	Embodied Energy for R4 MJ/sqm
*RFL heat flow down:	919	56.8	n.a.	0.2	0.18	10.4	10.4
Cellulose insulation:	29	3.3	0.0378	75.6	2.19	7.2	14.5
Sheep's Wool insulation:	10	14.8	0.0572	114.4	1.14	16.9	33.9
*RFL heat flow wall:	919	56.8	n.a.	0.4	0.37	20.9	41.8
*RFL heat flow up:	919	56.8	n.a.	0.6	0.55	31.3	62.7
Glasswool insulation:	18	30.3	0.0367	73.4	1.32	40.0	80.1
Polyester wool:	10	53.7	0.0562	112.4	1.12	60.4	120.7
SL Grade Polystyrene:	13.5	117.0	0.0407	81.4	1.10	128.6	257.1

Notes:

a) Embodied energy varies with place of manufacture, process of manufacture, transport, etc.
b) The values given are a consolidation from many sources. e.g. ATLA Newsletter Issue 7, 4/11/98
c) Air space insulation resistance calculated per AS/NZS 4859.1:2002/Amdt 1 2006 &/or ISO 6946:2007
d) ***RFL** = double-sided bright Reflective Foil Laminate (aluminium and cardboard). Here, R is the added value from splitting one unventilated air space into multiple parallel reflective air spaces.
   Heat flow down (roof, summer):-
      Added R2 created by dividing one 78mm air gap into 2 x 39mm reflective air gaps. (One foil)
      Added R4 created by dividing one 274mm air gap into 2 x 137mm reflective air gaps. (One foil)
   Heat flow horizontal (wall):-
      Added R2 created by dividing one 63mm air gap into 3 x 21mm reflective air gaps. (Two foils)
      Added R4 created by dividing one 125mm air gap into 5 x 25mm reflective air gaps. (Four foils)
   Heat flow up (roof, winter):-
      Added R2 created by dividing one 148mm air gap into 4 x 37mm reflective air gaps. (Three foils)
      Added R4 created by dividing one 364mm air gap into 7 x 52mm reflective air gaps. (Six foils)
      ("Thickness for R2" is the total thickness of multiple layers of RFL)
e) RFL products incorporating plastic have higher embodied energy/sqm than the cases calculated above. Likewise, reflective bubble materials have higher embodied energy/sqm than RFL as they contain plastic.
f) The above Cellulose insulation is recycled waste paper with fire retardant added.

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As has been long known, more is not necessarily better. With insulation this is because of the diminishing benefit of extra thermal resistance. (It is the initial insulation that makes greatest savings.)

For new homes, high R may be justified, but for older homes which will be demolished sooner, the optimum insulation is less. Ensure your insulation choice is environmentally wise.

*Note: to ensure optimum benefit from insulation, refer the industry associations' guidelines:
e.g. For cellulose insulation, refer www.acima.asn.au
For reflective foil insulation, refer www.afia.com.au

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