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Consultation Survey on Building-Integrated Photovoltaic Systems and Design Tools

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Executive Summary

This report presents the results of a web-based consultation survey conducted among BIPV specialists by CanmetENERGY's Integration of Renewable and Distributed Energy Resources (IRDER) Program in the period August to October 2017. The survey provided input from architects, engineers, researchers, consultants, manufacturers and policy-makers regarding their knowledge and experiences with building-integrated photovoltaic (BIPV) projects, constraints inhibiting market development as well as the utilization of BIPV design tools. The survey further aimed to identify the format and services a BIPV-specific design tool should incorporate according to industry stakeholders, and to identify individuals interested in participating in a Canadian BIPV working group.

The survey was sent to approximately 800 individuals, out of which 141 completed the survey. Most responses were received from representatives of the building engineering and construction industry (24%), followed by individuals employed in the field of architectural design and planning (21%), and research, development and demonstration (RD&D) (13%). Most of the respondents (73%) have gained their experience through BIPV systems installed in commercial and/or institutional buildings, and 40% have experience with BIPV in the low-rise residential segment. Furthermore, 64% of the respondents have experience with BIPV in new buildings, compared to 46% who have experience with the installation of BIPV in a retrofit project.

The survey results show that economic factors such as the return-on-investment (ROI) and the upfront cost of BIPV compared to conventional building materials are the main barriers hampering the market development for BIPV (see *Figure 1*). In fact, ROI was rated at an average of 4.06 on a scale from 1 (not important) to 5 (very important) and upfront costs were rated at an average of 3.99. Other reported barriers are the lack of financial incentives and overall lack of market establishment (3.73). Interestingly, the perception of barriers varies from one stakeholder group to another.

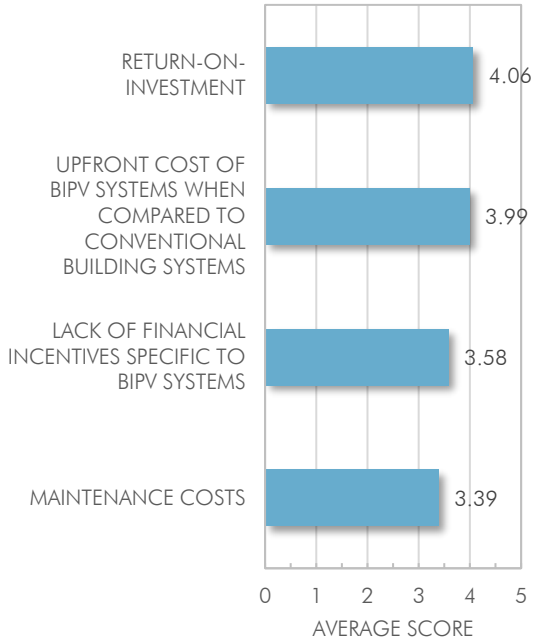

Figure 1: Rating of economic-related constraints (n=120)

Overall, the optimism among BIPV specialists is very strong with 98% of the respondents being at least somewhat interested in using BIPV in future projects and most respondents considering it likely (39%) or very likely (41%) that they will use BIPV in their future projects. The motives behind considering a BIPV system are diverse. Intriguingly, it appears that the main motivational factors are rather of environmental and social nature than economic. For example, 78% of the respondents stated they would consider using BIPV for environmental reasons and 76% would consider using it as an innovative technology.

According to the survey, the most-often used CAD software are AutoCAD (average score of 3.24), SketchUp (2.73) and REVIT (2.47). The consultation survey confirmed that the use of BIPV-specific design-tools is rare (<20%) and only limited to a few existing tools that incorporate BIPV capabilities. The primary intended use of the BIPV tool is during the conceptual/preliminary design and/or design development stage for energy performance assessment (91%), system sizing (81%), and to

support the design proposition to the client or customer (76%) and assessing the ROI (75%). Finally, the majority (58%) of the respondents prefer design guidelines as the format for a BIPV tool (see *Figure* **2**).

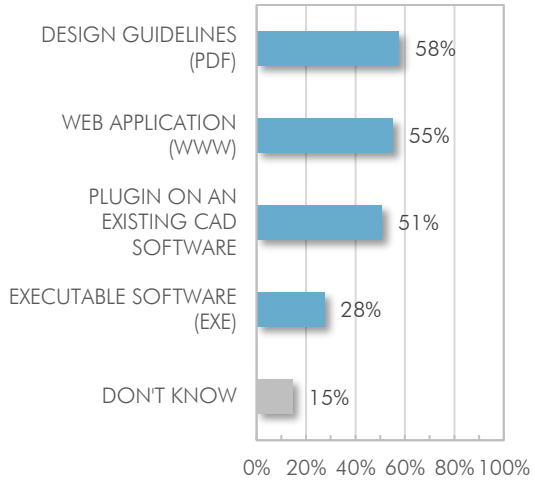

Figure 2: Preferred format for a BIPV design-tool (n=116)

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