Implications of Core Sunlighting for Energy-Efficient Buildings

University of British Columbia
and SunCentral Inc.

Lorne Whitehead

CNC/CIE - IESBC Workshop

Core Sunlighting

- Delivering concentrated sunlight into the building core
- Significantly reducing energy used for electric lighting
- Delivering light that most people prefer
- And doing so cost-effectively

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System design

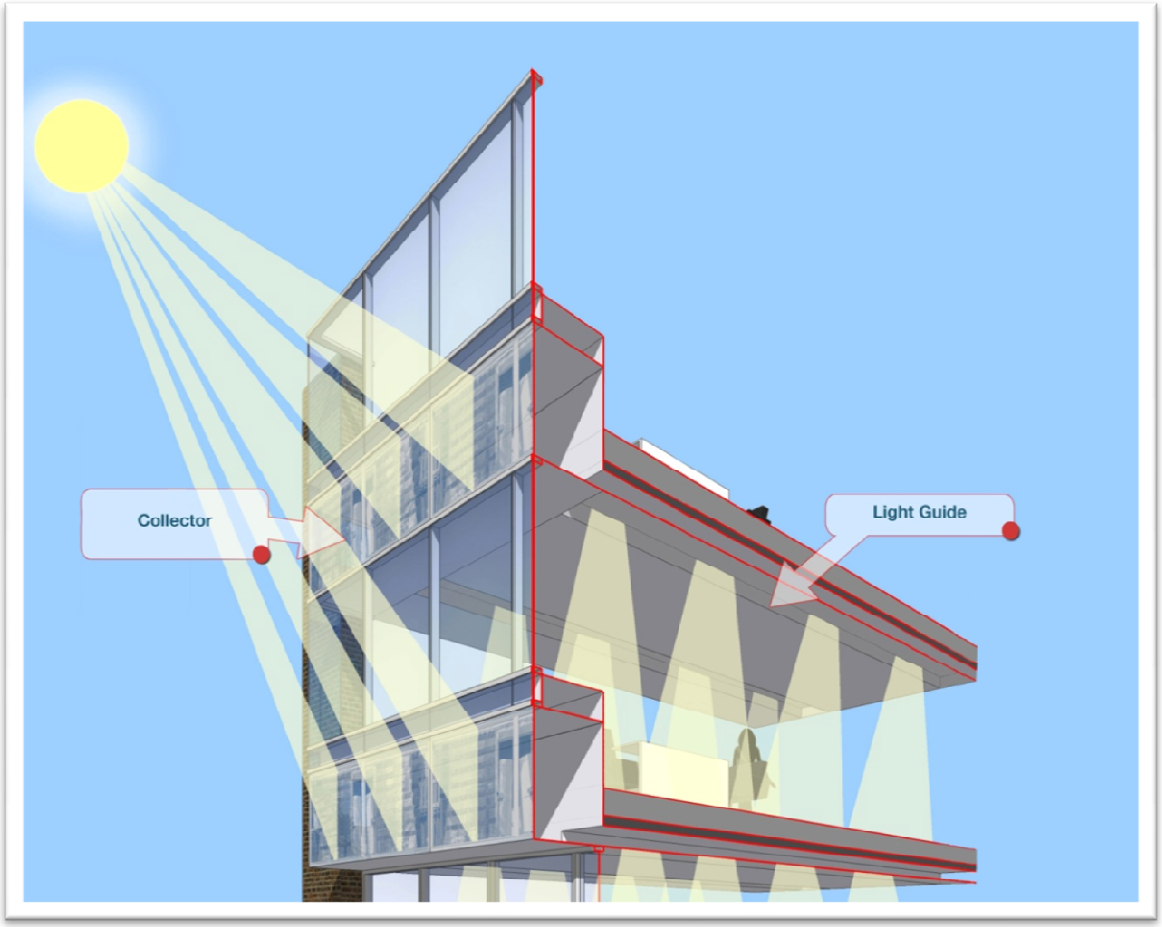
Two sets of components:

Sunlight Concentration:

Sun tracking and concentration system

Sunlight Guidance :

Light guidance system brings light to core



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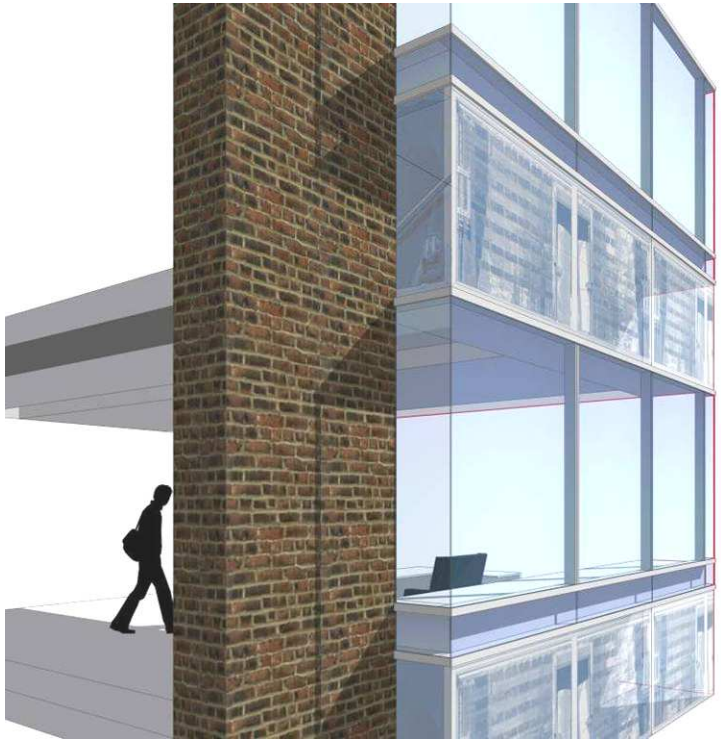
Architectural flexibility

- Concentrators can be exterior shade elements
- Can also be integrated and not visible from the exterior



(Renderings provided by Busby Perkins and Will Architects)

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Collecting and concentrating the sunlight

- Concentrates sunlight X10
- Concentration optics are in a weatherproof enclosure
- Reduces cost and eliminates regular maintenance
- Concentrated sunlight enters through small windows

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Tracking the sun

- Mirrors move in unison to track the sun

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Distributing the sunlight

- Light guides transport sunlight
- And are efficient electric fixtures
- Many different “looks” possible

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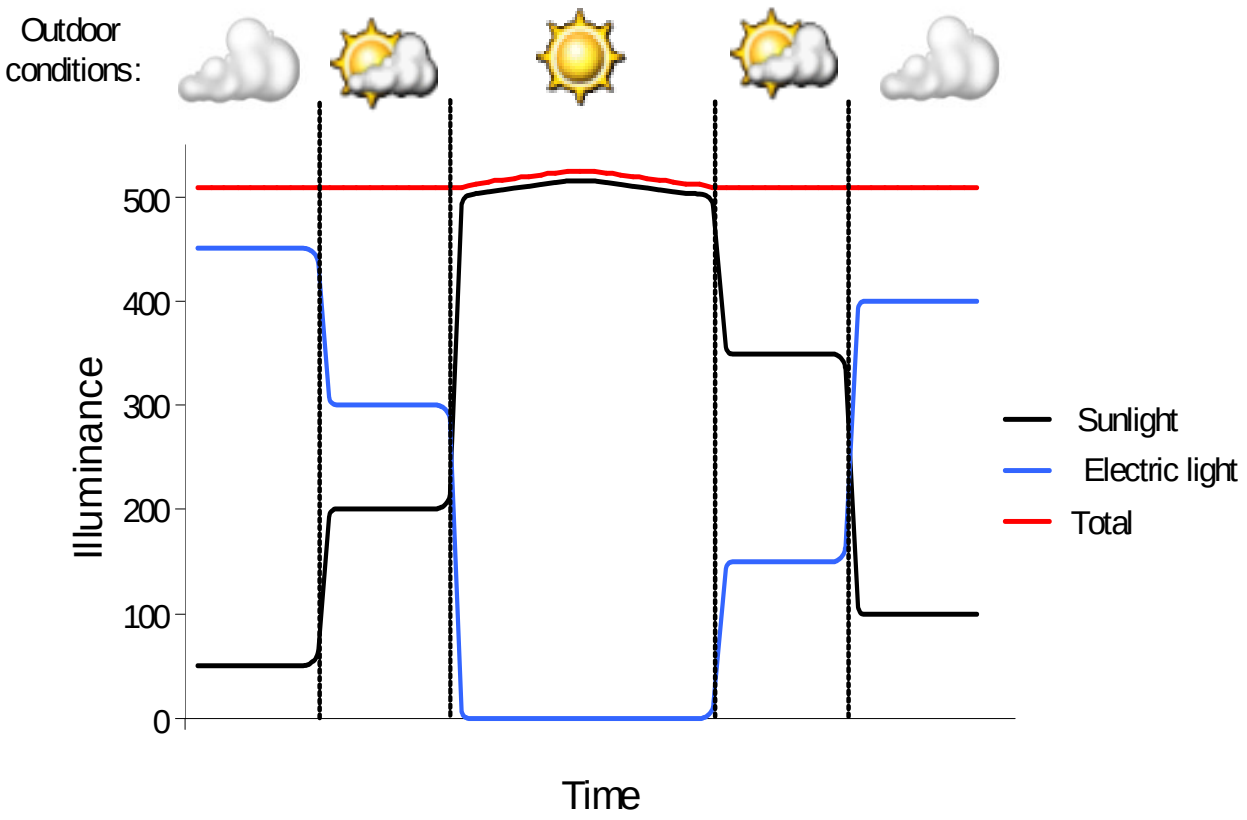
Electric light supplements sunlight



Demonstrating the system

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Core Sunlighting at Work

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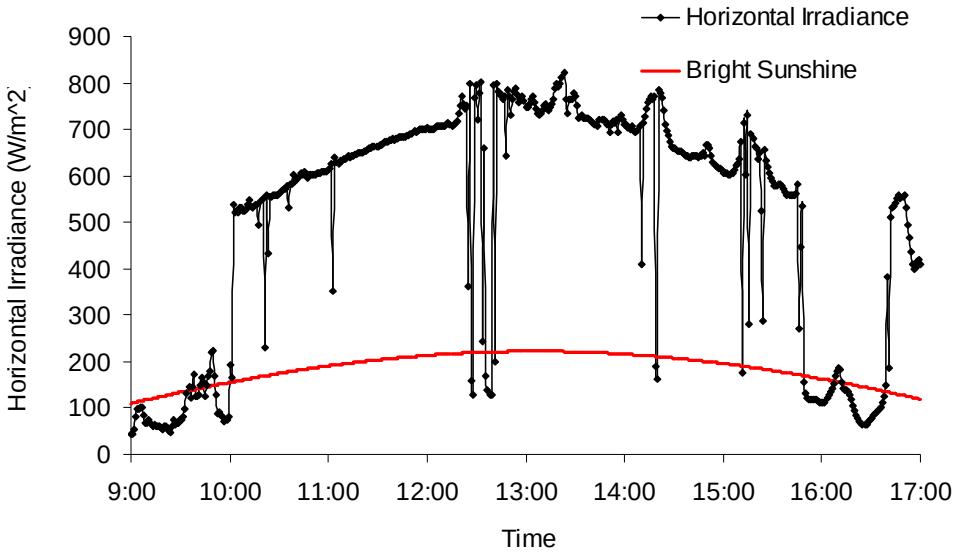
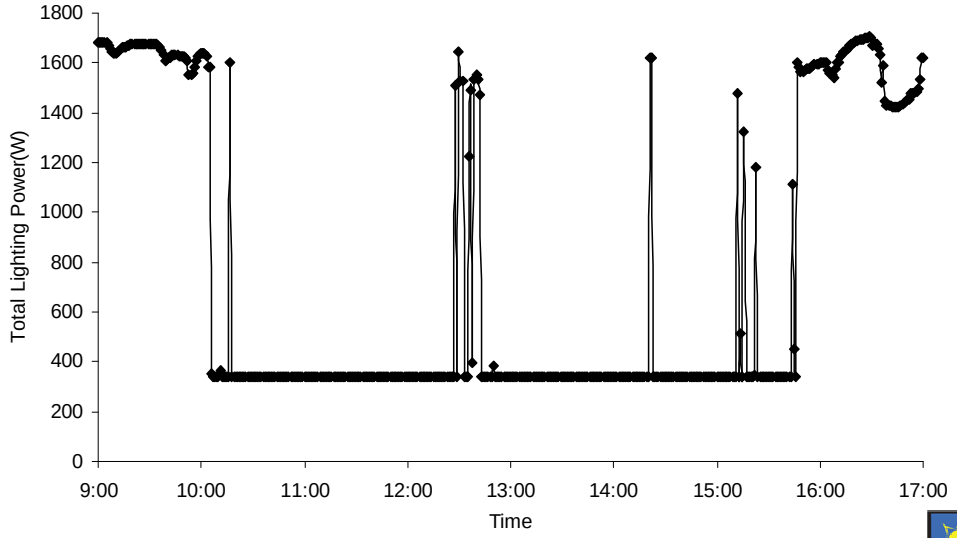
Performance on a mostly sunny day



Estimated:
Lights off for
340 minutes



Measured:
Lights off for
337 minutes

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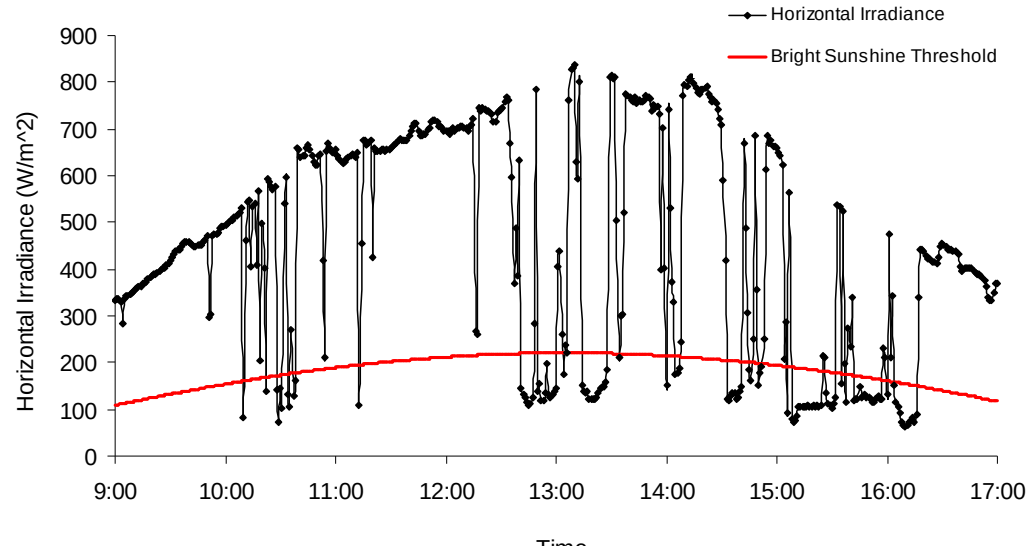
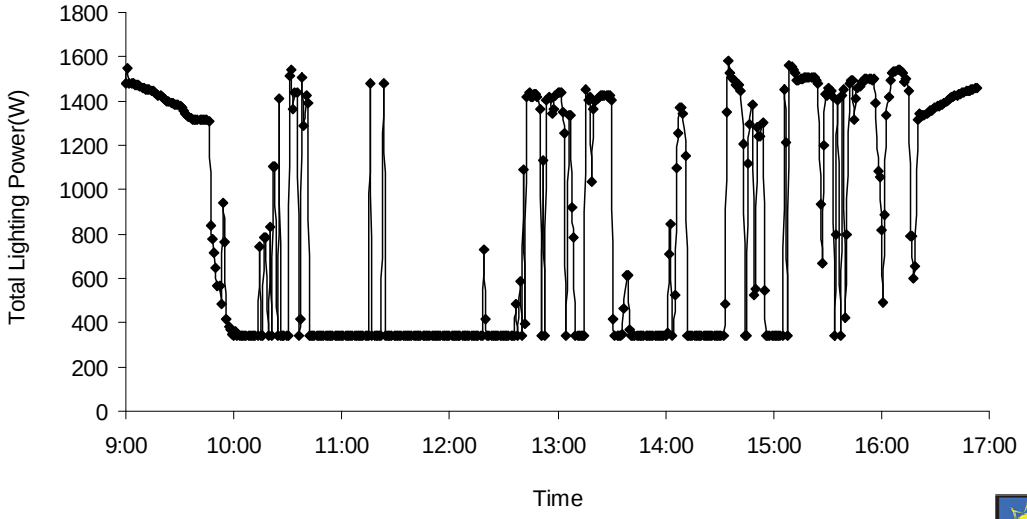
Performance on a partly sunny day



Estimated:
Lights off for
267 minutes



Measured:
Lights off for
265 minutes

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Conclusion

- Core Sunlighting is another way to turn off lights
- Compared to regular daylighting there are advantages
- Probably best to use both together
- And combine with excellent modern electric lights
- Overall, the future is bright for better lighting

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Acknowledgements

The authors are grateful for support provided by:

- Natural Sciences and Engineering Research Council of Canada
- BC Hydro Power Smart
- 3M Company
- Sustainable Development Technology Canada
- BC Innovative Clean Energy Fund
- Busby Perkins and Will Architects
- Morrison Hershfield Ltd.
- Ontario Power Authority
- Manitoba Hydro
- Natural Resources Canada
- Public Works and Government Services Canada
- BC Ministry of the Environment
- CEATI Inc.
- Vancity and the Real Estate Foundation of BC
- Advanced Glazing Systems Ltd.

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