Resilient Communities

Ten Things You Don't Know

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1. Why does it matter ?

- Its designed to address many related issues
  - It a system designed for today; not waiting on promises of tomorrow or stuck on yesterdays systems that hold us back.
- The building fabric is low in Embodied Energy
  - Cradle to Grave energy costs are small because locally available raw materials are used for the floor, walls and roof. The environmental costs of transport and production are not externalised, so its sustainable long term for everyone.
  - Its uses large quantities of low embodied energy materials, rather than small quantities of high embodied energy materials. So for the same embodied energy the build shell is far more efficient and insulated.
- Its cheaper and higher quality
  - Building 10 houses together allows factory automation whilst increasing quality.
- Its run on 100% renewable energy
  - In 5 years time it will be fully amortised (that means paid off).

2. Energy Micro Grids are cheaper

- Shipping container energy systems
  - A 20 ft ISO shipping container has all required renewable energy systems to run 10 house community.
  - Circulation pipes to each house included in container, where it connects to each houses build services module.
- Community owns the grid
  - Householders pay for what they use based on pro rata costs.
  - Typically no more energy bills at all after 5 years. The system is paid off fully.
  - Generates income for community by selling excess energy back onto main grid.
- Resilient & scalable
  - Each Micro Grid is connected to main grid to cover weather fluctuations.
  - System is smart and able to self diagnosis issues and maintenance requirements.
  - System can accommodate sub system changes as new technology comes along. For example generate hydrogen from Photovoltaic cells.

3. Buildings are simpler and smarter

- Intelligent Superstructure
  - Super Structure construction is simple, cheap and allows any interior wall layout.
  - Able to DIY because we remove complexity.
  - 2 days to erect with windows and passes all international codes.
- Building Services smart & simplified
  - Electrical / Plumbing / Vent system is automated, pre fabricated and passes all international codes.
  - Bolts to superstructure. 2 hours to install.
- Intelligent floor, wall and roof system
  - Single material floor, walls and roofing. Currently the building industry uses multi-material techniques that are complex, labour intensive and expensive.
  - Achieves German Passive House standards easily.
  - Able to DIY because we remove complexity.
  - 14 days to construct floor, walls and roof fully.

4. Architectural Designs are flexible

- 3D web based CAD system
  - Allows quick collaboration throughout design process.
  - Super structure allows any inner wall layouts and double height spaces.
- Factory automation linked to CAD system.
  - Super structure, Windows, Wardrobes all arrives on site to exact dimension and quantities, so no wastage.
- Integrated services core as used in commercial buildings
  - Prefabricated Kitchen, Bathroom, Laundry and all Services bolted to main super structure.
  - No wiring, plumbing or ventilation runs required.
- Material finishes are totally independent of system.
  - Exterior, interior finishes applied on site.

5. Continuous Iteration

- Systems approach allows continuous innovation cycles.
  - The House Services Automation System is continuous improved, upgraded and has new functionality added. Households are free to upgrade the software as they like.
  - The Micro-grid Automation System is iteratively improved and downloaded to the community over the internet. Energy efficiencies are improved as it learns.
  - Construction materials, techniques and system components continuously improved as part of open community participation.
- All management systems have an open API
  - Communities can change runtime parameters to match weather conditions or usage patterns.
  - Social networking allows plug-in's to be developed and shared.
- Round trip engineering
  - Building and Energy system runtime data is shared (Open Data) back into compute grid to allow analysis and improvement of construction and energy systems.

6. Open Data & Tools

- Allow experts access to the building automation data so they know what needs to get better.

Collaborative development teams

- "By researchers, for researchers"

Interoperable, open, software solutions

- Open APIs
- Published source code

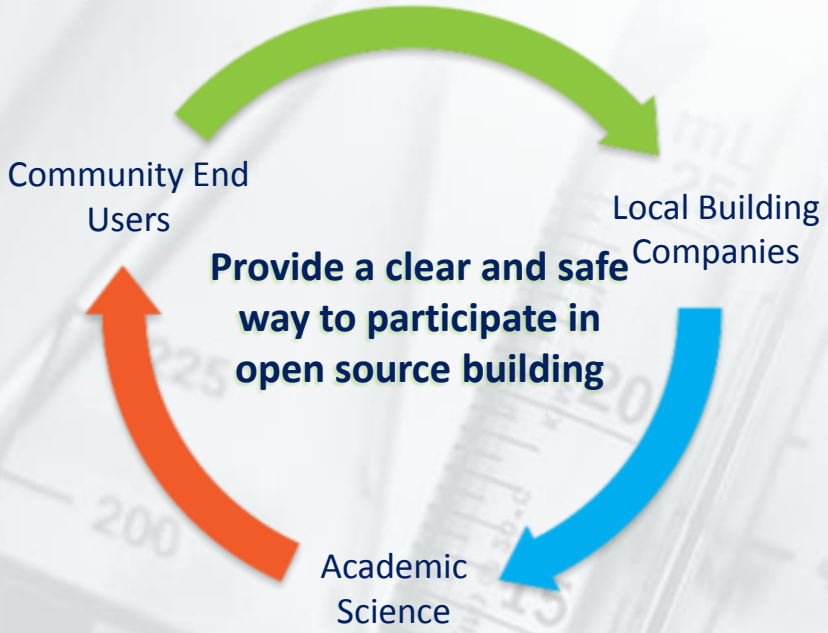
Incubation Labs by Communities

- Between communities themselves

Supporting university researchers & scientists

- Advancing the research process

7. Bringing Communities Together



- The Switzerland of IP
  - An independent, non-profit legal entity.
  - Provides open source experience and guidance, launch and community services.
  - Help community building developers commercialize projects.
  - Forge relationships and technology agnostic.

8. Resources for Engineering Professionals

- Allows collaborative development and knowledge sharing
  - List URL end points
- Access to live building systems data to analyse efficiency
  - List URL end points
- Learning
  - Wikis, videos

9. Resources for Developers and Designers

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10. E=mc2, but also Energy = Money

- Buildings account for 25% of energy usage
  - We need to make an impact here.
- Energy costs are always increasing
  - Energy is the most pure form of currency (gold backed currencies and fiat economics are an abstraction). Its energy costs that drives up the costs of everything else including:
    - ***Cost of direct energy to run buildings***
    - ***Cost of building materials based on energy used to manufacture.***
    - ***Cost of shipping materials. It averages 40% of the cost of materials in general. We need to shrink and localise supply chains.***
- Designed for obsolescence is dumb
  - Increase quality / longevity of buildings and components.
  - Increase modularity of those components to allow upgrade of parts, rather than replacement of whole.