

# The Ultimate Fire-Proof |Eco-Cool House

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I began my project with an investigation into what methods are being used to protect homes during bush fires, and how people work around the problems of loss of power and water when they hit. A big problem I found, was the decision people have to either stay and defend or evacuate.

It would need to be an ultimate fire protection strategy that would allow people to set up a protection system and leave their home. This would guarantee their safety and significantly increase the chances that their homes will survive!

With temperatures gradually increasing as a result of global warming, and the need to keep energy consumption down, I also investigated what methods are currently being used to cool homes as naturally as possible.

### **I came up with the “Ultimate Fire-Proof | Eco-Cool House”.**

It is a system that can either be built into a house, or most of the parts be added to an existing home.

I developed a way we could use fire rated panels to create a fireproof shell around a house. These panels can be pulled out from a storage space that sits just under the roof area (similar to an old-style panel lift garage door). It would slide out from the storage area, fold down and lock at the bottom to create a fire proof barrier for up to 1 ½ hours burn time. Damaged panels can easily be replaced after a fire has come through.

The panels can also act as a complete wrap around awning for the home, perfect to help keep temperatures down throughout the hottest parts of the day during summer, and still be able to enjoy the beautiful bush views!

A light coloured exterior on the awnings helps reflect the heat away from the house. There are also spray on products that can be applied to existing roofs to help deflect heat as well.

Windows would all be double glazed. People can therefore still have good size windows to enjoy the bush views while being protected from the penetrating heat of the summer.

A sprinkler system would be constructed using fire proof pipes and fittings, and would spray out flat from the top area of the roof, starting at the hips, ridges and valleys and traveling down to cover the entire roof area. This would protect from burning embers settling during a fire. The big difference here is that most similar fire protection sprinklers only spray water around and out from the roof area, which goes to waste. I've come up with a system that sprays flat at the top across the entire roof line, and runs down into the gutters to be collected by the downpipes which then connects to an underground water storage tank. The water is then pumped back up to repeat the process and recycle it to avoid needing town water, which the fire brigade turn off to use during bush fires.

This sprinkler system is also a very effective way of continuously cooling the roof and roof space during the hot summer months. The idea would be to run it during the hottest parts of the day (10:00am – 3:00pm) along with the existing air conditioner (using added ducts inside the roof space) to help keep temperatures down. It would then transfer to natural airflow using vents and Whirlybirds as temperatures cool down. This way, we can minimize the heat build-up in a home and keep the home cooler without adding any additional energy consuming products.

The Whirly birds and vents also have Ember Guard mesh installed on the inside, in case power supply is out and cannot be closed remotely when fires hit. This mesh will block any burning embers from getting inside the roof space and potentially lighting up the house.

To save on energy costs, the sprinkler system would run using a pump powered by solar panels. When fires hit, an underground generator would take over as a more reliable power source, in case solar panels are damaged from the fire and halt the system. The house can then be left with the sprinkler system running continuously to protect from ember attack during bushfires. All gutters would be covered by ember mesh to avoid any debris entering the system.

I also wanted to create an added layer of protection, especially for houses that are very close to the bush. It would act as a fire shield wall, made of a special stainless steel woven mesh (designed for bushfire protection on homes). I chose the stainless-steel bushfire mesh for the wall to allow some airflow to pass through and prevent an overload of pressure that could potentially topple the structure over. By linking separate panels, it compacts well, making it easy to store and bring out to erect for two people. This material is also quite light and easy to handle.

The pole supports would have to be thick enough and well anchored into the soil. They would ideally be steel reinforced concrete or similar (such as with the modern-day telegraph or flag poles) to allow for the pressure of high winds.

When not used, the posts remain in place and can be coloured to blend in with the environment. Metal pullies at the top and bottom would support a chain loop where the panels can be drawn up (similar to a flag) and attached to the chain as it is raised. The mesh protects against heat, flame and embers. It simply acts as added barrier against flame and embers travelling towards the house (especially those very close to trees and bush).

In conclusion, my invention does quite a few things to improve fire protection and help cool a home in a more energy efficient way, as well as allowing people to take the best option during a bushfire, and that is to **evacuate!**

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