

ORNL Buildings Crowdsourcing Website

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ORNL is DOE's Largest Science and Energy Laboratory

- \$1.4B budget
- 4,600 employees
- \$500 million invested in modernization
- 164 R&D 100 Awards (more than any other company)

- Nation's largest concentration of open source materials research
- World's most intense pulsed neutron source and a world-class research reactor

- World's most powerful open scientific computing facility
- Nation's most diverse energy portfolio
- Managing the billion-dollar U.S. ITER project



Technical Expertise and Connection to Leading Manufacturers



- Sprayable liquid flashing
- Residential and commercial construction
- New and existing buildings
- Only one-step, sprayable, water-based liquid flashing
- Up to three times faster installation than butyl tapes



2014 Highlights

Dow: Patented the sprayable liquid flashing and introduced LIQUIDARMOR™ to the US market.

- Primer-less self-adhered membrane (PSAM)
- Residential and commercial construction
- New and existing buildings
- Adheres to most construction materials without a primer
- Reduces installation time by up to 50%



2014 Highlights

3M: Partnered with ORNL to secure \$1.2M from DOE to develop and launch additional new air barrier materials, and measure energy savings due to increases in airtightness.

Supporting deployment of environmentally friendly technologies

Hillphoenix Advansor System

First HFC-free CO₂ transcritical refrigeration system to be UL listed in North America

12 US applications to date

Hillphoenix
A DOVER COMPANY

Honeywell N40 (ASHRAE designation: R-448A)

~67% global warming potential (GWP) reduction compared to R-404A

Improves system efficiency by 10%

Honeywell

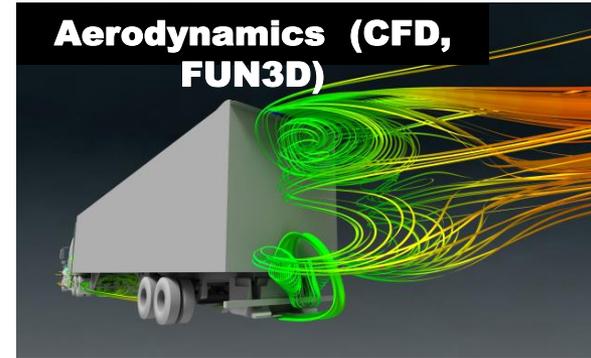
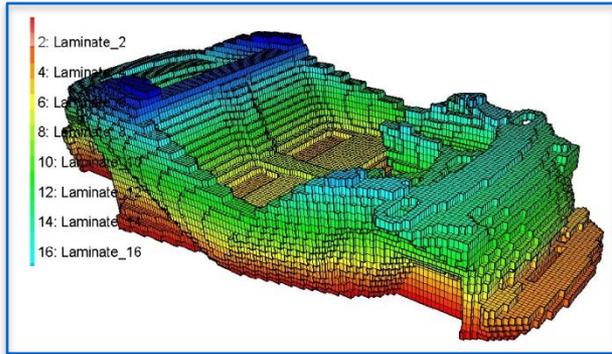
By leveraging CO₂ refrigerant systems and new refrigerant molecules, ORNL researchers mediate and minimize conventional refrigeration's environmental footprint

Lab

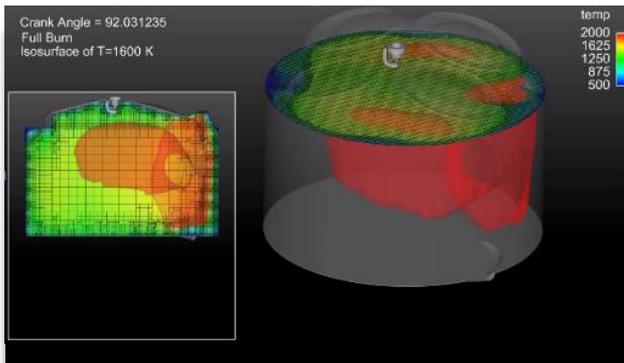
Market



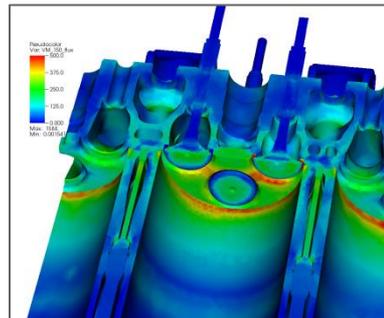
ORNL's 3-D Printing Capabilities



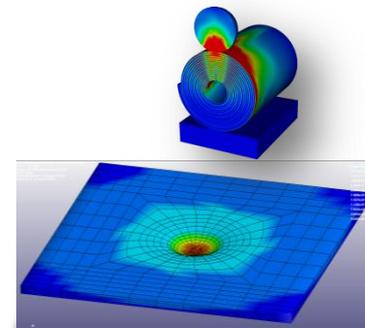
- Inspired by Virtual Vehicle idea and innovations in 3-D printing
- 3-D printed Shelby Cobra: concept to car in 6 weeks
- SmartTruck: product development time cut in half
- Leveraging HPC tools already in development with industry partners



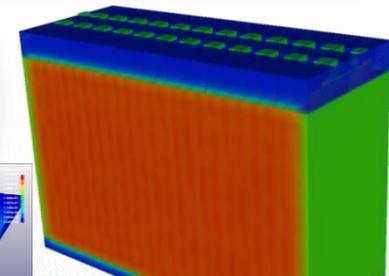
Engine Simulation (Converge)



Engine Mechanics (ANSYS Mechanics)



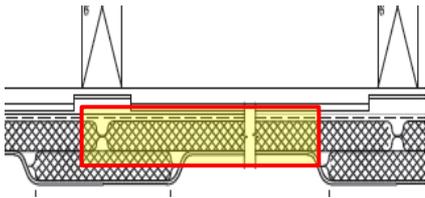
Battery Crash (LS-Dyna + CAEBAT 3D Tools)



Batteries (CAEBAT 3D Tools)

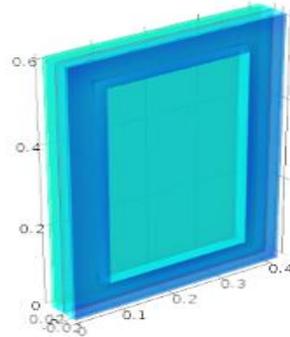
Rapid innovation in building technologies

Initial Design



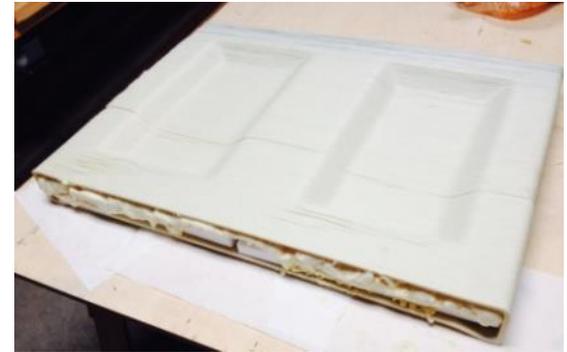
New design reduces thermal bridging

Modeled Performance



Increases thermal performance from ~R-15 to ~R-30

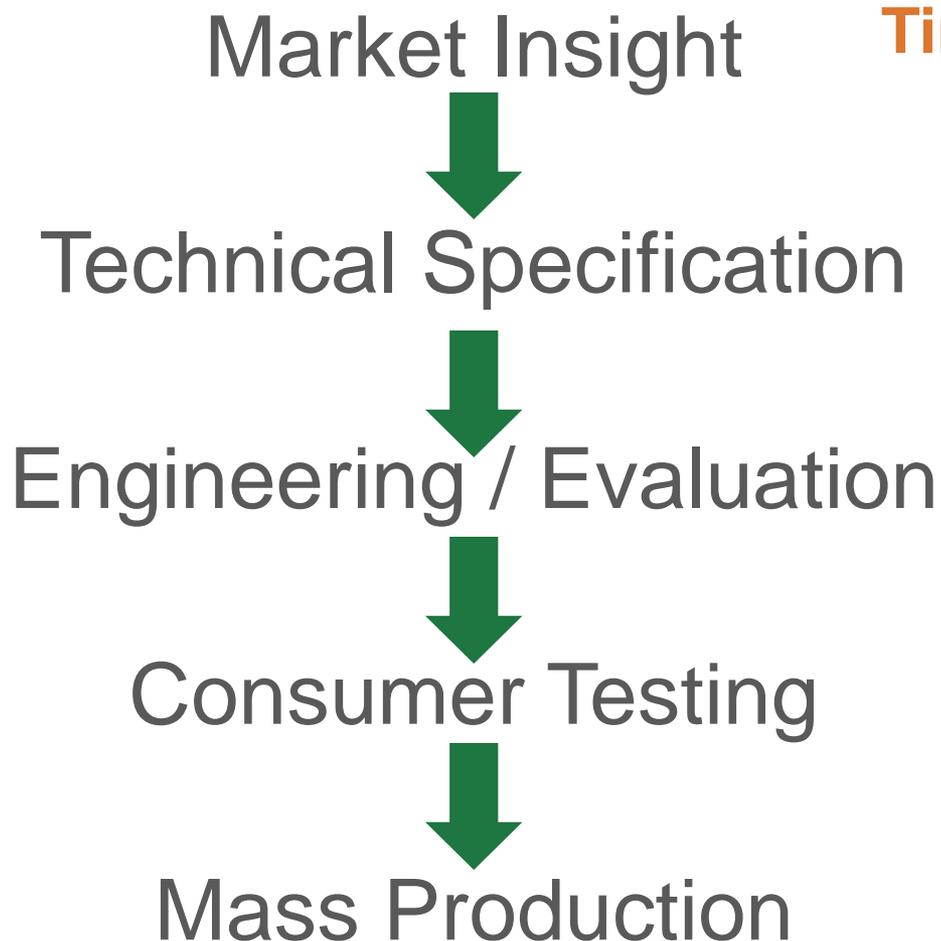
Prototype



From design to prototype FAST

Let's Put Our Ideas to Work at buildings.ideascale.com

Traditional Innovation to Market Path



Time / Money

It can take up to five years or more for a new product to enter the market and cost tens of millions of dollars

New products have a success rate of 50%

What if the cycle and cost could be significantly reduced?

Innovation Impediments

Barrier 1:

Selection Bias Relies on a Few Decision Makers

Barrier 2:

High Production Cost

Barrier 3:

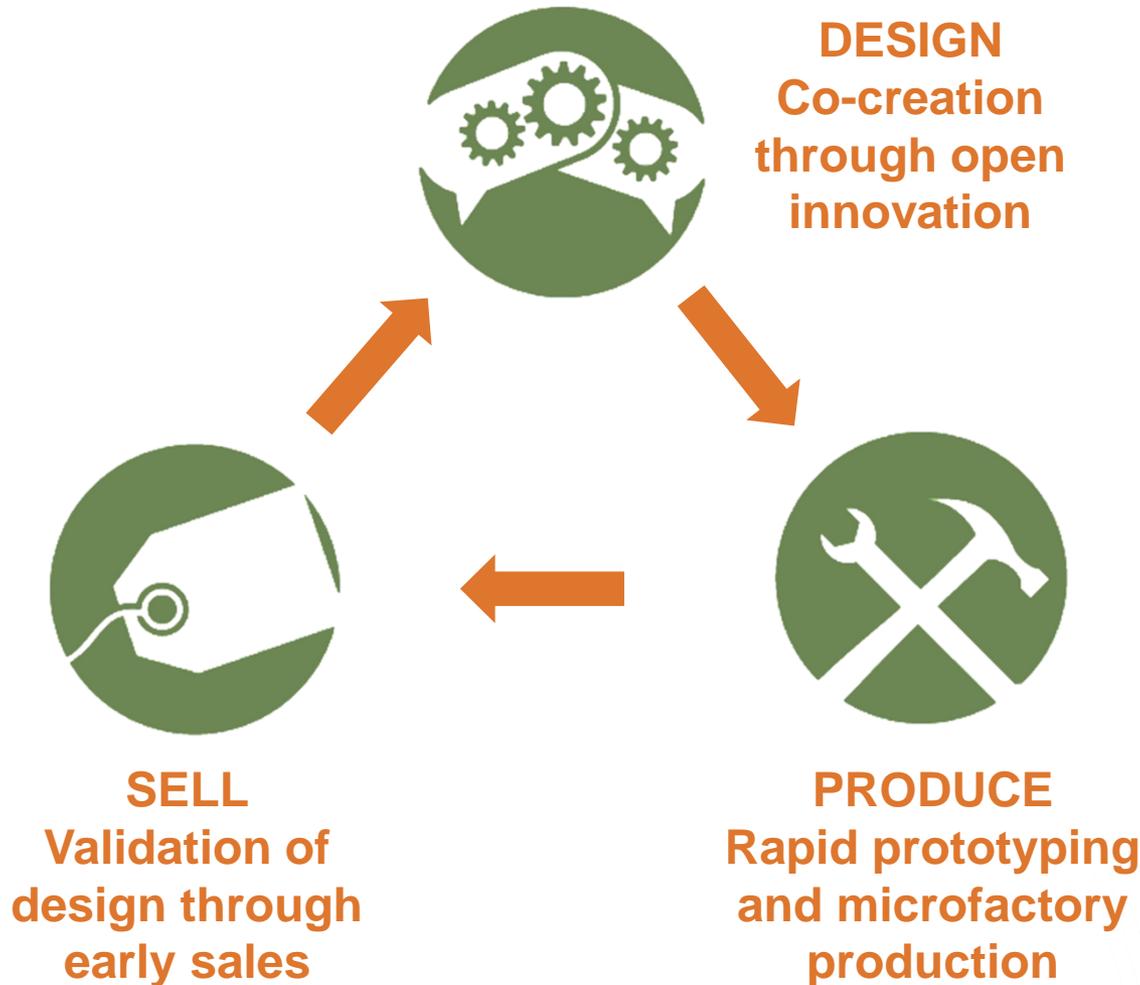
Confidentiality Inhibits Feedback until Years Later

Impacts

- Selling to management is difficult due to large investment (\$30 - \$50 M) and risk
- New product launches are discouraged
- Bias against innovation
- Lost opportunities

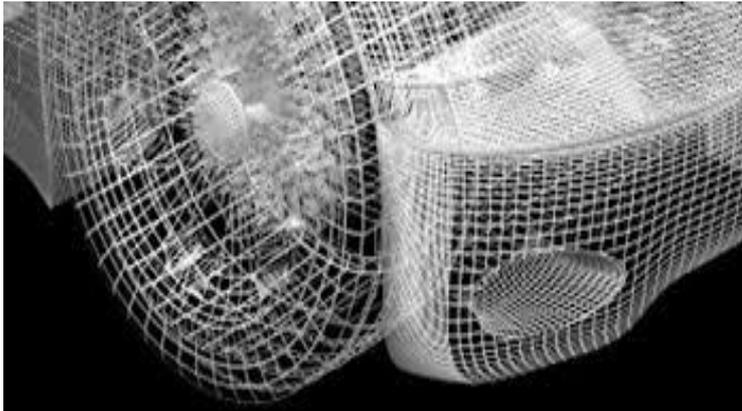
How many creative ideas never make it to market?

Rapid Innovation to Market Incubator (RIMI)



- Months to market
- Frequent and numerous product launches
- Quick consumer feedback
- Innovation is welcome
- Lower cost
- Reduced risk

RIMI in Practice

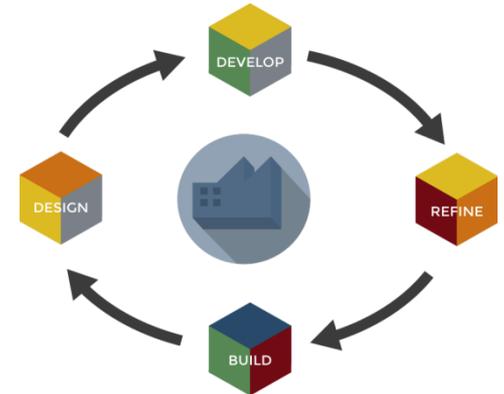


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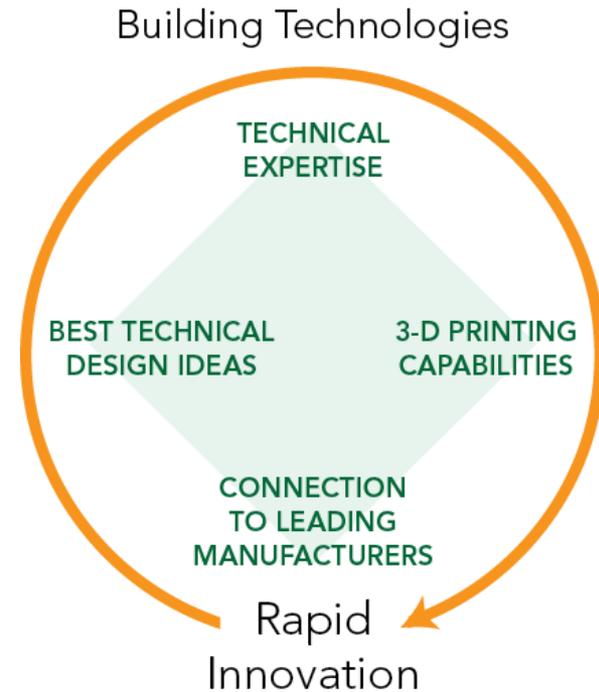
GE FirstBuild Business Model

- Ideas submitted online through FirstBuild site
- Top five ideas selected each month based on online voting
- Team comprised of GE and outside consultants down selects from top five and chooses one or two ideas for prototyping
- A single prototype is constructed at FirstBuild (GE covers all costs)
- Based on successful prototype, a plan is developed to build 20 to 30 units for sale
- Based on success of sales and feedback, GE will promote the unit to the factory for full production



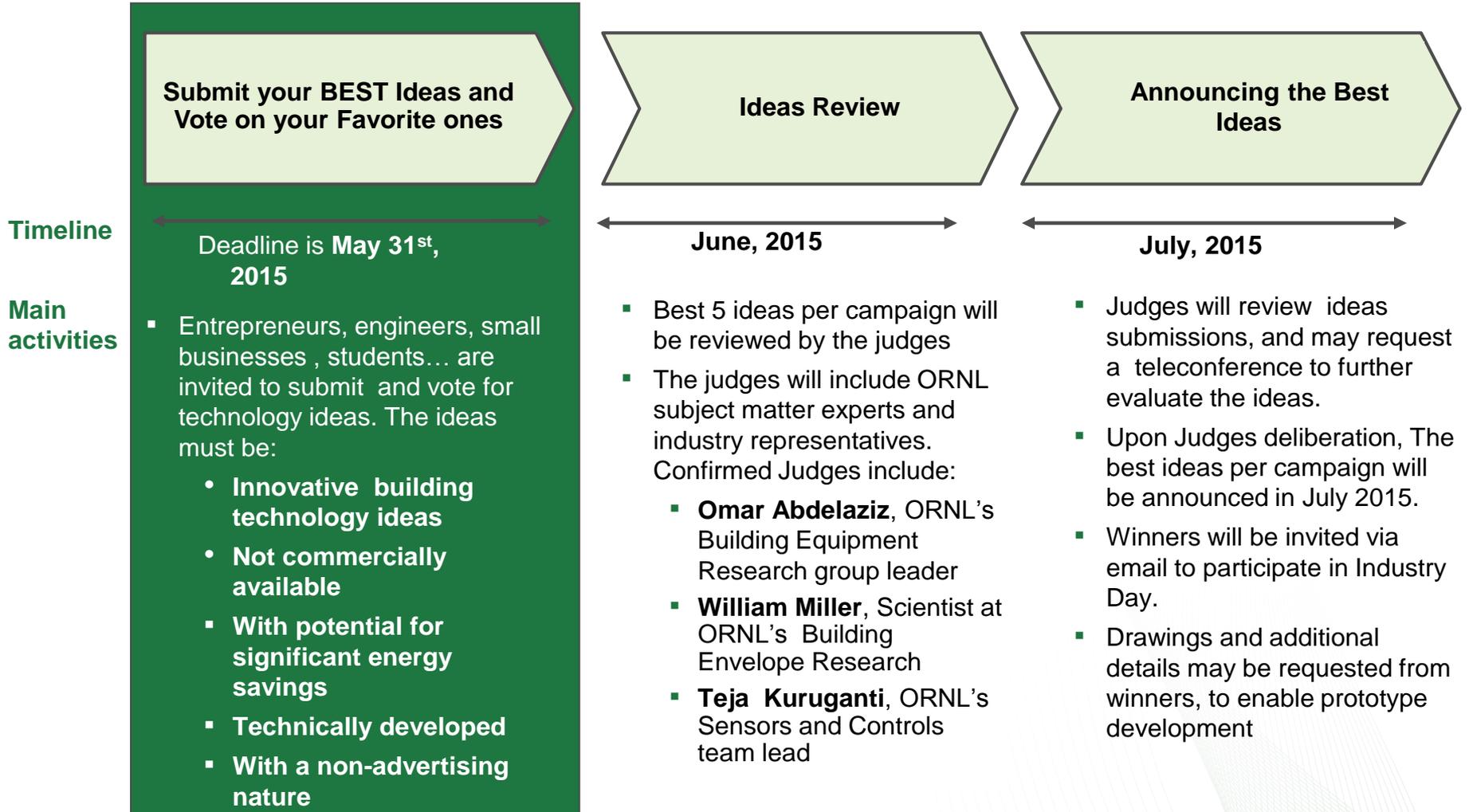
Piloting a Faster Innovative Tech 2 Market Model

- The Seed: The best ideas on new technology design collected via the ORNL crowdsourcing website
- The Linkage: Integrating the best ideas with ORNL technical building expertise, 3-D printing capabilities, and connection to leading manufacturers
- The Advancement: Opportunity to network and discuss path forward with ORNL scientists and leading manufacturers



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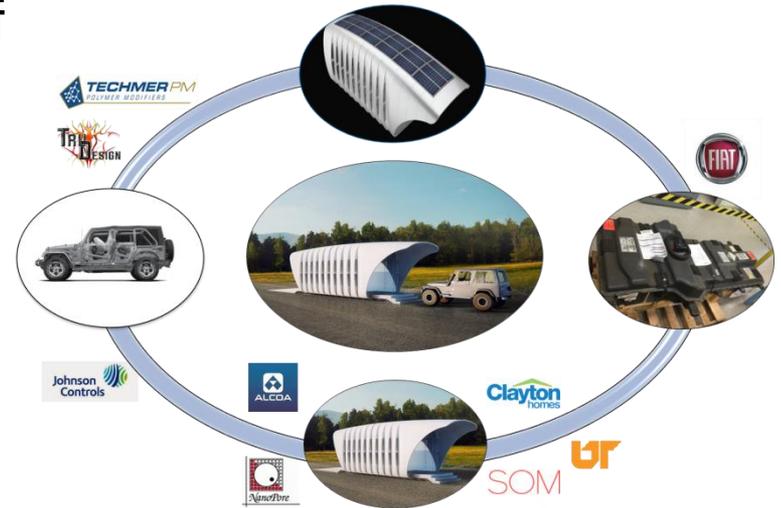
The Plan



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Recognition at Industry Day

- The best ideas will be invited to:
 - See a 3-D printed prototype of their idea
 - Present their ideas to a panel of industry experts
 - Witness extreme innovation
 - Network with ORNL Scientists and Industry to identify the potential for collaboration and funding opportunities



at Industry Day September 23-24, 2015

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ORNL's Buildings Crowdsourcing Website



- Designed to collect stakeholders input on the best buildings technology design ideas
- Users must register to submit and vote for ideas

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The Campaigns!

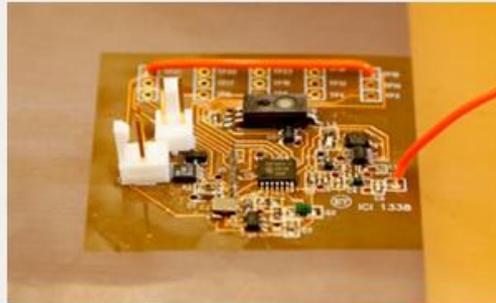
Choose a crowdsourcing campaign to get started:



EQUIPMENT & APPLIANCES

Submit ideas on designing and developing appliances and equipment for buildings.

[Submit Your Idea](#)



SENSORS & CONTROLS

Offer technical design ideas on how sensors and controls can be used to improve a building's energy efficiency.

[Submit Your Idea](#)



ENVELOPE TECHNOLOGIES

Share design ideas to improve building membranes for higher energy efficiency.

[Submit Your Idea](#)

- Examples of ideas submitted to date:
 - Active Insulating Panels
 - A Hybrid air water conditioner
 - Bluetooth energy control

Let's Put Our Ideas to Work at buildings.ideascale.com

Idea Submission Template

Submit Your Idea

*Required fields

Title*

64 characters left in Title field

The Solution:*

The Problem *

Campaign*

Tags (Optional)

Attachment (Optional)

Maximum upload size 25 MB

Submit

- Voters will decide which ideas rise to the top
- Give your idea an exciting title
- Make sure the ideas submitted are short, simple and to the point
- Attaching an image or a graphic is recommended
- No need to attach a technical document

Let's Put Our Ideas to Work at buildings.ideascale.com

Gearing up Support!

Capitalize on your network to encourage votes for your ideas

1 OF 15 NEXT IDEA ▶

SPACE CONDITIONING & APPLIANCES

Affordable Retrofit Heat Exchanger for Clothes Dryers

[E-Mail] [E-Mail Author] [Follow] [Comment] [Ban Member]

Clothes dryers "waste" an enormous amount of potential space heating. It's time to reclaim it. But the technology needed is more than the simple airflow redirect boxes (such as the DEFLECTO EX12 Heat Saver and Lint Trap) currently on the market. Humidity must be removed from the outgoing airflow by means of a condensing unit, and that moisture must be safely pumped into the waste drain.

According to a USA Today report (<http://www.usatoday.com/story/money/business/2014/06/12/clothes-dryers-energy-waste/10330629/>), "Americans spend \$9 billion annually to operate inefficient dryers, 75% of which are electric. He says they could save \$4 billion of that — and reduce heat-trapping carbon-dioxide emissions — if all electric units were updated to the most efficient hybrid heat pump model sold overseas, mostly in Europe."

The technology for dehumidifying dryer exhaust already exists as a built-in feature in a few pricey modern dryer models, especially in Europe, as noted above.

It's time for building scientists to put their heads together and create a standalone waste heat exchanger for dryers. It should be relatively compact (no more than about 6"x12", capable of being wall mounted, with a built in heat exchanger, condensation tray and small, 110 volt water pump. It should sell for under \$100.00, be easy to clean, and fit any standard 4-inch dryer hose.

appliances dryer ventilation waste heat recovery

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Submitted by **mal.power** 1 month ago


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Idea#52

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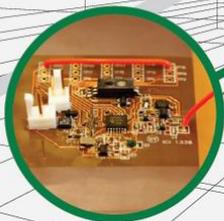
What we're discussing [-]

energy energy-efficiency buildings solar efficiency energy-saving retrofit vip design heating water

Questions & Answers

LET'S PUT OUR IDEAS TO WORK

SUBMIT YOUR
BEST IDEA



VOTE & DISCUSS
IDEAS



GET RECOGNIZED
AT INDUSTRY DAY



ORNL BUILDINGS CROWDSOURCING COMMUNITY

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