How Lean and Integrated Project Delivery (IPD) contribute to building Smart Energy Communities
By turning our communities into **Smart Energy Communities**, we can improve energy efficiency, cut costs, and **reduce greenhouse gas emissions in Canada**.

So what is a Smart Energy Community?

First, a Smart Energy Community integrates conventional energy networks. That means that the electricity, natural gas, district energy, and transportation fuel networks in a community are better coordinated to match energy needs with the most efficient energy source.

Second, a Smart Energy Community integrates land use, recognizing that poor land use decisions can equal a whole lot of energy waste.

Third, a Smart Energy Community harnesses local energy opportunities.
We need to GO BIG on GREEN

VP Sustainability Aspen Skiing Company
How **Lean** and Integrated Project Delivery (**IPD**) help to achieve the 6 Principles for Smart Energy Communities

1. First Reduce Energy Requirements
2. Optimize Exergy & Sustainable Expectations
3. Manage Heat Capture
4. Reduce Waste
5. Renewable Energy
6. Energy Delivery Systems
The Building Industry is a notoriously wasteful industry! ($500 Billion/year)

There must be something we can do?
The BIG IDEA

LEAN pays for GREEN

Convert $500Billion in annual waste to ......

All new buildings **Net 0** by 2020, commission and upgrade existing building to **70% less energy**
We need Net 0 buildings to become as common as the Prius
The Solution for the Building Industry has been written!
We need to FIX two reasons WHY our industry is broken

Inefficiency & BAD Behavior
How?

What is Lean?

A way of THINKING? ..... Culture?

A System?
Lean focuses on providing customer value through streamlined processes while practicing continuous improvement.
Lean for Construction is based upon the “Toyota Production System”

It is called Integrated Project Delivery (IPD). It includes two main systems

Last Planner: Collaborative System for Constraint Free Work Flow

Target Cost Design: Collaborative System for Design
Target Cost Design is a disciplined design management system that is based upon clearly defining project requirements and delivering a best value design to a target cost.
The Last Planner System enables commitment-based planning and workflow management. This system helps to achieve predictable and productive workflow.
Based upon the evidence IPD works!

200% Productivity … 40% less Capital Cost … 30% less Operating Cost
Lean is becoming a “New Religion”
Lean Construction Communities of Practice
Lean Construction Institute - Canada
1. The Planet needs help (Building 40% of GHG)
2. The building industry wastes $500 Billion per year
3. Lean is a new way of THINKING about collaboration, value and continuous improvement
4. Integrated Project Delivery (IPD) is a project delivery approach that is based upon lean principles. There are 2 main systems
   • Target Cost Design is a lean design system
   • The Last Planner System is a work flow planning and delivery system
5. IPD promotes collaboration, productivity and GOOD BEHAVIOR
6. Think of IPD as the Toyota Production SYSTEM for Construction
7. IPD is key to fixing a broken building industry
8. Learn more about IPD? Join … LCI – Canada
If Lean can save 40% of the cost of a project and it costs 10% to go passive house and another 10% to go Net 0……. Does that mean we could build Net 0-0?

Answer: ????

Next we want to ……
Integrated Project Delivery
Moneyball… Getting to Net 0 is the game!

You would never guess WHO was a Keynote speaker at our last LCI conference in San Francisco?
The Building Industry needs to stop acting like the New York Yankees!

We need to adopt similar processes as Billy Beane did in baseball or Edward Deming, who proved that “Quality is Free” in the automobile industry.
We need to perform like the Oakland A’s

By building a TEAM by finding undervalued performance the Oakland A’s have consistently outperformed the competition and have demonstrated

RULE #1: There does NOT need to be tradeoffs between cost and performance.
Why are we interested in Lean?

LEAN enables GREEN ..... Net 0-0!

HOW?

Take the 40% capital saving and buy PV Panels or Insulation
Lean to be Green Project Examples

In this next section we will look at project examples and how they achieve the 6 principles that contribute to achieving Smart Energy Communities.

1. First Reduce Energy Requirements (Rob Dumont Recipe/1602/Prefab Green)
2. Optimize Exergy (Radiant/RATS Experiment/Sustainable Behavior)
3. Manage Heat Capture (Manitoba Hydro Place/Passive Solar Greenhouse)
4. Reduce Waste (Lean to be Green Construction Industry)
5. Renewable Energy (Mosaic Center/Living Building Challenge/IPD)
6. Energy Delivery Systems (Okanagan College/Living Building Challenge/IPD)
1. Start with a really good performance RECIPE

From a GREAT chef

Dr. Rob Dumont who developed one of the first passive houses.

Directives for High Performance Homes in a North Climate!
IPD Project: 1602 Net 0 Economics

For our #PREFAB #GREEN Net 0 duplex in Saskatoon, Saskatchewan the capital cost premium to achieve #Net Zero home was $50,000. The energy saving provide a 6% Return on investment.

www.eco-smart.ca
2. Exergy

By fostering sustainable behavior, using passive designs and utilizing low grade heat systems (Exergy) we can minimize the capital cost of the PV panels needed to achieve Net 0 energy use.

To determine an acceptable thermal comfort range for our staff, we decided to conduct a **Responsible Adults Temperature Study (RATS)**

Dennis Cuku  
Mosaic Center for Community and Commerce  
Canada’s first private commercial Living Building Challenge project
Retro-commissioning Pilot Project achieves 4% Saving with a 1 DGC change in cooling setpoint

<table>
<thead>
<tr>
<th>Annual Cooling Energy Savings From a 1°C Increase in Cooling Temperature Setpoint</th>
<th>Percent Reduction in Cooling Energy</th>
<th>Cooling Energy Reduction (MJ)</th>
<th>Equivalent # of Sask Homes Powered With that Energy</th>
<th>GHG Reduction (kg CO2e)</th>
<th>Equivalent # of Cars Off the Road</th>
<th>Equivalent # of Trees Planted</th>
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<tbody>
<tr>
<td></td>
<td>4.2%</td>
<td>126,071</td>
<td>4.2</td>
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<td>1.5</td>
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Cooling Savings of $1000/yr/DGC for a 140,000 sq.ft building
3. Manage Heat Capture

Manitoba Hydro

LEED Platinum, 65% less energy, Double Wall Construction, Solar Chimney ... Energy Storage Systems
For our project we wanted to demonstrate to that triple bottom line economics work for commercial real estate. We are on target to deliver the Mosaic Centre to the highest level of sustainability as defined by Living Building Challenge for approximately the same cost as a traditional build.

Our return on investment will be in the productivity of our people, recognition as good stewards of the planet and from the financial benefits of having higher occupancy and no energy bills.

Dennis Cuku
Mosaic Center for Community and Commerce
Canada’s first private commercial Living Building Challenge project
5. Renewable Energy System
   “PV Economics”
6. Energy Delivery Systems

As leaders in the community it is our duty to protect the planet and demonstrate that triple bottom line economics work. For our second Living Building Challenge project, we have adopted Lean Project Delivery to raise the bar even higher as we want less cost, less time and to be fully commissioned at substantial completion.

One of our success stories is that we use waste heat from the sewage treatment plant to heat our building.

Kathleen Lausman

Okanagan College Kelowna Trades Centre
Living Building Challenge Project #2
These projects demonstrate that we can achieve High Performance at Less Cost”
IPD/Net 0 Projects in Western Canada

1602 Edward Ave Prefab/Green Targeting Net 0

Kelowna Trades Project Net 0/LBC

Mosaic Center Net 0/LBC
Yes we Can …. Perform like the Oakland A’s

By build a TEAM by finding undervalued performance the Oakland A’s have consistently outperformed the competition and have demonstrated

there does NOT need to be tradeoffs between cost and performance.
WOW ..
Less time, less cost, less risk, higher performance
“The definition of insanity is doing the same thing over and over and expecting different results.”

Albert Einstein
LEAN is a Journey
Integrated Project Delivery Training

Learn how to deliver an IPD project from leaders in the industry in a collaborative learning environment. Our online courses provide the flexibility to learn on your own time and/or collaborate with your peers as you develop lean design and construction capabilities from leaders in the industry.

For more information mguy@i-designs.ca
Breaking Down Barriers to Higher Performance
Thank YOU!

mguy@i-designs.ca

Thank YOU!