BUILDING ENERGY ENGINEERING POWERPOINT PRESENTATION – SLIDE NARRATIVE

SLIDE 1 – TITLE OF PRESENTATION

"CREATING A HEALTHIER, SUSTAINABLE COMMUNITY – APPLYING BUILDING ENERGY ENGINEERING PRACTICES"

SLIDE 2 – INTRODUCTION

The City of Kelowna (City) has created a comprehensive Official Community Plan (OCP) that offers an exciting vision through to the year 2030 for creating a sustainable community.

In the context of my presentation to you today, notable objectives of the OCP include:

- Significant reductions in Greenhouse Gas (GHG) emissions
- Improved building energy efficiency and performance.

One proactive approach the City can take towards attaining these objectives is by promoting Building Energy Engineering (BEE) practices during design and construction of new buildings, or when renovating existing structures.

Let's get into the details of what this involves, and why this approach makes sense…

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When we're discussing BEE practices, we're referring to the following actions:

- Applying computer energy modeling techniques to precisely replicate a building's thermal envelope and calculate expected energy performance. Inputs considered include:
    - The orientation of the building, accounting for seasonal variations and building lot features.
    - Number, size, location, and physical properties of windows and doors to be installed.
    - Quality and quantity of insulation placed below the slab, in and on the walls, and in the roof spaces.
    - Types of building materials and assemblies used.
- On-site testing of the finished building, measuring energy transfer and air leakage parameters and overall energy performance against the design model.
- Using a Certified Energy Advisor to validate the building's energy efficiency rating.

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What major benefits can computer modeling of energy performance offer?

- For one, energy modeling can fine-tune building designs to meet minimum energy performance requirements required by code, or offer superior energy performance inherent with Passive Building, R2000, Energy Star™, and Net Zero Energy Building designs.
- Energy modeling allows accurate calculation of expected return on investment when selecting superior energy performance building designs. Builders and owners can assess the payback time required to offset modestly higher construction costs with reduced utility bills, smaller mechanical systems and footprint requirements, and an extended building life.

OK, hopefully everyone is on the same page now about what we mean by applying BEE practices to building design and construction. Does anyone have any questions about any of this?

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Let's move on to discuss five key factors the City may want to consider in any decision to promote applying BEE practices while providing construction oversight in the local community. Specifically, we are referring to:

1. Addressing target objectives outlined in the OCP
2. Upcoming building code changes affecting energy performance
3. Becoming a sustainability leader in action
4. Managing the "Monster Home" reality of residential construction in Kelowna
5. Employing local expertise.

Allow me to dive into each of these points in greater detail.

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1. Addressing target objectives outlined in the OCP:
    - The City has committed to:
        - An aggressive and commendable 33% reduction in GHG emissions by 2020 from 2007 levels.
        - Improving the energy efficiency and performance of new and existing buildings (according to a provincial report providing baseline data for 2007, energy use in buildings accounted for nearly 30% of all GHG emissions in Kelowna – a significant contributor!)
        - Creating more mixed-use neighbourhoods (multi-family and commercial) using compact, connected urban and village centers. This objective implies larger and more complex building design and construction will be required.

- Applying BEE practices encourages the use of innovative building design and construction techniques that improve energy performance.
    - A key first step is using computer modeling to optimize designs using advanced materials, products, and assemblies (think Low-U windows, High-R and airtight building envelopes, high energy efficiency mechanical systems, etc.)
    - As a second step, introduce passive building heating and cooling schemes through proper building orientation and placement/size/quantity of windows.
    - Also, let's not forget the use of alternative energy sources, such as solar panels and heat recovery via geothermal techniques and innovative HRV/ERV technologies that BEE practices can easily incorporate.

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2. Upcoming Building Code changes affecting energy performance

- Presently, the City relies on designers and builders to follow the prescriptive path of the Building Code to comply with building energy performance requirements. Although straightforward in application, the prescriptive path offers no opportunities to optimize energy performance or reduce costs of construction.
- Updates to the Building Code in 2017 encourages designers and builders to follow the performance path to achieve, as a minimum, building energy efficiency targets mandated by the prescriptive path. The performance path can significantly improve energy performance beyond minimum requirements AND reduce total construction costs – but only by applying BEE practices as part and parcel of this approach.
- The Climate Leadership Plan the BC government issued in August 2016 clearly outlines the development of energy efficiency requirements (known as the "Energy Step Code") that surpass the requirements of the BC Building Code (BCBC). The intent of the Energy Step Code is to ensure that all new homes and buildings be Net-Zero ready by 2032. This Code is an enhancement of the performance path and will be implemented in five steps over that time. Step 1 is expected to require designers and builders to measure and test building construction based on the BCBC. Step 5 will require such buildings to almost meet the Passive House standards. Applying BEE practices for all steps will be essential. It will be up to the local government authorities to offer incentives for, and enforcement of, such steps.
- Given the trends, it makes little sense to invest in designing and constructing buildings meeting the minimum code requirements when in the relatively near future, such buildings will be forced to undergo significantly more costly upgrades after the fact to meet stricter energy performance standards.

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3. Becoming a sustainability leader in action

- The City of Vancouver has demonstrated laudable leadership by declaring it will become "The Greenest City in the World" by 2020. By implementing performance-based building code requirements of its own, above and beyond that required by the BCBC, Vancouver plans to achieve the following objectives by 2020:
    i. Reduce GHG emissions from new homes to half of 2007 levels
    ii. New homes to be "carbon neutral"
    iii. Reduce GHG emissions from existing buildings by 20% from 2007 levels.
- These objectives require Vancouver to demand builders take certain steps:
    i. Since 2008, builders have had to work with Certified Energy Advisors (CEAs) during design and inspection stages to comply with Energuide and HOT2000 energy model requirements, including blower door testing, visual verifications before installing insulation, and final inspections.
    ii. As of 2015, builders completing renovations exceeding $5,000 in permitted value must work with a CEA for an initial assessment.
- According to one federal government study, over the past decade, construction costs have dropped 40% to build a Net-Zero energy home. And the technology continues to improve. Further, today's Net-Zero energy homes are estimated to reduce operating costs by 30-55% from a typical home! Consider the leadership shown by BC Housing, the City of Vancouver, Okanagan College, the University of Northern BC, the Vancouver Coastal Health Authority, and many private developers that are constructing the best buildings they can now. Given the distinct advantages of building greener, there's plenty of incentive for local governments to be proactive in this effort -- why wait until it becomes law?
- In all cases, employing BEE practices help our local community and others achieve Greener Buildings and reduced GHG emissions.

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4. Managing the "Monster Home" reality of residential construction in Kelowna

- Many involved in the residential construction industry in Kelowna will agree, the City has its share of "monster homes." These are typically large and complex buildings with a strong emphasis on aesthetics, while energy-efficiency considerations are often an afterthought. These homes can benefit greatly from the application of BEE practices to improve the comfort, reduce the operating expense, offer resiliency against future energy cost increases, and likely present an attractive ROI to the homeowner. Certainly, meaningful GHG emission reductions can be achieved.
- However, there seems to be some resistance to applying performance-based design and construction techniques to such homes in preference to the prescriptive path. This results in lost opportunities to improve GHG emission reductions and achieve other stated benefits. The City may consider it prudent to exert more pressure to have such homes follow the performance path now – it will become the rule over time in any event.
- BEE practices will likewise benefit multi-family and mixed-use buildings that are favoured by OCP objectives. Even simpler, affordable homes can take advantage of higher energy performance, if perhaps to a lesser degree.

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5. Employing local expertise

- The writing has been on the wall for some time now as to how regulations and practices within the building industry must change to help create more sustainable communities.
- The management team at ROV Consulting has been paying attention to the trends. With our office in Kelowna, ROV has established a strong reputation within the building community locally and abroad over the past 20 years for delivering high-end service and quality.
- ROV has invested heavily developing strong expertise to offer a full suite of BEE services to our clients. We delight in expanding our services in this manner -- customers have the flexibility to engage ROV for its structural engineering expertise or its BEE services, or both, as required.
- ROV is THE local expert in BEE practices – there's no need to shop further afield to find the right expertise. Hiring locally promotes local innovation and employment opportunities in cleantech.
- ROV considers our BEE services a springboard for additional benefits we can offer the City. For example, the City may be interested in hiring ROV to undertake neighbourhood-level case studies to quantify the benefits of making changes to existing homes (for instance, improving building insulation) that reduce GHG emissions and enhance community sustainability.

- ROV believes we have established an excellent working relationship with the City over the years. We foresee additional synergy developing in this relationship as BEE practices become more commonplace – we look forward to serving the City's needs in this manner.

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Let's quickly summarize.

- We firmly believe that applying BEE practices for both new buildings and renovations is essential to achieve greater traction in environmental sustainability in our community.
- Benefits to the City by promoting BEE practices throughout the local building community include:
    - Assisting in reaching OCP objectives by reducing GHG emissions and fostering energy-efficient building designs, construction, and performance.
    - Staying current with trending building code requirements for enhanced energy efficiency.
    - Burnishing the City's image as a sustainable community leader.
    - Creating convergence with the "Monster Home" phenomenon and OCP objectives.
    - Partnering with local expertise and fostering local innovation and job creation.

[Wrap up the presentation with a Q&A session while projecting the last slide, below.]

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ROV Consulting Inc. is a Kelowna-based, OQM-certified consulting firm offering both Structural Engineering Design and Building Energy Efficiency consulting services.

The company is celebrating its 20th year serving the needs of designers, contractors, developers, building inspection services, and building owners across British Columbia, Alberta, Saskatchewan, the Yukon Territories, and Arizona.

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