ONTARIO BUILDING CODE BREAKFAST

Cracking The Code - Establishing A Winning Strategy For SB-10 Compliance

April 29, 2014
ONTARIO BUILDING CODE

- Secret Code That Only Cengiz Understands
ONTARIO BUILDING CODE

- Industry Is Scrambling to Figure It Out
ONTARIO BUILDING CODE
New SB-10 – Before 2017 (Div 2)

- Energy:
  - Exceed 90.1-2010 + Div2-Ch2 (Performance or Prescriptive)
  - Exceed 90.1-2010 by 5% (Performance)
  - Exceed MNECB by 25% (Performance)
  - Exceed NECB + Div2-Ch3 (Performance or Prescriptive)

- \( \text{CO}_2 \):
  - Exceed 90.1-2010 + Div2-Ch2 (Performance or Prescriptive)
  - Exceed 90.1-2010 by 5% (Performance)
  - Exceed MNECB by 25% (Performance)
  - Exceed NECB + Div2-Ch3 (Performance or Prescriptive)

- Peak kW:
  - Exceed 90.1-2010 + Div2-Ch2 (Performance or Prescriptive)
  - Exceed NECB + Div2-Ch3 (Performance or Prescriptive)
New SB-10 – After 2016 (Div 3)

- **Energy:**
  - Exceed Division 2 by 13%
    - Exceed 90.1-2010 + Div2-Ch2 by 13% (Performance)
    - Exceed 90.1-2010 by 17% (Performance)
    - Exceed MNECB by 35% (Performance)
    - Exceed NECB + Div2-Ch3 by 13% (Performance)
  - Exceed 90.1-20?? + Div3-Ch2 (Performance or Prescriptive)

- **CO₂:**
  - Exceed Division 2 by 13%
    - Exceed 90.1-2010 + Div2-Ch2 by 13% (Performance)
    - Exceed 90.1-2010 by 17% (Performance)
    - Exceed MNECB by 35% (Performance)
    - Exceed NECB + Div2-Ch3 by 13% (Performance)
  - Exceed 90.1-20?? + Div3-Ch2 (Performance or Prescriptive)

- **Peak kW:**
  - Exceed 90.1-20?? + Div3-Ch2 (Performance or Prescriptive)
ONTARIO BUILDING CODE

- So what do you do?
What are the project energy goals?

- OBC Compliance?
- Toronto Green Standard Tier 1?
- Toronto Green Standard Tier 2?
- LEED?
- OPA Incentives?
- Other RFP Project Requirements?
- Project energy goals can help to establish compliance strategy.

<table>
<thead>
<tr>
<th></th>
<th>MNECB-1997</th>
<th>NECB-2011</th>
<th>90.1-2007</th>
<th>90.1-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBC</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>TGS</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>LEED</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>HPNC</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>RFP</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
ONTARIO BUILDING CODE

- Have this conversation early
- Engage your energy consultant
- Communicate strategy to your team
Circulate the checklist **before** the BP submission date. Right Michelle??
ONTARIO BUILDING CODE

- Ask your energy consultant which compliance path and why.
- They are not all equivalent.
  - NECB demand requirements are tough for certain building types. But no mandatory requirements.
  - MNECB gives good lighting savings for offices
  - ASHRAE 90.1-2010 can require costly lighting controls
ONTARIO BUILDING CODE

- Ask your energy consultant which energy modelling software and why.
- They are not all equivalent.
  - eQUEST is good for hydronics
  - IES<VE> is good for air-side systems
  - EE4 has MNECB Summary Compliance Report
Toronto Green Standard

- Energy Model Before Site Plan Approval to Meet Energy Efficiency Requirements
  - Tier 1: 15% above Code (new Code)
  - Tier 2: 25% above Code (new Code)

- No Prescriptive Option Available

<table>
<thead>
<tr>
<th>Energy Efficiency Report</th>
<th>Effective: January 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Toronto Green Standard (TGS) GHG 1.1 and GHG 1.2 sets higher energy performance targets for new development.</td>
<td></td>
</tr>
</tbody>
</table>

For buildings greater than 2000 m², the Energy Report is the Design Development Stage Energy Report. The Energy Report summarizes the projected energy performance of a new building in comparison (as percentage improvement) to a reference building designed to meet OBC 2012. The Design Development Stage Energy Report is aligned with drawings and documents submitted during the Site Plan Control stage.
# TGS – The Percentage Game

<table>
<thead>
<tr>
<th>OBC</th>
<th>MNECB-1997</th>
<th>ASHRAE 90.1-2010</th>
<th>NECB-2011 or ASHRAE 90.1 + SB-10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25%</td>
<td>5%</td>
<td>Equal</td>
</tr>
<tr>
<td>TGS T1</td>
<td>36%</td>
<td>19%</td>
<td>15%</td>
</tr>
<tr>
<td>TGS T2</td>
<td>44%</td>
<td>29%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Prescriptive Options Available

- Very stringent
- 40% window-to-wall ratio
- R18 Opaque Wall Assemblies
- *Not practical for many (most?) buildings*
ONTARIO BUILDING CODE

- Energy Modelling is No Longer Only for “High Performance Buildings”
- Almost Every New Building in Ontario

VOLUNTARY → MANDATORY
NOT Just a Compliance Tool

- Improve Design and Optimize Operation
Site Orientation
Building Massing

- Point Tower vs. Bar Tower
Optimal Glazed Area

2850mm Clerestory

Figure 1: Plan view of fabrication area (1.3% > Threshold)

5000mm Clerestory

Figure 3: Plan view of fabrication area (51% > Threshold)

Figure 4: Fabrication area

Figure 5: Fabrication area - Nos of overhang
Exterior Shading

- Highly Depends on Location
  - Works in Dubai
  - Does Not Work in Vancouver
Passive Heating
Detailed HVAC Modelling

- What is more efficient – a heat pump or a fan-coil?
- Controls – setback, morning warmup, night purge, etc.
Natural Ventilation
Modelling Crucial to P3 Process

- NPV vs. painshare
- Low Aggregate Energy Target reduces NPV but creates painshare risk
- Evaluate scenarios and balance the risk.
Conclusions

- The Code is complicated – learn it.
- The Code gives you options – use them.
- TGS has us modelling early – take advantage of it.
- Incentives are available – get them.
- Model is mandatory – use it for more than compliance.
Thank you!

- **Brian Tysoe**, M.A.Sc., P.Eng., LEED AP BD+C, BEMP
- Associate, National Manager of Energy Modelling Services
- MCW Consultants Ltd.
- btysoe@mcw.com
- (416)598-2920