What We’ll Cover

- ZNE Policy Drivers in Michigan
- ZNE Companion Program
- ZNE Program Case Studies
Consumers Energy’s Integrated Resource Plan

✅ No Coal by 2040
✅ 90% Carbon Reduction by 2040
✅ 56% Electric Capacity from Renewable Energy

What’s Next for MI?

- 90% Carbon Reduction Goal (IRP)
- 2030 District
  - Carbon-neutral in 2030
- Jackson Smart Energy District
  - Provide an overall grid benefit
  - Satisfy 40% of the District’s electricity demand with on-site renewables
  - Reduce the District’s carbon emissions by 90%
- Circuit West
- Microgrids
- Demand Response
- Electric Vehicles
- Electrification of Buildings
- Increased Renewable Energy Generation
- Energy Storage
- Other Market Trends and Education
ZNE Program Status and Participants

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ZNE Program Timeline

- **ZNE Pilot Program** (May 2017-19)
- **ZNE Companion Program** (June 2019-20)
- **ZNE Specialty Program** (June 2020-?)

New Pilots ➔ Pilots ➔ Specialties ➔ Core
Existing Participants

11 Participants:
- 1 New Construction
- 2 Major Renovation
- 8 Retrofits

Overall Projected Savings:
- 4,227,190 kWh
- 10,098 MCF

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Total</th>
<th>Count</th>
<th>Average Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>279,626</td>
<td>4</td>
<td>69,907 sf</td>
</tr>
<tr>
<td>Mixed-Use</td>
<td>182,058</td>
<td>1</td>
<td>182,058 sf</td>
</tr>
<tr>
<td>Warehouse/Office</td>
<td>159,840</td>
<td>1</td>
<td>159,840 sf</td>
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<tr>
<td>Museum</td>
<td>128,000</td>
<td>1</td>
<td>128,000 sf</td>
</tr>
<tr>
<td>Education</td>
<td>112,800</td>
<td>2</td>
<td>56,400 sf</td>
</tr>
<tr>
<td>Community Center</td>
<td>33,000</td>
<td>1</td>
<td>33,000 sf</td>
</tr>
<tr>
<td>Food Processing</td>
<td>45,534</td>
<td>1</td>
<td>45,534 sf</td>
</tr>
</tbody>
</table>

Existing Participants’ EUI Goals (kBtu/sf/yr)

Median EUI Goal: 35 kBtu/sf/yr
- New Construction/Major Renovation = 33
- Existing Building = 43

Average EUI Percent Reductions: 46%
- New Construction/Major Renovation = 52%
- Existing Building = 31%
ZNE vs. ZNE-Ready

As an energy efficiency program, its incentives and requirements are solely based on energy reduction efforts, renewable energy generation is not required, but encouraged!

- ZNE: A building that generates as much energy as it uses, annually.
- ZNE-Ready: A building that has reduced its energy use intensity (EUI) to meet the program’s EUI goal requirements.

ZNE Companion Program Goals

**EUI Goal:**

- 25 kBtu/sf/yr and 20% reduction in regulated whole building energy, or

- If that cannot be reached:
  - 30% for existing buildings (compared to existing energy use).
  - 40% for new construction (over MI adopted ASHRAE 90.1 Table G 3.1).
ZNE Companion Program Eligibility Requirements

• The final design must be all-electric.

• Must be in early stage schematic design (i.e. no late “on-ramping”).

• Owners are limited to 2 enrolled projects (or 1 campus).

• Commercial buildings only.

• New construction, major renovation, or retrofits.

• All deliverables are required for payment (i.e. no skipping of deliverables or associated requirements).

• A minimum of 2 whole building energy conservation measures (ECMs).

Incentives

$1.50 per square foot  
(maximum of $150,000 and minimum of $13,000 per project)

Incentives will be paid out as follows:
• 50% paid upon completion of Phase 1, 2 and 3
• 50% paid upon completion of Phase 4 and 5

Incentives fund a portion of the added costs to reach a ZNE-Ready target (i.e. engineering support, energy modeling, cost-benefit analysis, equipment costs and post-occupancy measurement & verification) and the energy savings associated with it.
Project Initiation

**Application Questionnaire** - to assess eligibility and ZNE feasibility.

**Data Collection** - drawings, schedules, occupancy count, building program, 3 years of the energy bills (EB), site conditions, building audit reports (EB) and other relevant documents/analysis.

**ZNE Feasibility Study** - performed by Consumers Energy as an initial assessment of the project’s baseline energy use, viable ECM opportunities, EUI goal feasibility and solar sizing to achieve true ZNE.
Project Initiation

**Design Team Procurement**

- Design Architect
- Mechanical, Electrical and Plumbing (MEP) and Civil Engineer(s)
- Energy Modeler
- Lighting Designer
- Contractor
- Commissioning Agent
- Green Building and Solar/Renewable Energy Consultant(s) (optional)

**Kickoff Meeting**

- Walkthrough of building and/or site.
- Owner, design team, Consumers Energy rep. and additional stakeholders.
- Review program requirements/deliverables and discuss ZNE vision for the project.

**Reoccurring Monthly Meetings**

- Customer, design team and Consumers Energy rep. attend throughout the project
- Assign actionable tasks to project team in preparation for the design charrette
Phase 1: Preliminary Design

1.1 Preliminary Energy Model
1.2 Design Charrette
1.3 OPR

Schematic Design → Design Drawings, Energy Modeling & ECMs

<table>
<thead>
<tr>
<th>Current Design</th>
<th>ECM 1: Roof</th>
<th>ECM 2: LED + Controls</th>
<th>ECM 3: HVAC</th>
<th>ZNE Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>EUI (kBtu/sf/yr)</td>
<td>38</td>
<td>36</td>
<td>32</td>
<td>25</td>
</tr>
</tbody>
</table>

Phase 2: Advanced Design

2.1 Energy Model
2.2 Cost-Benefit Analysis
2.3 Basis of Design
2.4 Submetering & CDs

Design Drawings, Energy Modeling & ECMs → 100% CDs

Payback (years)

- LED: 2.9
- MMS: 9.2
- HVAC: 0.8
- Windows: 11.8
- Simulation: 3.8
- 6 AC: 2.9
- 7 Heating: 0.4
- Total: 5.4

10/11/2019
Phase 3: Construction

3.1 Construction Kickoff
3.2 M&V Plan
3.3 Circuiting Inspection
3.4 Envelope Cx
3.5 System-Level Cx

Phase 4: Measurement

4.1 Monitoring Equipment
4.2 Performance Testing
Phase 5: Verification

12-Month Performance Period

5.0 Verification: 12 months of energy data

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ZNE Program Case Studies
Kalamazoo Nature Center

Existing Building
Status: Advanced Design Phase
EUI Baseline: 51
EUI Goal: 35 (31% reduction)

ECMs
• Added Roofing Insulation
• Minor Window Replacement
• Interior & Exterior LED’s & Controls
• Heat Pump with Water Side Economizer
• Energy Recovery Unit (ERU)
• Building Monitoring System (BMS)
• Energy Star Appliances
• Replace Green Roof
• Replacing Dome (?)

WMU Aviation Education Center

Major Renovation & Addition
(16,000 sf to 69,000 sf)
Status: Construction Phase
EUI Baseline: 90
EUI Goal: 40 (51% reduction)

ECMs
• Ultra Efficient Envelope (roof & walls)
• High Efficiency Windows
• Water Source Heat Pumps
• Interior and Exterior LEDs
Thank you!
Interested in signing up?
Contact us for more information on eligibility:
Benjamin.Glendening@cmsenergy.com