EcoBlocks

EcoBlocks aim to be mass replicable, economically viable, and nearly entirely resource self-sufficient communities. EcoBlocks are an alternative way to meet the huge and growing demand for urban space in China, currently filled by inefficient and wasteful apartment blocks. The EcoBlock concept is still a only a concept, but it's creator Harrison Fraker , former dean of the UC Berkeley School of Architecture, has worked with Arup to prove the concept and is in talks with various Chinese cities to build an EcoBlock. The slide show below is Professor Fraker's full introduction to the concept, and I will focus on a few key slides in my post today.

**Harrison Fraker- EcoBlocks**

Whole Systems Design

Professor Fraker has done a masterful job of using whole systems thinking to design the EcoBlock. As the schematic below shows, the EcoBlock considers the many interactions between the energy, water, and waste systems. The anaerobic digester is a prime example: water used to flush the toilets goes into the septic tank as waste, which then goes through the digester where it is turned into energy. This is an interesting example of "waste equals food" , a concept Will McDonough and

**Michael Bruangart**

champion in

Cradle to Cradle

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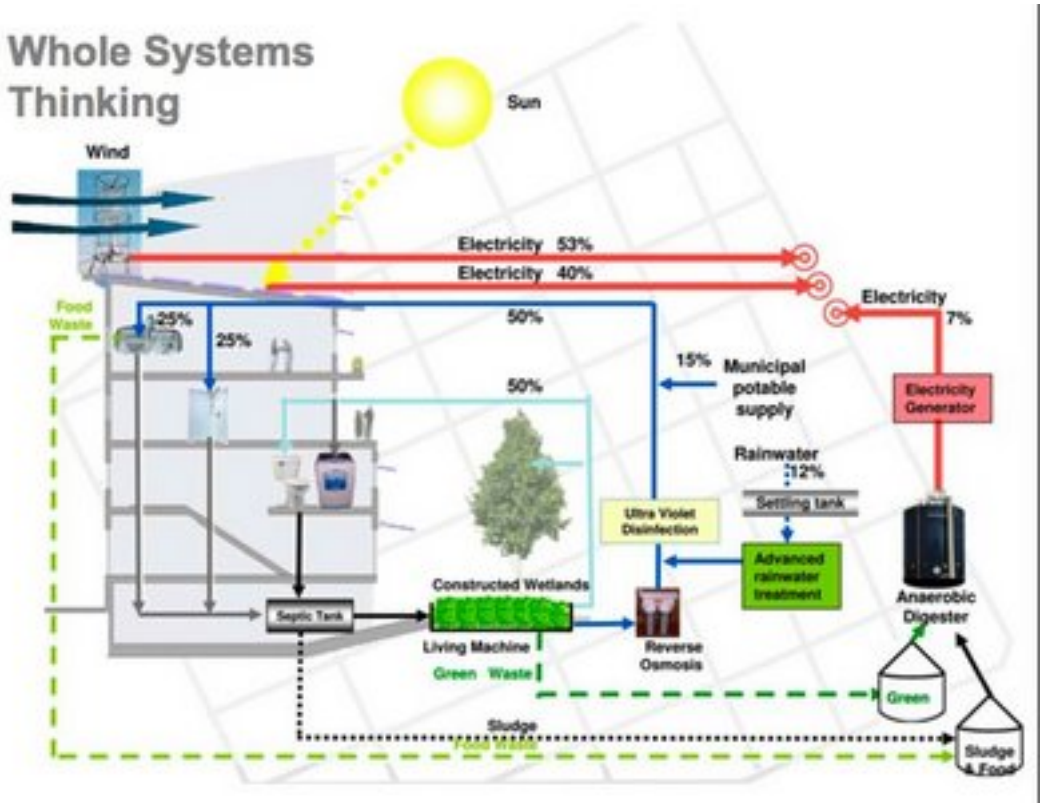
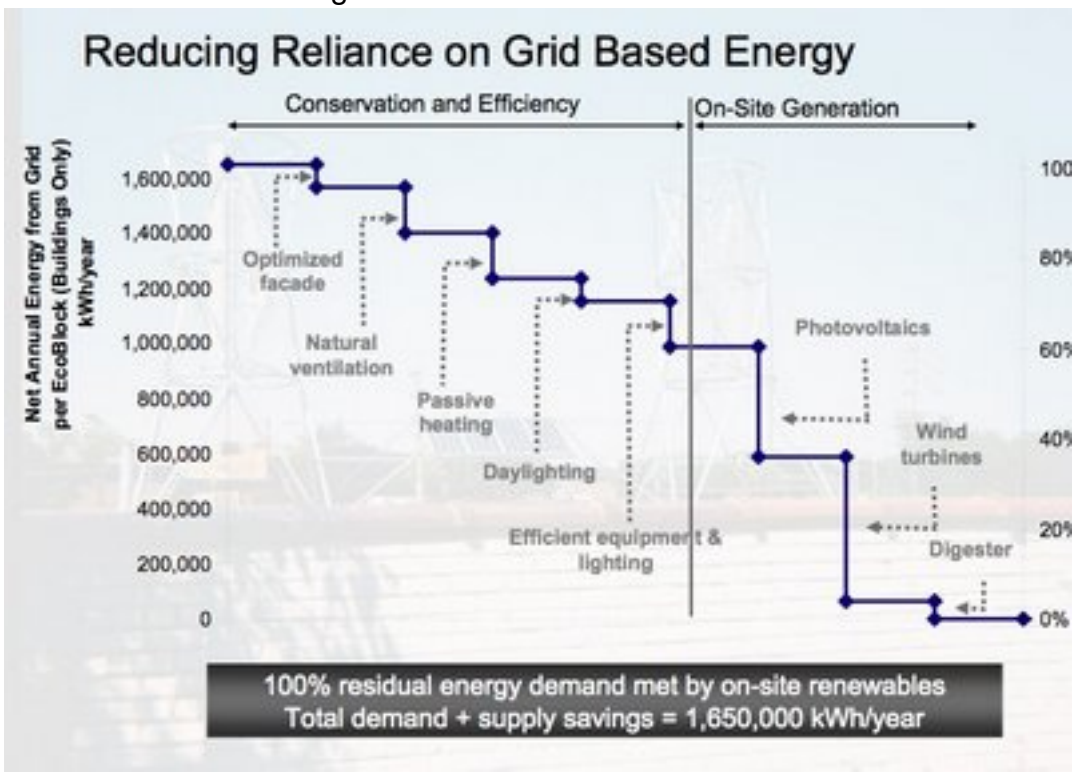
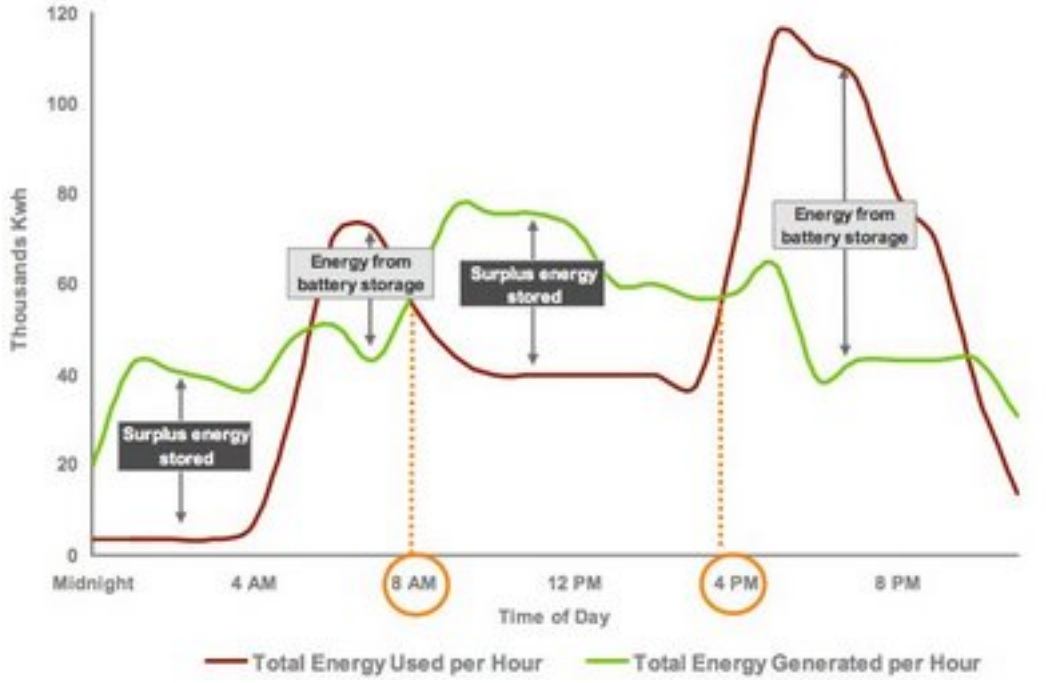



The upshot of this whole systems thinking is a development that is almost entirely self-sufficient from a resource perspective. As the chart below shows, thanks to significant energy efficiency measures and on-site generation, EcoBlocks is a net-zero energy community and doesn't need

to be connected to the grid.

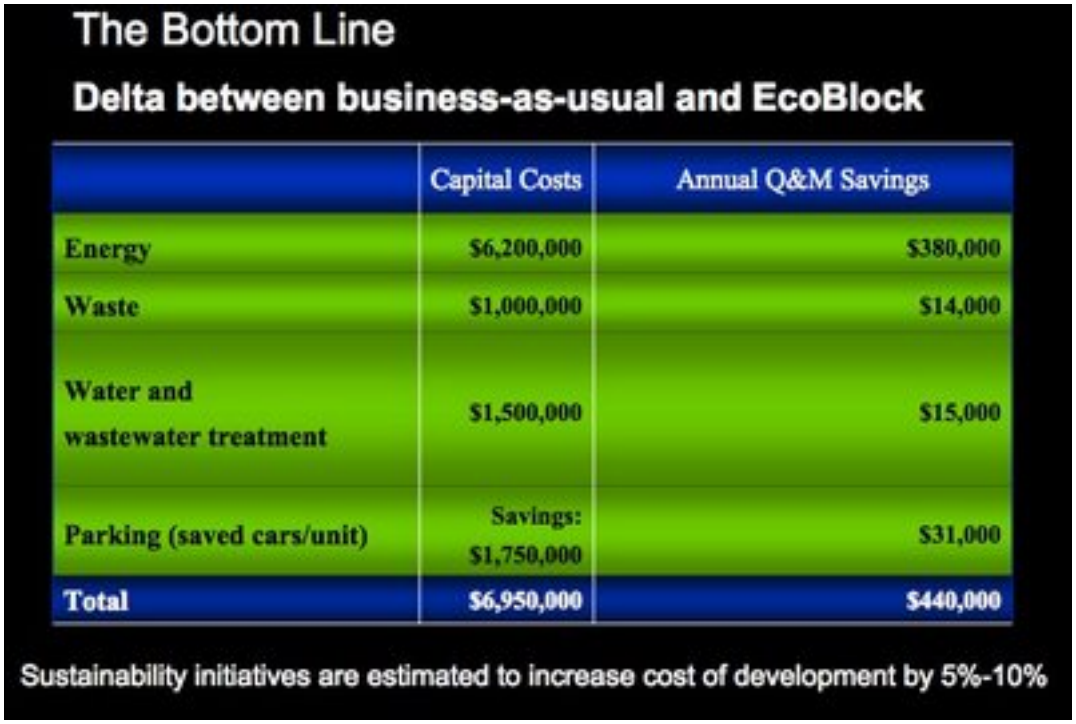



As a result of water conservation measures and extensive on-site treatment, EcoBlocks are entirely self sufficient from a water perspective. The EcoBlock also tries to close the waste loop. All sludge, food waste, and green waste is sent to the digester where it is used for energy generation. Unfortunately, the waste loop is not completely closed, and about 17% of the complex's waste (primarily non-recyclable solid waste) will have to be sent to the landfill.

The EcoBlock's community design aims to create a pedestrian-friendly environment, maximizing the room for social interaction and minimizing emissions related to automobiles.

First costs
But of course, the primary barrier keeping EcoBlocks from moving from concept to reality is cost, or rather, the distribution of costs and benefits among different players.



The Bottom Line

**Delta between business-as-usual and EcoBlock**

| | Capital Costs | Annual Q&M Savings |
|---|---|---|
| Energy | $6,200,000 | $380,000 |
| Waste | $1,000,000 | $14,000 |
| Water and wastewater treatment | $1,500,000 | $15,000 |
| Parking (saved cars/unit) | Savings: $1,750,000 | $31,000 |
| Total | $6,950,000 | $440,000 |

Sustainability initiatives are estimated to increase cost of development by 5%-10%

The EcoBlock's additional sustainability initiatives are expected to increase the upfront costs by 5-10% over a standard development. On it's face, that seems pretty remarkable: a completely net-zero energy and water and nearly net-zero waste community for just 5-10% more than a standard resource-inefficient development.

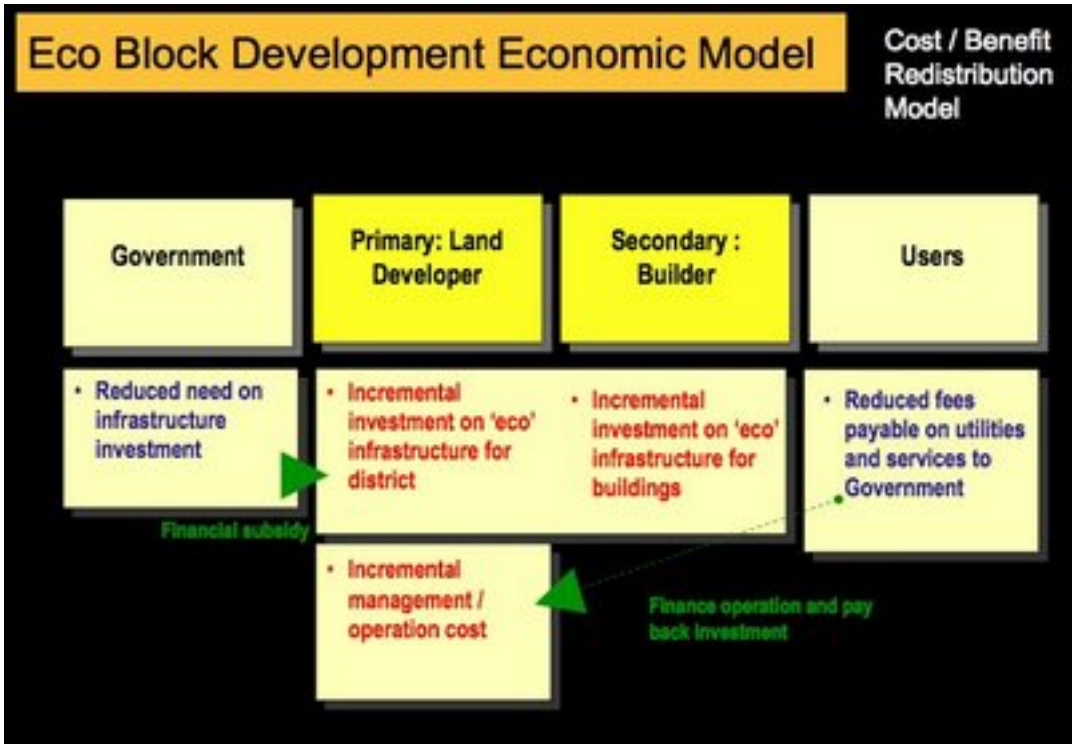
But an extra $7 million in upfront development capital can significantly affect the project's economics: Professor Fraker estimates that this investment will take a 10.1 year payback period. 10 years is a long time for developers anywhere, and light years in China's fast-moving development market, and is likely to be a big deterrent to Chinese developers.

But the real financial barrier with the EcoBlocks is not necessarily this cost increase per se, but rather a mismatch between costs and benefits. All the costs- solar panels, digesters, wind turbines, wastewater treament facility, etc- are borne by the developers. On the other hand, most of the benefits are enjoyed by either the tenants or the government.

The benefits that flow to the tenant are obvious: a net-zero energy and water community means no monthly electricity or water bill. Theoretically, these utility saving benefits could potentially be capitalized upfront and included in the price of the units. However, that would likely make the units prohibitively expensive for the average urban Chinese resident, limiting the usefulness and scalability of the EcoBlock model.

Most likely, government support in the form of a financial subsidy to developers will be needed to get EcoBlocks off the ground. Luckily, I think the government has a real incentive to do this. Besides the many obvious environmental benefits of this type of development, the EcoBlock could also save the government a lot of money in capital spending. Since EcoBlocks are net-zero energy and net-zero water, the government doesn't have to provide any power or water infrastructure to the community. If many communities pursued this mode of low-impact development, this could result in the reduction of an entire water treatment plant or coal-fired power plant, saving the government significant amounts of infrastructure spending. Government therefore has an economic incentive to encourage mass implementation of EcoBlock-like low-impact communities.

The chart below shows one kind of government subsidy model that Fraker envisions. Essentially, the government gives a financial subsidy to the developer, who is then incented to build a resource efficient EcoBlock development. After completion, users pay the developer a phantom "utility bill" to the developer instead of a real utility bill. Essentially, the idea is for those who get the long-term benefit (government, users) to pay the developer, the actor with the most control over the design.




The future role of government in green building
Thus far, the green real estate market in China (and the US to a lesser extent) has consisted almost entirely of Class A office buildings and luxury apartments in Tier 1 cities. Developers are willing to build green for these high-end markets because they can make more money in three primary ways: higher rents since companies will pay more for green space ; lower operating costs as a result of lower energy bills; and a
better competitive position
thanks to the green features.

But green buildings cannot just be an isolated, high-end phenomenon; in the future every building- from the cheapest hutong all the way to the most luxurious hotel- will need to be green. And for that vision to be achieved, green building payoffs can't be based on higher rents alone.

The Asia Business Council's report on green buildings showed that investing in energy efficiency is 4-6x cheaper than investing in new power plants. The problem is, this statistic takes the societal viewpoint. From the viewpoint of the average Chinese developer, sustainability is an extra cost and the benefits will be enjoyed by somebody else. Government must step in and change this economic calculus: In order for developments like the EcoBlock to be competitive and mass-replicable in the short term, the government must step in and provide financial incentives to developers.

But maybe it doesn't have to be the Chinese government. The recent Brookings Institution report on overcoming obstacles to US-China cooperation on climate change recommends that the US and China announce a major headline green initiative that "capture[s] the public's imagination". Could EcoBlocks in China- and financial incentives from the American government to build them- fit the bill? http://chinagreenbuildings.blogspot.com/2009_02_01_archive.html