How can we ensure that the multiple benefits of zero carbon buildings (IEQ, low utility bills, climate change mitigation and adaption, etc.) are available to all members of our communities?

Housing Development Consortium, Shift Zero, Emerald Cities Seattle

Building for the Future

A Housing Community driven program to maximize housing units produced while driving energy use, carbon emissions, water consumption, and storm water runoff toward zero.
Our Vision
All people live with dignity in safe, health and affordable homes within communities of opportunity

Community Driven Goals & Solutions

Utilities

Housing & Efficiency Advocates

Government

Funders

Pressures on the System

Housing Developers
- Deliver more units
- Adapt to ever-changing regulations
- Control construction costs

Asset/Property Managers
- Preserve quality inventory
- Recruit/retain great staff
- Spiraling maintenance & replacement costs

Exemplary Buildings
- Housing crisis
- Climate & environmental crises
- Evolving codes & regulations

Community/Society
An Exemplary Affordable Housing Building:

- maximizes housing units produced,
- offers long-term life-cycle cost benefits,
- and an improved quality of life for residents.

An Exemplary Affordable Housing Building is one in which:

---energy and water consumption, and storm water runoff is reduced;

first through state-of-the-art building design strategies and efficiency measures,

then through on-site renewable energy generation and water capture.
Typical New Affordable Housing Energy Use

- Domestic hot water: 10 EUI
- Space heat: 9 EUI
- Other: 2 EUI
- Lighting: 5 EUI

ESDS COMPLIANT MULTI-FAMILY BUILDING
annual energy performance - 35 EUI

Exemplary Affordable Housing Energy Use

- Domestic hot water
  - Heat pump source
  - Optimized distribution system and most efficient plumbing fixtures
- Space heat
  - Better windows & walls
  - Balanced ventilation with heat recovery
- Lighting
  - Optimized LED lighting
  - Common area occupancy and daylighting sensors
- Other
- Plug loads
  - Best Energy Star appliances
  - Incl. heat pump dryers
  - Unit master switch

EXEMPLARY MULTI-FAMILY BUILDING
annual energy performance - 20 EUI
**Washington State Goals for the Building Sector**

Many organizations and jurisdictions have adopted a range of building performance goals over the past decade that have significantly changed the conversation about energy codes and building energy performance. The primary policy driver for the Washington State Energy Code increases in stringency is the language adopted by the Washington State Legislature, which reads:

*Residential and Nonresidential construction permitted under the [2031 state energy code](#) must achieve a 70 percent reduction in annual net energy consumption (compared to the 2006 state energy code) (RCW 19.27A.160)*

And—

*Construct increasingly efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by the year 2031 (RCW 19.27A.020)*

### “Do Nothing” Course for Exemplary Buildings

<table>
<thead>
<tr>
<th>Sources of Capital for Premium</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gap</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Incentives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Loan on Operating Savings</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tax Credits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Legend:**
- **Gap**: CostPremium
- **Incentives**: CostsPremium
- **Loan on Operating Savings**: CostsPremium
- **Tax Credits**: CostsPremium
"Future" Course for Exemplary Buildings

Path to Exemplary Buildings

- **Pilots** (4-8 Buildings)
  - 6% Cost Premium

- **Scale-Up** (10-20 Buildings)
  - 4% Cost Premium

- **Exemplary Standard** (All Buildings)
  - 2% Cost Premium

Sources of Capital for Premium:
- Tax Credits
- Loan on Operating Savings
- Incentives
- Gap

Cost Premium
- 2020: 6%
- 2025: 4%
- 2030: 2%
Exemplary Buildings Program

<table>
<thead>
<tr>
<th>Phase</th>
<th>Pilot Phase</th>
<th>Scale-up Phase</th>
<th>Exemplary Standard Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 Buildings (400 units) in 2019 (part of 20 by 2020 Challenge)</td>
<td>10 (1,000 units) Buildings in 2021-22</td>
<td>All Buildings in 2024</td>
</tr>
</tbody>
</table>

**Optimize Construction**

- **Supply Chain** - Volume purchasing across owner/developers to be able to offset some of the incremental cost for upgrades. Ready availability of mechanical, plumbing, window, insulation, and ventilation systems. (Develop supply chain in ramp-up phase)
- **Labor** - Train a robust highly trained, affordable workforce

**Sustainable Operations and Maintenance**

- **Commissioning**
- **Performance-Based Operations**
- **Training of building staff maintenance contracts**

**Funding and Financing** – Identify funding sources that will cover the premium to build to exemplary standards.

- **Optimize current funding sources.**
- **New Grants/Incentives**
  - Utilities
  - Government
  - Philanthropy
- **New Financing**
  - Government Supported
  - Private Capital
  - Financial Institutions

**Policies & Code** - Evolve or change policies to accelerate our move toward exemplary buildings.

- **Design Review Board** – limit expensive cost drivers, present Exemplary Building Program as a “pre-approved standard”, Climate Change Imperative,
- **Adjust Cost and Funding Limits** – to account for exemplary buildings and long term operating savings that result

**Program Funding**

<table>
<thead>
<tr>
<th></th>
<th>Pilot Phase</th>
<th>Scale-Up Phase</th>
<th>Exemplary Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resident Units</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Base Project Cost</strong></td>
<td>$25,000,000</td>
<td>$25,000,000</td>
<td>$25,000,000</td>
</tr>
<tr>
<td><strong>Hard Cost Premium %</strong></td>
<td>6%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Hard Cost Premium (6%)</strong></td>
<td>$1,500,000</td>
<td>$1,000,000</td>
<td>$500,000</td>
</tr>
<tr>
<td><strong>Soft Co$t Premium %</strong></td>
<td>1%</td>
<td>.5%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Soft Cost Premium</strong></td>
<td>$250,000</td>
<td>$125,000</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Financed Operating Savings (10 years at 2.5%)</strong></td>
<td>($250,000)</td>
<td>($250,000)</td>
<td>($250,000)</td>
</tr>
<tr>
<td><strong>Net Funding Needs</strong></td>
<td>$1,500,000</td>
<td>$875,000</td>
<td>$250,000</td>
</tr>
</tbody>
</table>
  - **Tax Credits**
  - Foundations
  - Utility Incentives & Grants
  - Special Grant & Gov’t Funding

- **New Financing**
  - Government Supported
  - Private Capital
  - Financial Institutions

- **New Grants/Incentives**
  - Utilities
  - Government
  - Philanthropy

- **Design Review Board** – limit expensive cost drivers, present Exemplary Building Program as a “pre-approved standard”, Climate Change Imperative,
- **Adjust Cost and Funding Limits** – to account for exemplary buildings and long term operating savings that result
Hurdles:

- Rick Pricing for New Technologies
- Total Development Cost Cap
- Capital Funding for Pilots Premiums
- Soft Funding for Pilots
- Recruiting More "Good" Project Candidates

How are we doing?

- Utility Funding for Efficiency
- Utility Funding for Renewable Energy
- Demonstration Projects Recruited
- Special State Funding for Pilots
- Philanthropic Funding for Pilots
- Support from Manufacturers
- Support from General Contractors
- First Project Breaks Ground in January 2020

Our Vision
All people live with dignity in safe, healthy, and affordable homes within communities of opportunity
What has us excited?
Cost Reduction Strategies

- We have organized 3 groups to work on cost reductions and are getting lots of support and interest. They are:
  - Central Heat Pump Hot Water Systems
  - Optimized (cost of performance) building envelope
  - Balanced Ventilation with Heat Recovery

Thank you.