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ing into the state, as our imports are mostly capital-based (vehicles, machinery,

and productivity would start to affect competitiveness for our products in world

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Hobart invention may hold the solution to global warming

HOBART inventor John Harrison, whose company TecEco is a member of the TCCI, has just won the latest episode of the ABC's *New Inventors* broadcast across Australia.

Mr Harrison won with his company's product, eco-cement, which is a blend of reactive magnesium oxide (reactive magnesia) with conventional hydraulic cements like Portland cement.

The invention is of global importance because eco-cements set by absorbing carbon dioxide out of the air and could potentially turn the problem of global warming around.

"Whereas conventional cements like Portland cements are based on calcium, eco-cements are made by blending calcium and magnesium minerals," Mr Harrison said.

"There are two main ingredients – a hydraulic cement such as Portland cement and magnesia.

"Optionally a wide variety of wastes can also be used for their physical property rather than chemical composition, solving recycling problems.

"As magnesium is the eighth most abundant element in the earth's crust there are no supply issues."

> **"The idea that we can use carbon to make our cities greener than the forests we replaced is exciting ...**

Mr Harrison hopes to make his magnesium oxide using a kiln he has also invented which combines heating and grinding for efficiency, has no emissions and is powered by solar or waste energy.

Magnesite, which is a compound of magnesium that is abundantly available in nature (and may also soon become available from power stations after it has been used to store carbon dioxide from smoke stacks) is heated in a kiln invented by Mr Harrison to approximately 650 deg C to produce reactive magnesium oxide.

Because the kiln runs at low temperatures, free energy such as from wind or solar cells or alternatively waste heat can be used.

As a result, less fossil fuels are burned. More importantly, the carbon dioxide gases driven off from the magnesite in the kiln are captured for alternative use or safe disposal.

"The reactive magnesia powder from the kiln is blended with a pre-determined, but flexible amount of Portland cement and aggregates to make an eco-cement which in porous materials absorbs carbon dioxide forming stronger fibrous mineral carbonates that bond together aggregates many of which can be wastes," Mr Harrison said.

"Eco-cement can handle more industrial waste than other hydraulic cements because it is less alkaline, minimising the solubility of heavy metals, and because it does not react with wastes jeopardising the strength of the concrete.

"On the other hand Portland cement concretes can't use huge amounts of waste because they are too alkaline and reactive leading to delayed and disruptive reactions.

John Harrison with an eco-cement brick.

"Eco-Cement only carbonates in porous materials such as concrete blocks, mortars, porous pavement etc, in which it sets and hardens by absorbing the carbon dioxide directly out of the air.

"The more magnesium oxide, the more carbon dioxide is absorbed.

"The rate and amount of absorption depends on what stage of setting the concrete has reached.

"As an example, typical concrete blocks are fully carbonated within a year or so.

"The idea that we can use carbon to make our cities greener than the forests we replaced is exciting and given the amount of materials that go into building cities and all the associated infrastructure this technology will go a long way towards solving our emissions and waste problems."

For more information on TecEco and eco-cement go to the website at ***www.tececo.com***

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