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Residential and Commercial Energy RIS Public Comment
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**Residential Energy RIS Public Comment from the Tropical Green Building Network.**

The Network's charter is to identify, develop and action projects that will have a measurable impact on the uptake of sustainable building practices in Far North Queensland. To achieve this, builders, construction service professionals, building material manufacturers, retailers, government representatives, industry and community associations and other interested stakeholders are invited to work together. The Network members have had the opportunity of considering the review of the Australian Building Codes for 2010. In preparation for a response to the Regulatory Impact Statement the Tropical Green Building Network and the Centre for Excellence in Tropical Design in Townsville hosted a 'live link up' session at the James Cook University Campus's in the respective cities on the 15th September 2009. The session focused on the Thermal Simulation Software BERS Pro and AccuRate exploring the limits of the software and other issues that have a regulatory impact on sustainable building practices.

## Introduction

Building Codes Australia has been directed by COAG to deliver 6 Star energy performance compliance in the 2010 codes. The Network in principal supports the move to increase the star rating but does not support the use of the Thermal Performance Simulation Software delivering the star ratings until such time as the software is indiscriminate in the rating that it provides for naturally ventilated design and tropical design. Until the software can achieve that requirement, TGBN maintains that the Star Rating requirement should not move higher than the current 5 Stars.

It is reported that across Australia where a climate and design allows the successful reliance on natural ventilation and passive design to cool buildings, the star rating produces a bias against and not in favour of a building that is designed to consume

less energy in this way. Generally it is reported that the software works well in parts of Australia that has mechanical heating loads and also a combination of heating and cooling loads although the downfall is in areas where the software deals primarily with cooling loads.

The Thermal Performance Simulation Software also known as AccuRate produces a rating of 1 to 10, the higher the star the more energy efficient. When in regulatory or star rating mode, the software assumes the use of mechanical heating and cooling to produce a star rating. Where a building design has solutions so that mechanical heating and cooling are not required, the software star rating will not take this into account and assumes an energy use. The software can be used in a 'free run' or non-regulatory mode to model no mechanical ventilation although the outcome cannot be used to produce a star rating and meet regulatory requirements.

There are other deficiencies in the Thermal Performance Simulation Software reported in the House Energy Rating Industry Reference Group Discussion Paper (May 2008) produced by the Northern Territory Government Department of Planning and Infrastructure. There are concerns regarding how well house energy rating software assesses the energy performance of residential buildings in the tropics that has delayed the acceptance of the use of the software in the Northern Territory. Much of the analysis and findings are also applicable to tropical North Queensland.

**Summary**

Regulatory impact includes deficiencies and limits in the Thermal Performance Simulation Software that causes discrimination on a number of levels. The discrimination adversely affects the primary outcome to reduce energy use in buildings in parts of Australia including Tropical North Queensland.

Public perception is distorted where a building that relies on mechanical heating and cooling can achieve a higher star rating than a building that does not. Ramifications include designers and builders seeking a high star rating perpetuating design that relies on mechanical ventilation to maintain occupant comfort. The software that is purported to be used as a design tool does not function to assist star rating naturally ventilated design. The vernacular architectural design in regional Australia, in particular the tropics that features naturally ventilated buildings may potentially be denigrated. The 'peer review' process that may be a forced path for compliance will incur costs, time and risk to the building process. The applications of credits through State regulation such as the credit in Queensland of half a star and a full star for outdoor living areas that have a ceiling fan does not duly compensate the discrimination.

The Tropical Green Building Network considers that the limits of the software in the regulatory star rating mode produces deficiencies and requires ongoing research and development regarding how the software rates buildings in the tropics, particularly in areas such as:

- natural ventilation and mechanical ventilation assumptions.
- raised and suspended floors.
- insulation types and their application.
- the validation of predicted roof and room ventilation rates.

- comfort ratings and separate day time and night time performance indicators.

It is considered imperative that the software is indiscriminate before it is a 'deemed to satisfy' provision for building code compliance.

Passive design reducing the reliance of costly energy consuming mechanical ventilation has environmental and economic benefits and requires the support of Building Codes Australia to meet the COAG principles of reducing energy use.

The Regulatory Impact Statement fails to calculate the current and future costs the proposed regulation inflicts by impeding the construction of passively designed building in parts of Australia. The resources of the Tropical Green Building Network do not allow a comprehensive exploration of the costs. We rely on key industry stakeholders and government to evaluate impacts of the deficiencies that we have noted in this response.

The Tropical Green Building Network supports initiatives that develop tropical expertise with the view of exporting expertise to other tropical developing countries that are embracing sustainable building practices.

## The Importance of Air Movement and Ventilation

In part 3.2.1 'Factors affecting internal air movement of an Evaluation of AccuRate simulations of various design strategies to improve house thermal performance in Darwin and Alice Springs', prepared by Tony Isaacs Consulting Pty Ltd for the Northern Territory Department of Planning and Infrastructure it is explained that air movement allows people to tolerate higher temperatures and humidity's without discomfort. Houses which promote better air movement through windows and other openings will be able to reduce the amount of time where air conditioning is needed to provide comfort. In addition, ceiling fan simulation is available in the AccuRate software that can be used to artificially provide air movement and so make conditions comfortable at higher temperatures. The way in which AccuRate models this air movement is based on research undertaken by Dr. Steven Szokolay, one of Australia's leading experts in the thermal performance of tropical housing. This comfort effect due to air movement is allowed for in the calculation of comfort in AccuRate and it affects the way it activates air conditioning. AccuRate checks at each hour whether temperatures could be made comfortable simply by opening windows. It considers comfortable conditions to be no more than the neutral temperature plus 2.5 degrees, that is, when the occupants start to feel some discomfort. If the room can be made more comfortable by opening windows no air conditioning is used. If windows are opened in 'free-running' (non-conditioned) mode AccuRate assumes they will be left open for a minimum of 3 hours to reflect the fact that real occupants will not go through the assessment of comfort as rigorously as a computer model. AccuRate will also turn on air conditioning if the air is too humid, generally at around 50% Relative Humidity. If air movement is provided by opening windows this is relaxed to 90% on the advice of Dr. Szokolay. If AccuRate is correctly predicting internal wind speed this comfort effect should substantially reduce cooling loads in well ventilated houses.

We understand that an area of improvement in the software is the data that may be included on Wind speed and air movement as a factor for increasing comfort. As the

software has limits in this area, the simulation of naturally ventilated and passive design is also limited and producing deficiencies and discriminations. Professor Richard Aynsley has developed data in this area and the uptake of the data in AccuRate may alleviate the limits.

## Regulatory Impacts caused by Thermal Performance Software Deficiencies

### Thermal Performance Simulation Software based compliance

The Cost Benefit Analysis studies presented by The Centre for International Economics as part of the Consultation Regulation Impact Statement reports a survey of HIA members where a Brisbane study of new residential construction found 60 per cent of new residential constructions opting for simulation compliance. The Tropical Green Building Network has many members in North Queensland reporting that they do not use the software for vernacular architecture due to its failings and report using the 'deemed to satisfy' prescriptive method for building certification purposes.

### Distorted Public Perception

Star ratings are an indicator that allows a consumer to compare one house against another. Public perception is distorted where a building that relies on mechanical heating and cooling can achieve a higher star rating than a building that does not. The Housing Industry Association recently held their annual housing awards in Far North Queensland and a house entered into the awards claimed a 7 star rating although it was reliant on air-conditioning for comfort and a house that did not rely on air-conditioning only achieved a 5 star rating. The advertising and marketing of new homes is including promotion of the star rating supplied by the thermal performance simulation software and public awareness of the rating is increasing. Building values are potentially supported by the star rating and where the star rating discriminates due to the inherent failings of the software, building values can be also adversely affected and this may represent an area of potential litigation unless the use of star ratings in marketing material is cautioned appropriately.

Designers and builders perpetuating design that relies on mechanical ventilation to maintain occupant comfort in a bid to achieve a high star rating will have a negative ramification. The inherent deficiencies of the software may directly impact on the opportunity cost of designing naturally ventilated buildings that uses less energy.

With the introduction of mandatory disclosure including greater public awareness on the horizon, the inherent deficiencies of thermal performance simulation software will be more critical in parts of Australia where the software discriminates against design that does not rely on mechanical ventilation.

The Tropical Green Building Network gives consideration to a control of the issuing of star ratings in Climate Zone 1 where a star rating may only be used to produce a confirmation that the design reaches the regulatory requirement of 6 stars in 2010 and the issue of star ratings above 6 stars should not be allowable until such time as the software is indiscriminate.

The Tropical Green Building Network gives consideration to a control of the issuing of star ratings in Climate Zone 1, and the issue of star ratings above 5 stars should not be allowable until such time as the software is indiscriminate.

**Thermal Performance Simulation Software – A Design Tool?**

We support the use of the software as a design tool where it can result in lower costs, more flexible design solutions to the minimum energy efficiency requirements than taking the 'Deemed To Satisfy' approach.

Unfortunately, the use of the software as a design tool where the software can simulate design changes to maximise thermal performance does not work for a passive design unless it is in the 'free run' mode. Maximising thermal performance may include providing design features that reduces openings and insulates the building envelope in a bid to maximise the performance of mechanical ventilation. Good tropical design that relies on large openings, cross ventilation. Light colours and building membranes that breathe and have low thermal mass are penalised in the regulatory star rating mode.

**Raised Floors**

'Far North Queensland is one of six key 'hot spots' in Australia where the impacts of climate change are likely to be significant, with potentially large losses to the built environment from flooding, sea-level rise and storm surges associated with tropical cyclones (IPCC, 2007)'. This statement is from a document ' Positive Change - Climate Change Risks and Opportunities for the Cairns Region, Climate Change Adaptation Action Plan released by the Cairns Regional Council (31 July 2009)

The document further states that a barrier to climate change adaptation is the array of technical guidelines, standards and codes that underpin the planning and design of infrastructure that do not currently incorporate climate change considerations because they are based on historic climate information, or only provide limited guidance. This is equally the case for information and guidance materials that underpin planning, design and development assessment. Many of these have statutory standing and until these are amended to incorporate climate change considerations, the delivery of climate change sensitive infrastructure and developments will be impeded.

Flooding from increased storm surge heights, resulting from rising sea-levels and more intense tropical cyclones, and flash flooding from higher intensity rainfall were identified as significant risks to Cairns and extends to the Far North Coastal region. A limit of the software is the treatment of raised suspended floors where floors that are on the ground achieve a higher star rating to houses that are raised. We understand that this occurs as the ground temperature stays constant and generally cool and in a suspended floor the air temperature around it varies. The software models the airspace when it doesn't flow and we understand that this is where the problem lies. We further acknowledge that the software and deemed to satisfy provisions includes insulating timber floors and we understand that this increases the cooling load requirements in the software.

Members of the Tropical Green Building Network have discussed the moisture trapping effects of building materials and systems in highly humid climates and wrapping building envelopes in insulation products potentially causes rotting and mould increasing chances of structural inadequacy, maintenance costs and shortening the life of a building.

The impacts of the proposed regulation for underfloor insulation in Climate Zone 1 requires further consideration as aspects of this proposed regulation reveals that in tropical parts of Australia the practice of underfloor insulation and trapping humid air is counter productive to energy efficiency measures. The Tropical Green Building Network does not support the inclusion of this proposed regulation.

**The House Energy Rating Industry Reference Group Discussion Paper (May 2008):**

The paper was produced by the Northern Territory Government Department of Planning and Infrastructure and it has raised the following concerns that are applicable to Tropical Australia.

Night time performance of masonry buildings compared to light weight buildings:
Possible lack of sensitivity of star ratings to the night time performance of tropical housing and the impact of this on the relative ratings of masonry buildings compared to light weight buildings. This issue may be addressed through the release of a new version of AccuRate which will incorporate new cooling settings which differentiate between night time and day time comfort levels.

Rooms that do not seal:
Rooms that do not seal (eg. flyscreen only, unglazed openings) can not be rated using AccuRate in its current configuration. The adequacy of the Deemed To Satisfy BCA energy efficiency requirements to deal with such houses is being considered by the Building Advisory Committee.

The NT House Energy Rating Industry Reference Groups preliminary recommendation:
The NT House Energy Rating Industry Reference Groups preliminary recommendation is that “industry education occurs to clarify how rooms that do not seal should be assessed with respect to BCA minimum energy efficiency requirements.”

“It is strongly preferred that new cooling settings which differentiate between waking and sleeping comfort are incorporated into a new commercially released version of Accurate prior to it being used for Building Code of Australia energy efficiency assessments in the Northern Territory. “The HER IRG considers that there is a need for ongoing research and development regarding how AccuRate rates residential buildings in the tropics, particularly in areas such as comfort ratings, separate day time and night time performance indicators and the validation of predicted roof and room ventilation rates. It is considered imperative that this work progress parallel to the introduction of house energy rating in the Northern Territory.”

## Further Regulation Impacts.

### Proposed Insulation Requirements

A proposal for the 2010 BCA is to regulate the location of insulation where 50% of insulation is required to be located above a ceiling of a pitched roof to cater for air-leaks in roofs. This has been considered and not supported by the Tropical Green Building Network.

We refer to a letter attached by Professor Dick Aynsley that addresses the importance of restricting daytime heat gains without restricting night time heat losses and that condensation is a serious issue that is caused by the use of bulk insulation products in warm humid climates. Professor Aynsley recognises the importance of thermal reflective insulation in warm coastal regions of Australia. Where thermal reflective insulation product may be successfully applied to meet 'R' value requirements at roof level, there should be no further requirement to locate insulation above the ceiling. The placement of insulation at a ceiling level is counter productive in buildings that do not rely on mechanical cooling and by enforcing ceiling insulation at this location the proposed regulation is discriminating against naturally ventilated passively designed buildings in tropical Australia.

It is recommended that their should be no proposed regulation to locate 50% of insulation above a ceiling for a pitched roof and this recommendation may apply to climate Zones 1 and 2.

### The Issue of Credits through State Regulation

The applications of credits through State regulation such as the credit in Queensland of half a star and a full star for outdoor living areas that have a ceiling fan does not duly compensate the discrimination. There is also some suggestion that a credit may apply for suspended floors in 2010. The credits are a short term fix to help passive design achieve building approval. Poor design causing inefficient energy use can also benefit from the credits. The software's purpose of delivering a means for energy performance ratings is eroded by credit giving.

The Tropical Green Building Network recognises that the Queensland State Government and Building Codes Queensland may adopt credits through the Queensland Development Code and the Network may support credits while Building Codes Australia and associated government departments are clearly actioning and pursuing improvements addressing the deficiency and limits of the Thermal Performance Simulation Software. The use of credits to offset the deficiencies in the Software should be a short term measure only and ceased as soon as practical.

### Peer review

Where buildings do not achieve a star rating that complies with the energy performance regulations in Queensland, an alternative assessment pathway to achieve compliance can be the 'expert judgement' or 'peer review' process. The assessment is conducted by a specialist (the expert) in building design and energy efficiency. It is preferred that

applicants have already used the star rating process or deemed to satisfy provisions and failed to achieve compliance. Experts will provide applicants with a completed peer review assessment report used to gain building approval.
Applicants can choose to apply to one of eight experts in Queensland. The application must include a description of the building and its energy efficient design features, the method of assessment used including all qualifying relevant factors eg. Comparative references and a justification of how the building's design features will perform in compliance with the minimum energy efficiency performance requirements under the BCA.

The fee for the assessment is set by the expert and agreed with the applicant. The expert has 20 business days where no variations are required to provide the assessment. Should the expert require design amendments further fees are paid for re-assessment of amendments and there are no known time limits for the review. The applicant must communicate to their clients any amendments to the design that cause cost changes and changes to the appearance of the building.

There appears to be no published criterion or terms of reference other than promise of an explanation when the process is completed; the result could be a pass or fail. Criterion alluded to are not available for consideration in the normal software based assessment, or available for critique or consideration prior to the 'Peer Review' process. The designer is further affected by loss of access to their preferred assessors, including the loss of control regarding intellectual property distribution.

The peer review process may incur costs, time, risk, uncertainty and inconsistency to the process of building to reduce dependence on mechanical temperature control.

The Tropical Green Building Network may only support the 'Peer Review' process after the deficiencies and limitations of the Thermal Performance Simulation Software that cause discrimination and penalties to naturally ventilated and passive design are removed.

**Climate Zone Anomalies**

Climate Zone anomalies are causing issues with the star rating performance of buildings on the Atherton Tablelands in North Queensland and this requires require rectification. There are other parts of Australia that would also benefit from the software having additional climate files. The AccuRate software requires a change to the protocol that increases the number of climate files from 69 to 80. Currently the software protocol changes are lagging behind government driven policy changes.

The Tropical Green Building Network recommends that the deficiency in the Thermal Performance Simulation Software caused by the need for additional climate files be rectified.

## Additional consideration to Photovoltaic Panels and Solar Hot Water Systems

The Tropical Green Building Network would support regulation that provides voluntary installation of Photovoltaic Panels and Solar Hot Water systems and other technology or

device that allows a measured performance of energy use reduction. As the Thermal Performance Simulation Software is primary to the BCA energy performance measures regulating buildings the measures should be taken into account through the software enabling a star rating when energy reducing devices are installed.

**Economic Impact of Proposed Regulation**

Passive design reducing the reliance of costly energy consuming mechanical ventilation has environmental and economic benefits.

The areas of deficiencies causing discrimination have associated costs and the limited resources of the Tropical Green Building Network do not allow a comprehensive exploration of the costs. We rely on key industry stakeholders and government to evaluate impacts of the deficiencies that we have noted in this response. The Regulatory Impact Statement fails to calculate the current and future costs the proposed regulation inflicts by impeding the construction of passively designed building in parts of Australia.

The changing population patterns in Australia accentuate a need to provide regulation that supports energy efficient and sustainable building practices in Northern Australia.

For the five years from June 2003 to June 2008, Queensland's average annual growth rate was 2.4% per year, making it the fastest-growing state or territory for that period. The 2007-08 growth rate was 2.3%, joining the Northern Territory as the second-fastest growing state or territory (following Western Australia). This was the slowest annual growth rate for Queensland in the five years to June 2008. (ABS SLA POPULATION CHANGE, Australia - 2007-08).

Outside of south-east Queensland, the LGA of Cairns (R) had the largest and fastest population growth in the year to June 2008, with an increase of 6,000 people (3.9%). (ABS SLA POPULATION CHANGE, Australia - 2007-08).

The following passage is an extract from a leaflet ‘Minimum energy rating for air conditioners. New sustainable housing laws’ produced recently by Building Codes Queensland, Department of Infrastructure and Planning).

*Queenslanders are increasingly installing air conditioners into their homes, with around 70 per cent of households now having at least one air conditioner. Air conditioning is contributing to increased average household energy consumption and greenhouse gas emissions, particularly when less energy efficient models are installed and used. The increasing use of air conditioners also places additional demands on community-owned electricity infrastructure which contributes to peak demand. Extreme peak demand occurs on very hot days when most households are running air conditioning at the same time. The economic costs in terms of energy consumption of air-conditioning in tropical Australia may be measured against the benefit of committing resources to providing Thermal Performance Simulation Software that supports passive design that reduces reliance on air-conditioning in the tropics.*

Building Codes that regulate the energy performance of buildings in Northern Australia are of paramount importance. As the population of the region continues to grow, the built environment will support communities that are living in part of Australia's most environmentally diverse and ecologically important regions. New technology in building materials, building systems and passive design that limits the use of energy consuming mechanical ventilation and other impediments to sustainable building that also preserves and enhances vernacular architecture in this region requires the support of Building Codes Australia to meet the COAG principles of reducing energy use.

The Tropical Green Building Network supports initiatives to develop sustainable building practises that also provide economic advantages. Effort has been put into developing tropical expertise with the view of exporting expertise to other tropical developing countries that are embracing sustainable building practices. Developing the software to provide more sensitive ratings for tropical building styles may contribute towards Australian industry earnings from this area.

**Recommendations**

- The Tropical Green Building Network considers that the limits of the software in the regulatory star rating mode produces deficiencies and requires immediate and ongoing research and development regarding how the software rates buildings in the tropics.

- It is considered imperative that the software is indiscriminate before it is a 'deemed to satisfy' provision for building code compliance.

- Until the lag between software development and aspirations for more stringent ratings can be closed the Tropical Green Building Network cannot support higher than the current 5 Star requirement.

- In relation to distorted public perception, The Tropical Green Building Network gives consideration to controlling the issuing of star ratings in Climate Zone 1 where ratings above 5 stars should not be required until such time as the software is indiscriminate.

- The impacts of the proposed regulation for underfloor insulation in Climate Zone 1 requires further consideration as it is counter productive to energy efficiency measures for naturally ventilated buildings. The Tropical Green Building Network does not support the inclusion of this proposed regulation.

- It is recommended that their should be no proposed regulation to locate 50% of insulation above a ceiling for a pitched roof and this recommendation may apply to climate Zones 1 and 2.

- The Tropical Green Building Network recommends that the deficiency in the Thermal Performance Simulation Software caused by the need for additional climate files be rectified.

- The Tropical Green Building Network recognises that the Queensland State Government and Building Codes Queensland may adopt credits and the use of credits to offset the deficiencies in the Software should be a short term measure only and ceased as soon as practical.

- The 'Peer Review' process in Queensland should not be supported until after the deficiencies and limitations of the Thermal Performance Simulation Software that cause discrimination and penalties to naturally ventilated and passive design are removed.

**Conclusion**

In a drive to bring about a nationally consistent minimum standard for the energy performance of buildings to allow comparative star rating indicators, thermal performance simulation software that is destined to provide the consistency has limits in the regulation mode and inherent deficiencies that are discriminating against passive design, the very design type that it should be supporting. Resource allocation and action to improve the Thermal Performance Simulation Software is an imperative.

Regulation that enforces the 'wrapping' of buildings in membranes and materials that restricts natural air-flow in tropical Australia should be abandoned. Where a building has been designed for natural air-flow, regulation should support this design and not erode the intent of the design.

Enforced practices that erode the intent of passive design reducing energy use are counter productive and increases environmental and economic costs. The Regulatory Impact Statement must consider the economic impact of the increased energy use enforceable by the proposed 2010 Building Codes of passively designed buildings in particular those situated in Tropical Australia.

**Dear Sir or Madam,**

I am concerned that the current scare campaign following the unfortunate death of an insulation installer will discourage Queenslanders from using reflective foil insulation, which has unique advantages for insulating houses in warm climates.

Most Australians live in houses along the coast where climate extremes are moderated by proximity to the ocean. In the milder climatic regions where there is negligible need for house heating, reflective air spaces in roofs offer an ideal means of controlling the dominant summer heat gain through roofs. Ask any house insulation supplier in Brisbane and they will tell you they sell insulation to householders mainly during the hotter months.

**Why Reflective Insulation should be Used in Warm Coastal Regions**
Horizontal reflective air spaces are the only type of insulation which offers:

- A high resistance to heat flow downward through the roof from solar heat gain
- A low resistance to heat flow upward through the roof allowing rapid heat loss in the evening

No other insulation material has these properties.

In effect horizontal reflective air spaces in roofs act as one-way valves for summer heat flow restricting daytime heat gain while facilitating night time heat loss. This is important because indoor discomfort in the evening which inhibits sleep can be very debilitating.

Use of reflective air spaces in roofs combined with natural ventilation and ceiling fans in houses along much of the Australian coast can provide from 8 to 10 star energy efficiency ratings on the energy rating scales. These would be amongst the most energy efficient houses in the developed world.

Another serious issue is condensation, a frequent problem with bulk insulations in tropical and sub-tropical environments, both in air conditioned and naturally ventilated buildings. The damage has been well documented in a number of studies, notably by architects Macks and Robinson at the Gove Aluminium township at Weipa, where extensive structural damage was observed.

A critical issue is the appropriate location and installation of effective vapour barriers. This is not a simple problem: the vapour barrier should be on the warm side of the insulation, but the warm side of a wall or roof depends on the time of day, the use of the building and which orientation of a wall or roof surface.

If foil insulation is used, even if there is some condensation during cooling, this will evaporate when the foil warms up and no serious damage is done. Evaporation is more difficult when moisture penetrates bulk insulation because, as the outer layer begins to dry, the resistance to heat transfer increases and prevents the warming and drying of the damp insulation at the centre of the material. The moisture progressively builds up and eventually rots out the timber.

In roofs in coastal Queensland, a suitable vapour barrier would generally be required to be installed above bulk insulation. The most effective vapour barrier is, of course, reflective foil laminate. In this case the bulk insulation detracts from the whole system. You would be better off with just the foil!

Foil insulation has been used for over fifty years in Australia, always applied with staples. The solution to any safety concerns is not to ban foil – the best available form of insulation for our climate - but rather to ensure that installers are trained in procedures that ensure safety, particularly with so many inexperienced installers entering the field.

It is possible to eliminate most dangers with foil insulation. The serious fire safety issues that occur with bulk insulation are less easily managed. Short of a very thorough examination of every job by a trained electrician there will be fires caused by bulk insulation surrounding older undersized wiring.

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