

# ‘Scaling up’ with visualization tools to engage a wider public on community energy

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*Energy Visualisation – Lessons Learned  
from the eViz Project: The Next Level  
Plymouth University  
10 September 2015*



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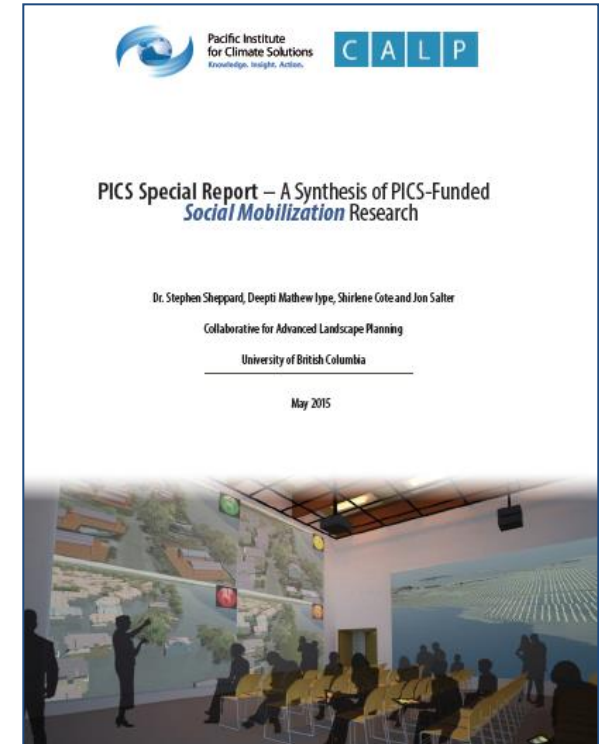


# Outline

- 1. Brief review of PICS Social Mobilization research findings with energy focus**
- 2. Community Energy Explorer (CEE) tool (beta testing)**
  - 1. Potential of mass thermal imaging**

# 1 Social Mobilization Synthesis

- **Special Report** reviews 7 projects across BC (funded by PICS)
- **Focus of research theme:**
  - Reaching silent majority
  - Overcoming social barriers to clean energy
  - Role of digital media
  - Evaluation of effectiveness



(Sheppard et al., 2015)

Research evaluation against a range of possible outcomes

OUTCOMES & CONTRIBUTING FACTORS		Good Life Green Life	Do it in the Dark	Meeting the Climate Change Challenge (MC3)	
				Eagle Island Retrofit	T'Sou So'Com
MEASURABLE RESULTS	Actual GHG reduction/energy saving		✓✓	✓✓	✓
	Progress toward achieving GHG targets		?		
	Per capita GHG reductions	?	?	✓✓	?
	Reduced vulnerability to impacts			✓	✓
	Co-benefits realized	✓✓	✓✓	✓✓	✓
REAL ACTIONS TAKEN	Social behaviour change (positive)/ collective action	✓	✓✓	✓✓	✓
	Mitigation actions taken, e.g. facilities, technology	?		✓✓	✓
	Adaptation actions implemented				
POLICIES ENACTED	Sustainable development pathway adopted				✓
	Mitigation policies adopted				✓
	Adaptation policies adopted				✓
	Mitig/Adapt. policy support increase	?	?	?	?
COMMUNITY ATTITUDES/CAPACITY IMPROVED	Broader cultural shift or ripple effect on values / perceptions / norms		✓	?	?
	Increased community capacity			✓✓	✓
	Increased motivation/concern about climate change/energy	✓	✓✓	✓✓	✓
	Shifted/increased awareness/ understanding of climate change etc.	✓	✓✓	✓✓	✓
	Increased/improved community dialogue on climate change/energy	✓	✓✓	✓✓	✓
PROCESS EFFECTIVENESS/ ACHIEVEMENTS	Integrated decision making or design development				
	Community-led planning			✓	✓
	Social movement ongoing/ripple effect	✓	?	✓✓	✓
	Effective community engagement - reaching beyond the usual suspects	✓✓	✓✓	✓✓	✓
	Effective community engagement - engaging/rewarding experience	✓✓	✓✓	✓✓	?
	Effective partnering		✓	✓✓	✓
	Peer-to-peer learning (among practitioners)				
	Neighbour to neighbour interaction		✓✓	✓✓	✓
	Action campaign event(s)		✓✓		
	Preparatory social learning	✓		✓	✓

# Classification of PICS Social Mobilization research projects

CATEGORIES		PROJECTS								
		Good Life Green Life	Do it in the Dark	MC3		Greenest City (GCCP)		Revelstoke Urban Form Workshops	Solar Colwood	Community Energy Explorer
				Eagle Island Retrofits	T'Sou-ke Solar Community	Transport Facebook	Energy Workshops			
Independent of formal process		✓	✓	✓	✓					✓
Relates to formal process						✓	✓	✓	✓	✓
Type of intervenor	Grassroots/ community			✓	✓					
	3 <sup>rd</sup> party <sup>1</sup>	✓	✓			✓	✓	✓		✓
	Government					✓	✓		✓	✓
Focus of study	Building Energy		✓	✓	✓		✓	✓	✓	✓
	Broader sustainability /GHG issues	✓		✓	✓	✓	✓	✓		
Number of people engaged (approx.) <sup>2</sup>		Approx. 3,000 to date; (Research: 6 households / 9 people)	646 students (registering on MEE Facebook tool)	26 house- holds	96 house- holds	750 Vancouver residents (Research: 537 registered on Facebook)	70 approx. Vancouver residents	44	1600 homeowner s	50+ users to date
Geographic scale		Metro Vancouver	6 university campuses	Small neighbor- hood	Small neighbor- hood	City of Vancouver	30 block neighbor- hoods approx.	3-6 block neighbor- hoods	Municipalit y of Colwood	Metro Vancouver
Tools/digital media used		Video, website, social media, workshops & film screenings	Video, social media (especially Facebook), energy dashboard	Thermal imaging, email	Unknown	Social media, especially Facebook	Graphics, mapping, 3D visualization, physical collage /game	Graphics, mapping, 3D visualization, touch-table	General public information (e.g. website, emails, etc.)	Graphics, mapping, 3D visualization, interactive web interface.

Estimated 9430 individuals contacted or more deeply engaged through these interventions

Estimated 3000 actually engaged in the PICS-funded research evaluations



# MC3 Case Study:

## Eagle Island community-led neighbourhood retrofit

- 28/31 homes have done energy audits and thermal imaging (intensive, personal, mostly indoors)
- Most have done energy upgrades, reduced carbon emissions by 66% (estimated)
- Fuelled by fun (dinners, wine, etc) and vivacious champion
- Key support role of local government

### Sources:

- PICS White Paper (draft) on thermal imaging and community-led action (Cote, Sheppard, Burch, & Pahl, 2015);
- UK research: Goodhew et al., 2014)
- <http://mc-3.ca/eagle-island>

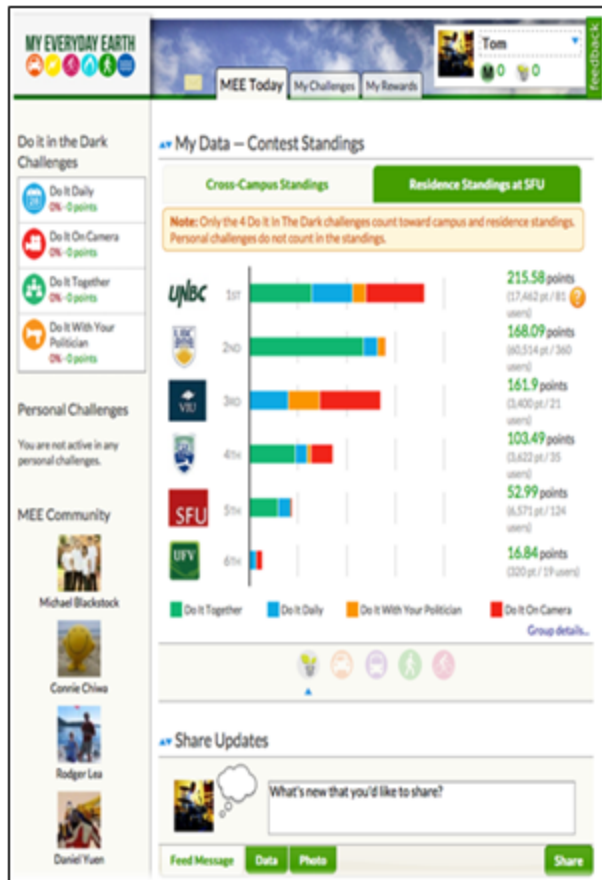


Photos: S. Sheppard  
Thermography: Steve Goodhew

# 'Do it in the Dark' Campaign

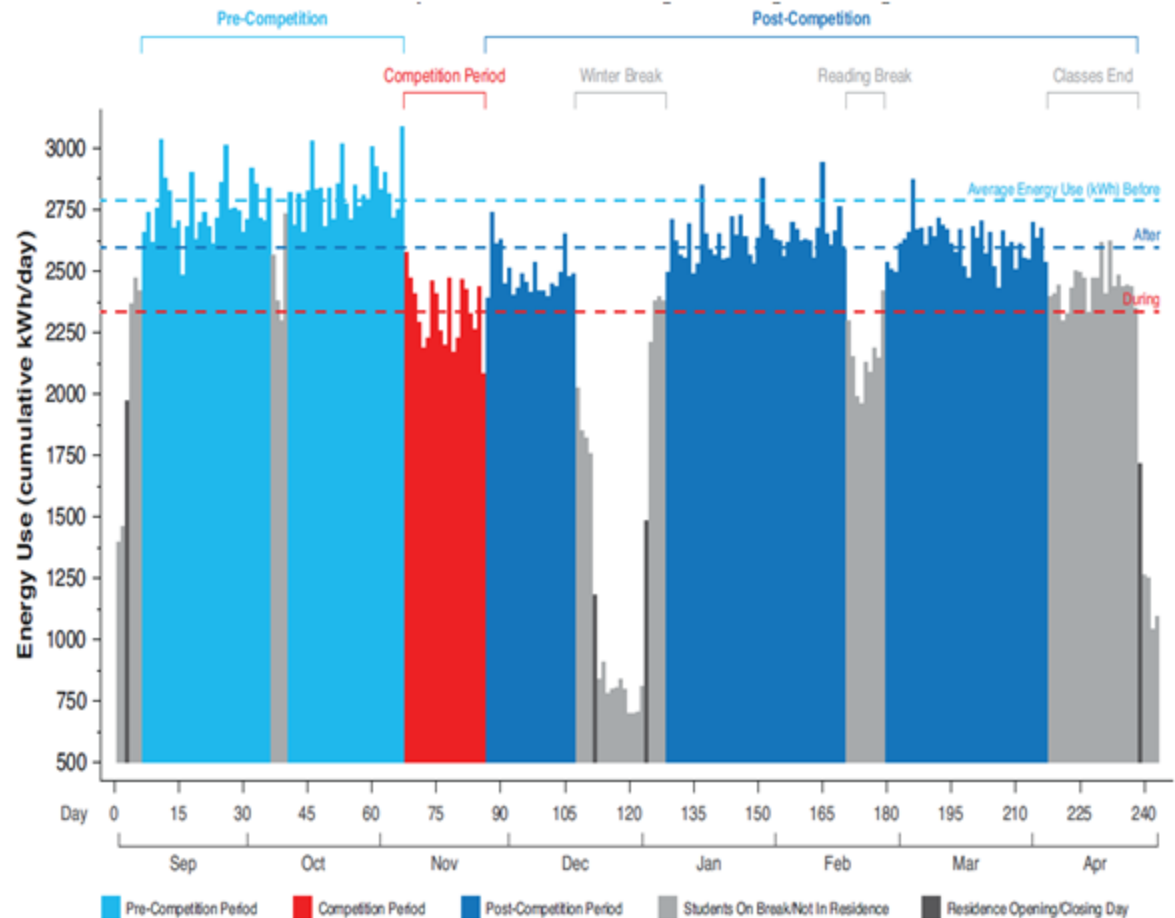
## Digital media as catalysts for climate action campaigns

Combination of social media, multi-media and face-to-face engagement (fun) in a 3-week competition among campus residents led to significant year long energy savings



Source: Senbel et al., 2014

Competition Interface (My Everyday Earth Facebook app)



Totem Park daily energy use from Sep 2011 – Apr 2012, showing clear decline during competition.

# What have we learned?

- Grassroots & 3<sup>rd</sup> party initiatives can produce substantial reduction in carbon footprints over 1 months to 3 years
- Power of 'bottom-up' social collaboration/peer pressure in a small geographical area with distinct identity eg. T'Sou-Ke First Nation Solar Community



Source: <https://www.aadnc-aandc.gc.ca>)

OUTCOMES & CONTRIBUTING FACTORS		PROJECTS							
		Greenest City Conversations (GCCP)	Transport Workshop	Energy Workshop	Red-stake Urban Form Workshop	Solar Cabwood	Community Energy Explorer		
MEASURABLE RESULTS	Actual GHG reduction/energy saving		✓✓	✓✓			✓		
	Progress toward achieving GHG targets		?				?		
	Per capita GHG reductions	?	?	✓✓	?		?		
	Reduced vulnerability to impacts/ improved resilience			✓	✓				
	Co-benefits realized	✓✓	✓✓	✓✓	✓✓		✓✓		
REAL ACTIONS TAKEN	Social behaviour change (positive)/ collective action	✓	✓✓	✓✓	✓✓		×		
	Mitigation actions taken, e.g. facilities built, technology installed			✓✓	✓✓		✓×		
	Adaptation actions implemented								
POLICIES ENACTED	Sustainable development pathway adopted			✓✓		?	✓		
	Mitigation policies adopted			✓	?	?			
	Adaptation policies adopted			✓					
COMMUNITY ATTITUDES/CAIN CITY IMPROVED	Mitig./Adapt. policy support increase	?	?	?	?	✓	?	×	?
	Broader cultural shift or ripple effect on values/perceptions/ norms		✓	?	?			×	
	Increased community capacity			✓✓	✓✓		✓	?	?
	Increased motivation/concern/ caring about climate change/energy	✓	✓✓	✓✓	✓	?	?	?	?
	Shifted/increased awareness/ understanding of climate change etc.	✓	✓✓	✓✓	✓	?	✓✓	✓	?
	Increase/improved community dialogue on climate change/energy	✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	?
PROCES EFFECTIVENESS/ ACHIEVEMENTS	Integrated decision making or design development					?	?	✓	
	Community-led planning			✓	✓✓				
	Social movement ongoing/ripple effect	✓	?	✓✓	✓✓			?	
	Effective community engagement - reaching beyond the usual suspects	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓×
	Effective community engagement - engaging/rewarding experience	✓✓	✓✓	✓✓	?	✓✓	✓✓	✓✓	?
	Effective partnering		✓	✓✓	✓				✓
	Peer-to-peer learning (among practitioners)?								✓
	Neighbour to neighbour interaction		✓✓	✓✓	✓✓		✓	✓✓	
	Action campaign event(s)		✓✓						
	Preparatory social learning	✓		✓	✓		✓	✓	×
CONTRIBUTING / ENABLING FACTORS	Financial incentives applied/ available to users			Yes	Yes			Yes	
	Government support of intervener			Yes	Yes			Yes	Yes
	Compelling visual media used	Yes	Yes	Yes	?		Yes	Yes	Yes
	Active social media used	Yes	Yes	Yes	?	Yes		?	TBD
	Fun activities	Yes	Yes	Yes	?		Yes	Yes	TBD
	Emergent dialogue/co-creation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Spiritual values engaged	Yes			Yes				

Key:

Intended outcome	✓✓	Strong positive result overall	✓	Weak positive result overall
No positive result overall (for intended outcome)	?	Outcome unknown or uncertain (lack of available data)		

Table 1 - Key findings of PICS research & outcomes of selected Social Mobilization interventions



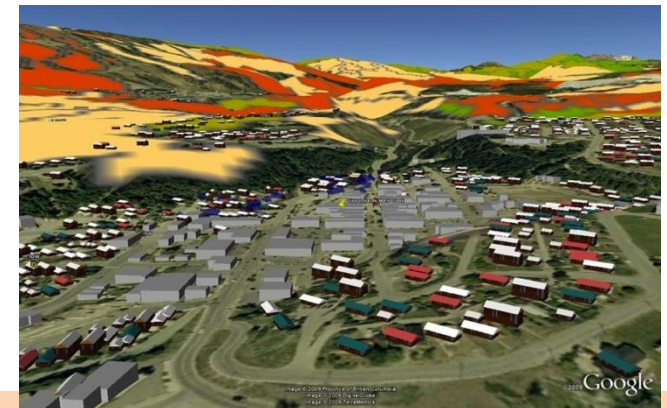
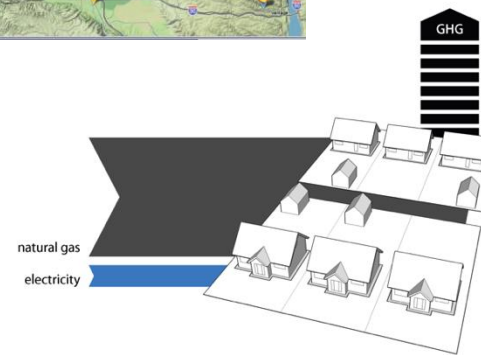
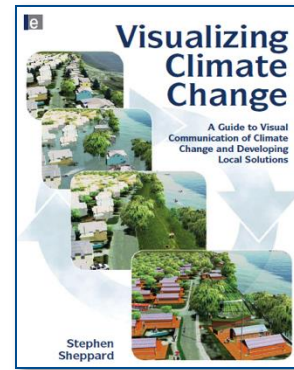
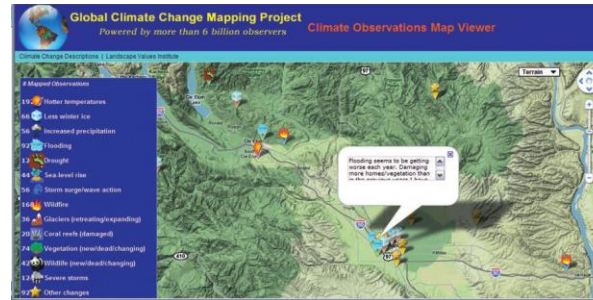
# So, what works?



- **Fun!** (social interaction, parties, vlogs, competitions, games, etc)
- **Multiple channels** for social engagement, across and within stakeholder or community groups
- **Digital (social) media** for linking people, building momentum for community engagement exercises, including structured/mediated use of social media
- **Powerful visual media** related to the community in question (self-generated or more authoritative/evidence-based)
- **Collective problem solving and peer pressure** at neighbourhood scale with 'grass roots' groups
- **Coordinated top-down and bottom-up processes**, conducted by multiple partners
- **3<sup>rd</sup> party intervenors** (NGOs, researchers, etc.) who build trust and introduce well-designed new tools, processes and initiatives for uptake by communities and government

# Various visual learning tools

- 2D maps/community mapping
- Info-graphics
- Visualizations and video









Local food market

Live / work development

Stormwater drainage swale

Smaller, efficient cars

60% reduction in home energy consumption

Passive solar conservatory

Community gardening

Multifamily suites

Increased public transit

Electric commuter vehicles

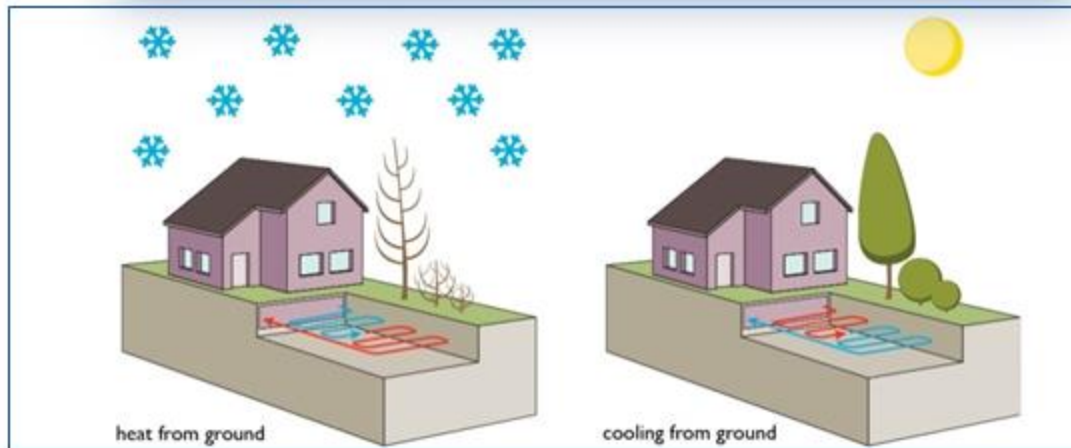






## 2 Community Energy Explorer online resource

- “Community Energy 101”
- Powerful visuals
- Interactive maps
- Local case studies and success stories



[www.energyexplorer.ca](http://www.energyexplorer.ca)

(Barron et al., 2013)

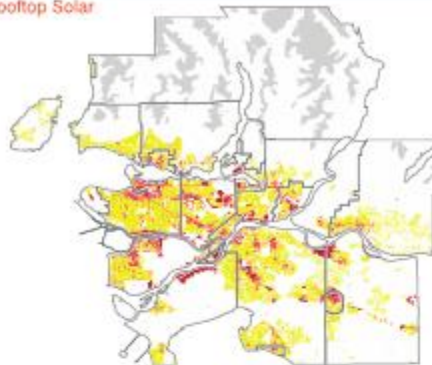


# Renewable energy capacity and demand mapping

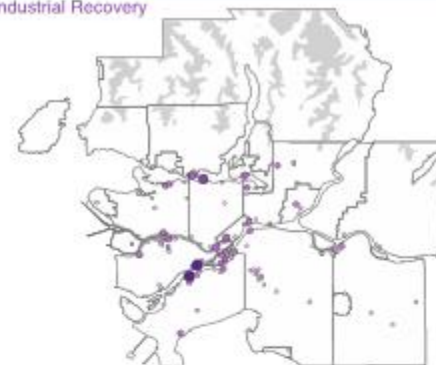
Micro Hydro



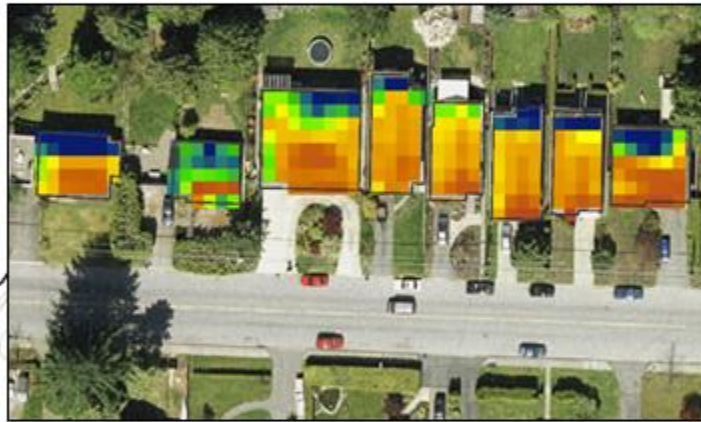
Rooftop Solar



Industrial Recovery



Livestock Biogas



Solar Potential Kilowatt-hours/year

tt-hours/year

West Van Solar Potential

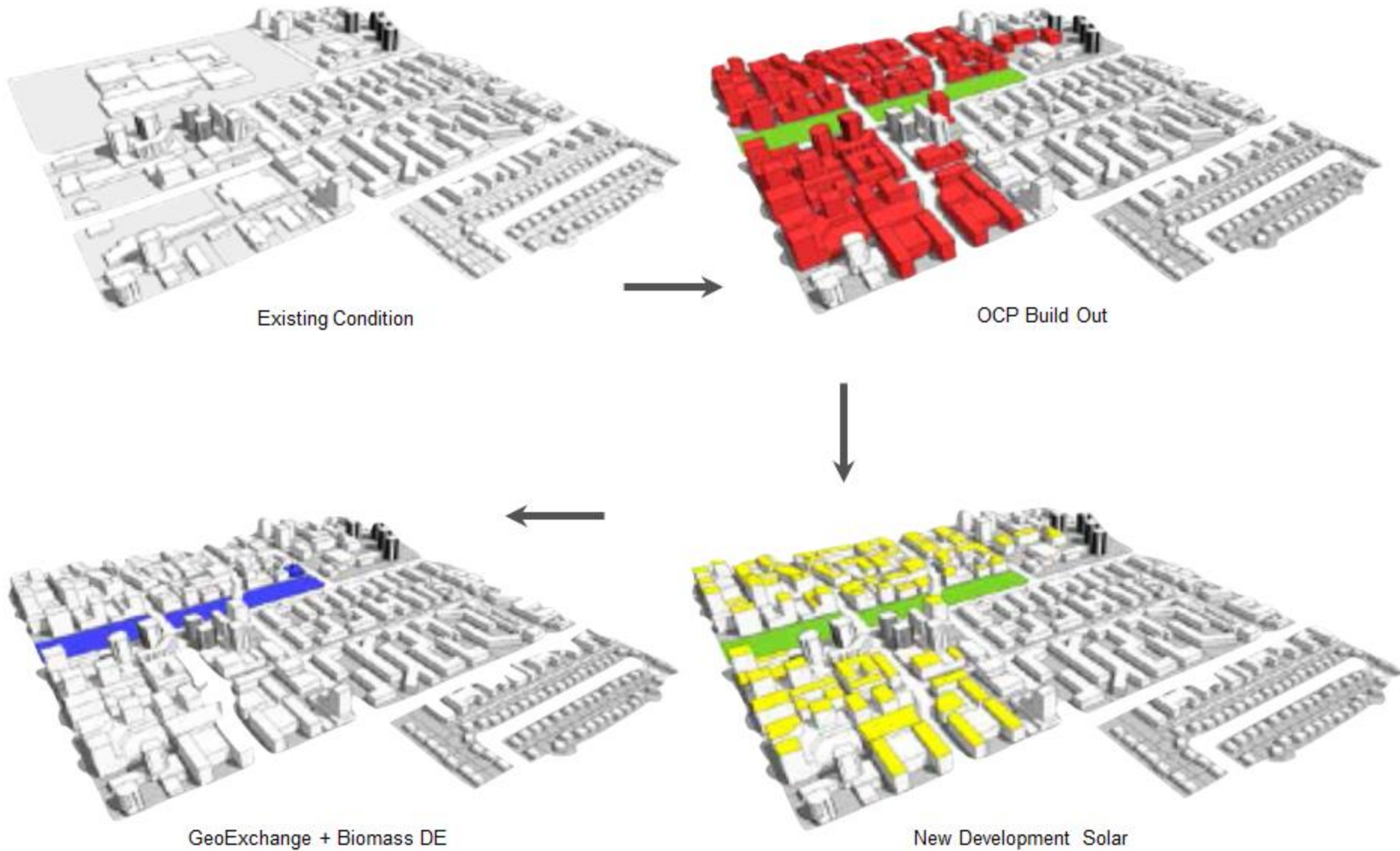
0.0289 - 0.1733

0.1733 - 0.8223

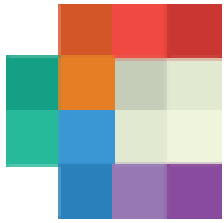
0.8223 - 1.1735



# Case Studies





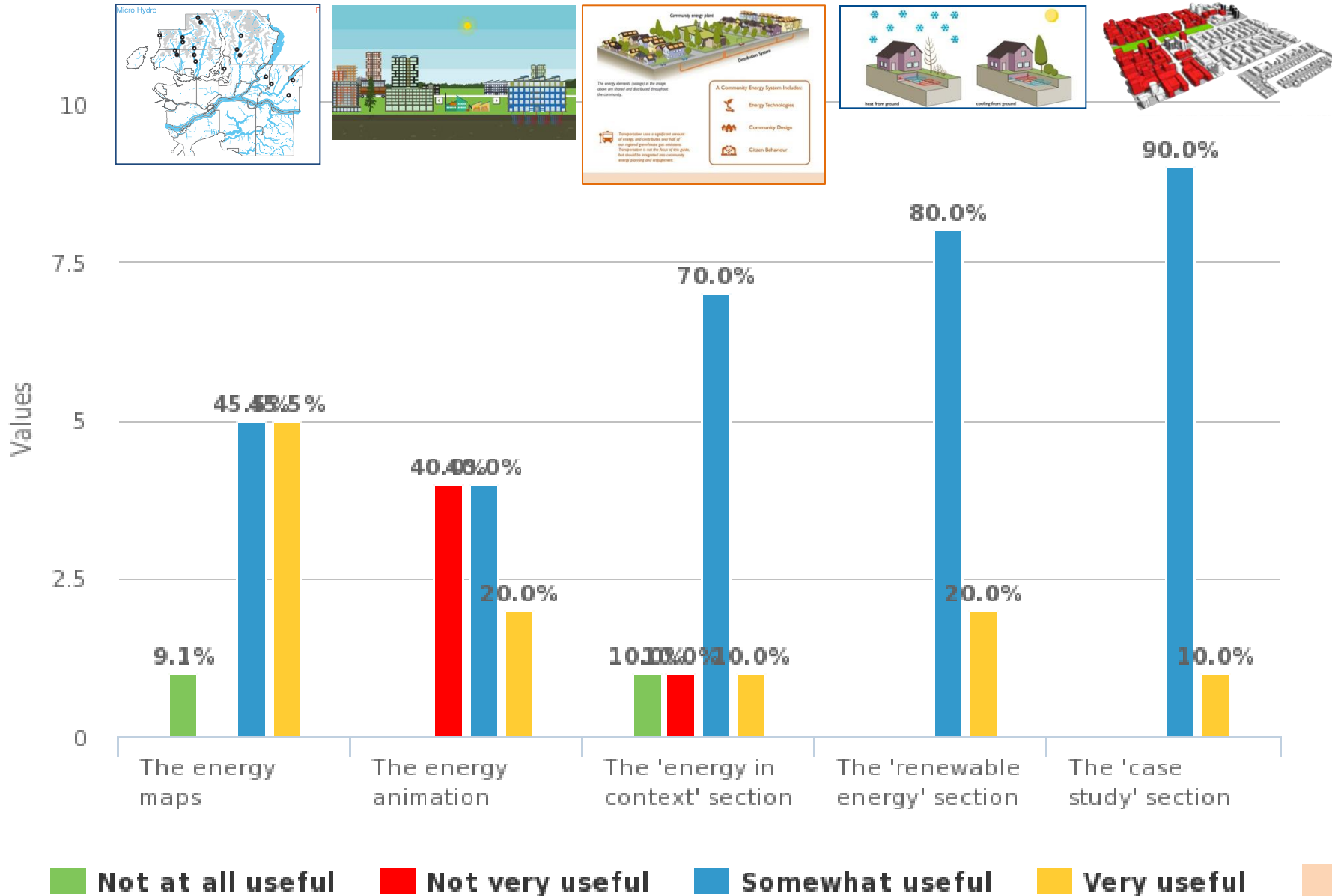


# Intended Users of CEE



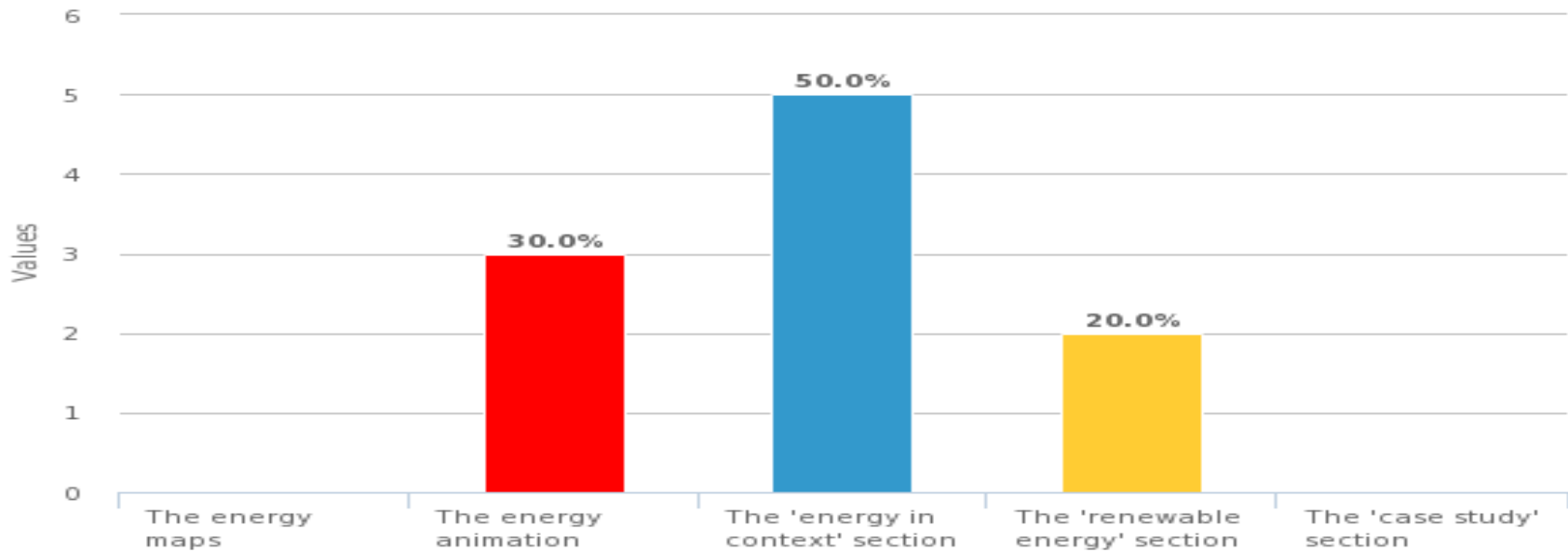
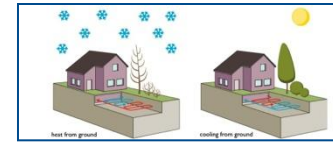
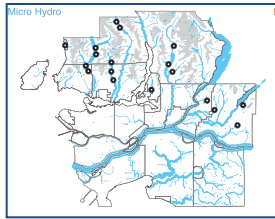
- **Non-expert users**
  - public events
  - homework before an energy workshop or public consultation on energy/development projects
  - educational resource
- **Practitioners:**
  - Preparing slide-shows (free source of graphics)
  - Live presentations to councils on local energy resources, energy demand, etc.
  - Regional & community-level data on renewable energy supplies

# Beta results: Website usefulness by section



n = 10 (usability testing) - Salter, 2015

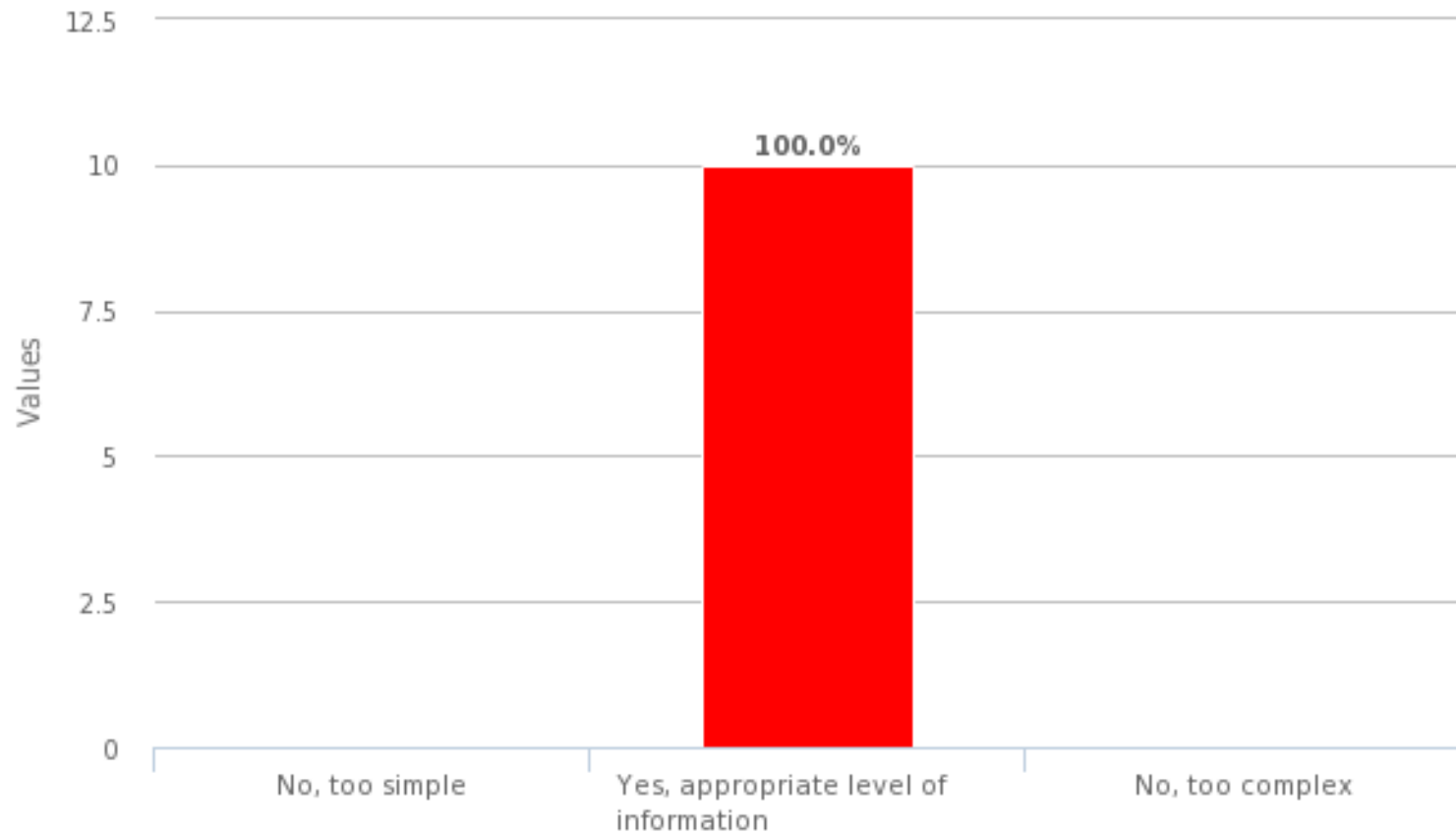
# Best Website Section for Non-Experts



n = 10 (usability testing) - *Salter, 2015*



# Appropriate Level of Information



# 3 City of Vancouver mass thermal imaging project

## Greenest City Goals:

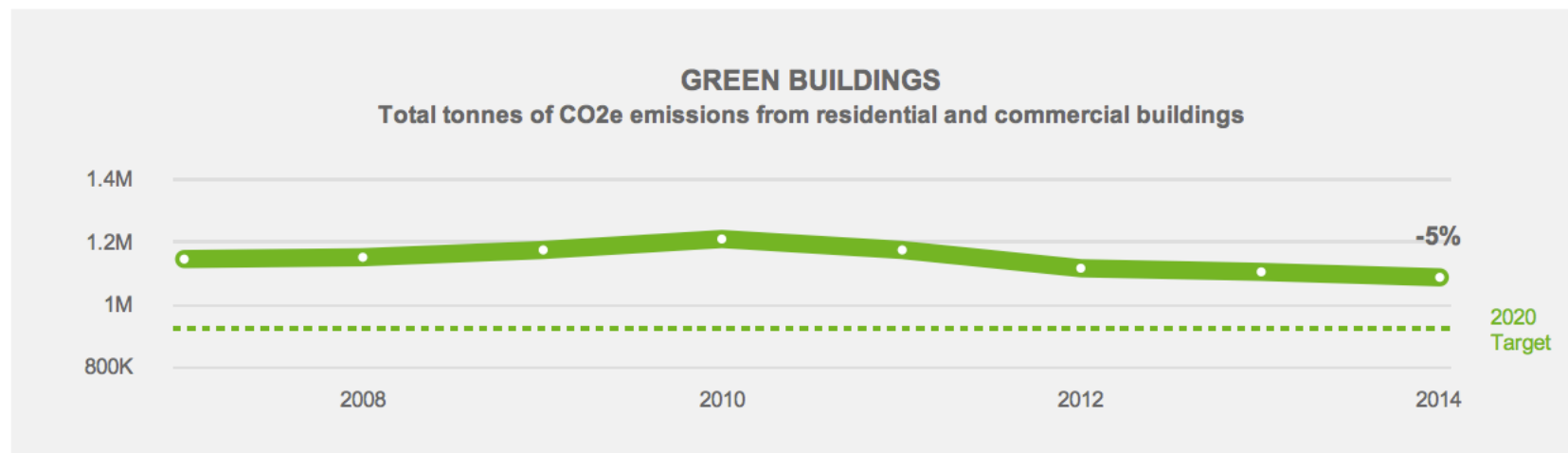
- Green Buildings (2020)

<http://vancouver.ca/green-vancouver/green-buildings.aspx>



Our target: Reduce energy use and GHG emissions in existing buildings by 20% over 2007 levels

## Progress we've made so far




# 3 City of Vancouver mass thermal imaging project

- **Promise:** mass scale street-level, thousands of homes at one time; identify the most energy inefficient homes; cheaper per house: opt-in?
- **Dilemmas:** top-down; privacy?; still home-owner by home-owner (not socially enabled); not indoor (initially), not tailored.

Your independent energy efficiency advocate since 2008 [SIGN UP](#) [LOG IN](#)

**sagewell**<sup>SM</sup> [HOW WE HELP](#) [ABOUT](#) [BLOG](#)

## How energy efficient is your home?



- Capture the energy savings potential of your home
- Sagewell's password-protected thermal image report shows heat losses from exterior building components.
- Easily connect with energy efficiency programs for rebates and credits on insulation, heating systems, and windows.
- Get started today by searching for your address below.

**Find your home or building**

Enter your street address, city, state and zip - or enter your invitation code [FIND SAVINGS NOW](#)

🏠 All Homes: 131,704,730 🚫 Highly Inefficient: 13,170,473 🏠 Inefficient: 26,340,946 🏠 Somewhat Inefficient: 26,340,946 🌿 Efficient: 65,852,365

"The thermal imaging was a real kick in the pants to get us going on [making improvements], instead of just thinking about it." - A.B.

"Thank you. This is fun and useful." - T.M.

"We...GREATLY appreciate the help in finding how to improve our heat/cool retention to save our environment and pocketbook! Thanks for your help!" - J.N.

"Thanks, what a great service to offer!" - J.P.

<http://www.sagewell.com/myhome/>

# Principles for ethical & effective communication on climate change with visual media (Sheppard, 2012)

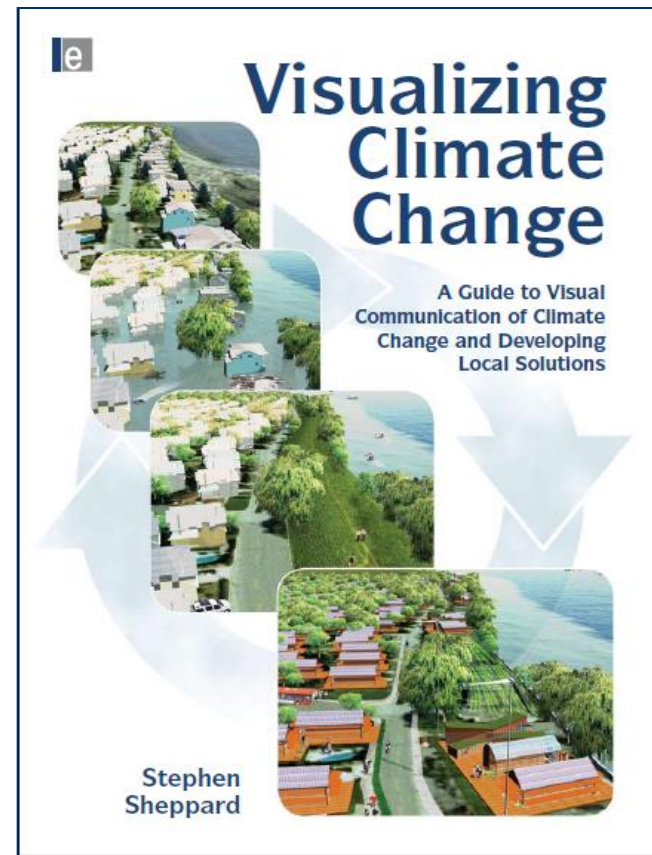
- **Clarity** – vivid, easily seen and understood
- **Credibility** – honest, balanced, verifiable, **co-constructed, endorsed?**
- **Engagement** – interesting and accessible
- **Connectivity** – relevant, **personal, integrated?**
- **Feasibility** – practical, cost-effective, replicable

# Thank you

- Please visit <http://pics.uvic.ca/research/publications/other> for **Summary Report** or **Full Special Report on Social Mobilization**

[www.energyexplorer.ca](http://www.energyexplorer.ca) for **Community Energy Explorer**

- Comments to: [deepti.mathewiype@ubc.ca](mailto:deepti.mathewiype@ubc.ca)  
[www.calp.forestry.ubc.ca](http://www.calp.forestry.ubc.ca)



[www.visualizingclimatechange.ca](http://www.visualizingclimatechange.ca)