

As *Natural Capitalism* states, 'The cost-versus-savings graph illustrates what is common sense.' It should cost more to get bigger energy and resource savings and efficiencies right.

The key is to analyse the whole system both in terms of resource usage and costs, to identify potential synergies and unforeseen savings. This can be achieved, for example, through closing loops on resource flows, or finding innovative methods of integrating systems.

Whilst it can seem counter-intuitive, design engineering that optimises the costs across the whole system, can often 'tunnel through the cost barrier.'

It is therefore in our interests that more engineers are trained in these win-win opportunities, and that bold strides are taken by those controlling and leading current industrial processes. Leading by example will encourage wider industry to knuckle down. 🌐

Charlie Hargroves, Mike Smith and James Moody

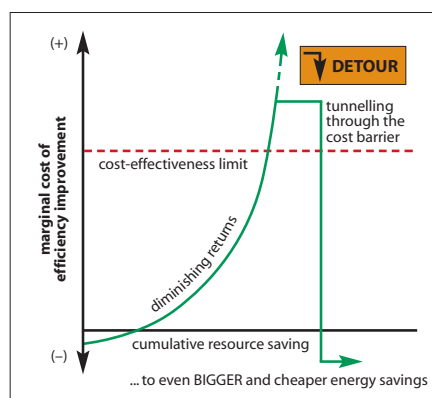
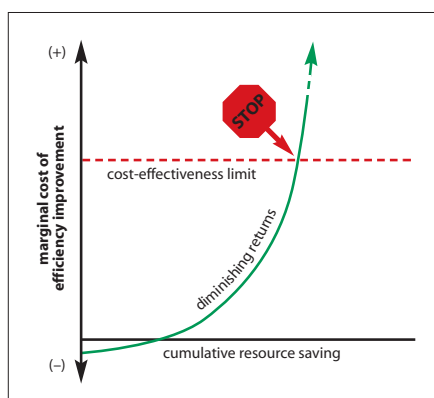
Charlie Hargroves, Mike Smith and James Moody are from *The Natural Edge Project* – a volunteer-led initiative to raise awareness and action on national sustainability priorities through partnerships across organisations. <http://www.naturaledgeproject.net>

A guide to whole systems

The Rocky Mountain Institute is committed to improving engineering design education and has initiated a project to develop a Whole Systems 'Design Integration Guide'. The guide will detail a range of case studies drawn from many engineering disciplines. With calculations and benefits analysis, it will be peer reviewed by the peak engineering, academic and corporate bodies.

To assist in the development and dissemination of the project, a Whole Systems Engineering Alliance will be initiated with the Australian team from The Natural Edge Project, supported by CSIRO and Engineers Australia, to work with RMI to assist in the development of the Design Guide and in the formation of the Alliance to enable it to reach a global audience of engineers.

Far left: normally, finding value by seeking resource savings through efficiency changes has a cost limit. Left: with a whole-systems view, diminishing returns and up-front costs can be 'tunnelled through' by hidden value in larger resource and productivity savings for the same or less cost.



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Ancient wisdom in a new city

THIS PICTURE shows a scale model of the 'new' city of Ningbo in China which Australian consultancy Hassell recently won an international competition to design with Hyder engineers.

Ningbo was actually built in AD700, and Hassell's innovative, modern city plan compliments the ancient centre by incorporating its time-tested sustainable practices.

Principal at Hassell, Robin Edmond said 'we secured the commission because we didn't try to re-invent the wheel. Instead, we combined twenty-first century technology with traditional Chinese agricultural practices in conserving soil, resources and water.'

'For example, Ningbo is made

'We combined twenty-first century technology with traditional Chinese agricultural practices in conserving soil, resources and water'

up of a myriad of canals because it is prone to flooding. We decided to continue the tradition of using canals for flood protection, drainage and transport but enhance their capacity for other purposes such as water supply and treatment for recycling in a modern sustainable way,' Mr Edmond said.

'We estimate the 'new' Ningbo, which will house 350 000 people on 4000 ha of land, will use less than half the energy of a contemporary



Hassell

western city through high efficiency wind generators, solar power, and methane 'eggs' in all housing, and public transport corridors to minimise private vehicle use.

'Given China's high urban growth rate, Ningbo will be a vital benchmark for the planning, design and construction of future Chinese cities.'