Building Technologies Program

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Strategic Analysis of Emerging Technologies – Windows

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Emerging Technologies Team within the context of BTP

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Emerging Technologies: Research, development and commercialization of technologies five years or less to market ready

Commercial and Residential Integration Teams: Stimulate market push and pull

Standards and Codes Teams: Minimum equipment standards and building codes accelerate market penetration

Emerging Technologies strategic analysis informs decision making

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- The Prioritization Tool aims to provide an objective comparison of new and existing technologies/measures
- It estimates potential energy savings and costs of conserved energy using a widely accepted methodology and validated sources of input
- This enables a “level playing field” comparison of technologies
- Outputs are reviewed through various “lenses” with stakeholders
- Results inform decision making, resulting in a balanced portfolio and quantitative BTP/ET goals
- The process is “evergreen” with continual refinement of inputs and methodology

Output: Energy savings by 2030 with DOE activity/investment (staged)

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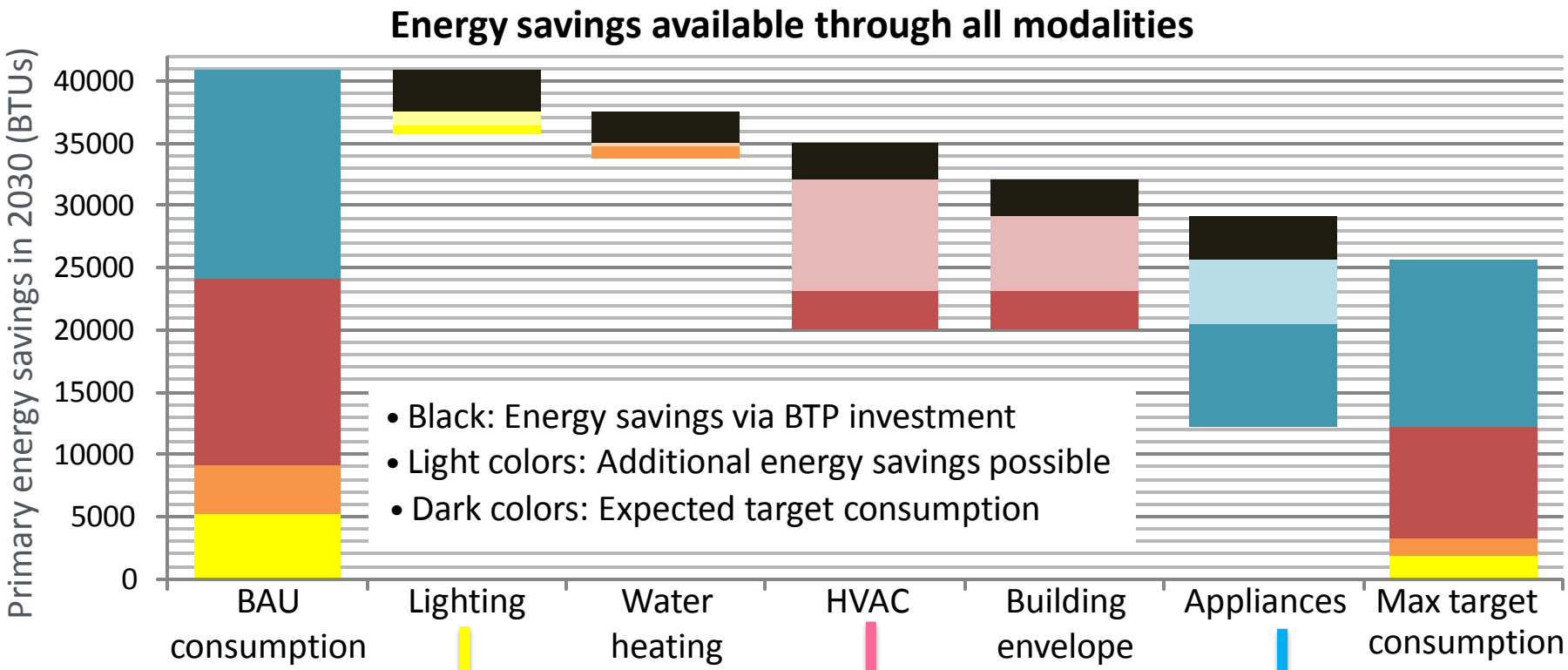

LED lighting offers exceptional opportunity to transform end-use

WH technologies are far from maximum efficiencies

Huge potential for energy savings in HVAC and Envelope which require R&D and/or market stimulation

Appliance standards drive down energy use

Prioritization Tool: inputs, methodology and outputs

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Inputs

Each measure (e.g. technology) requires four data inputs:

- **Performance improvement:** technical energy savings
- **Cost:** incremental cost of the technology over common baseline
- **Market:** stock this measure (e.g. technology) can impact
- **Supporting information:** lifetime, adoption rate, code/standard date, etc.

Metho-dology

We apply standard analysis methodology:

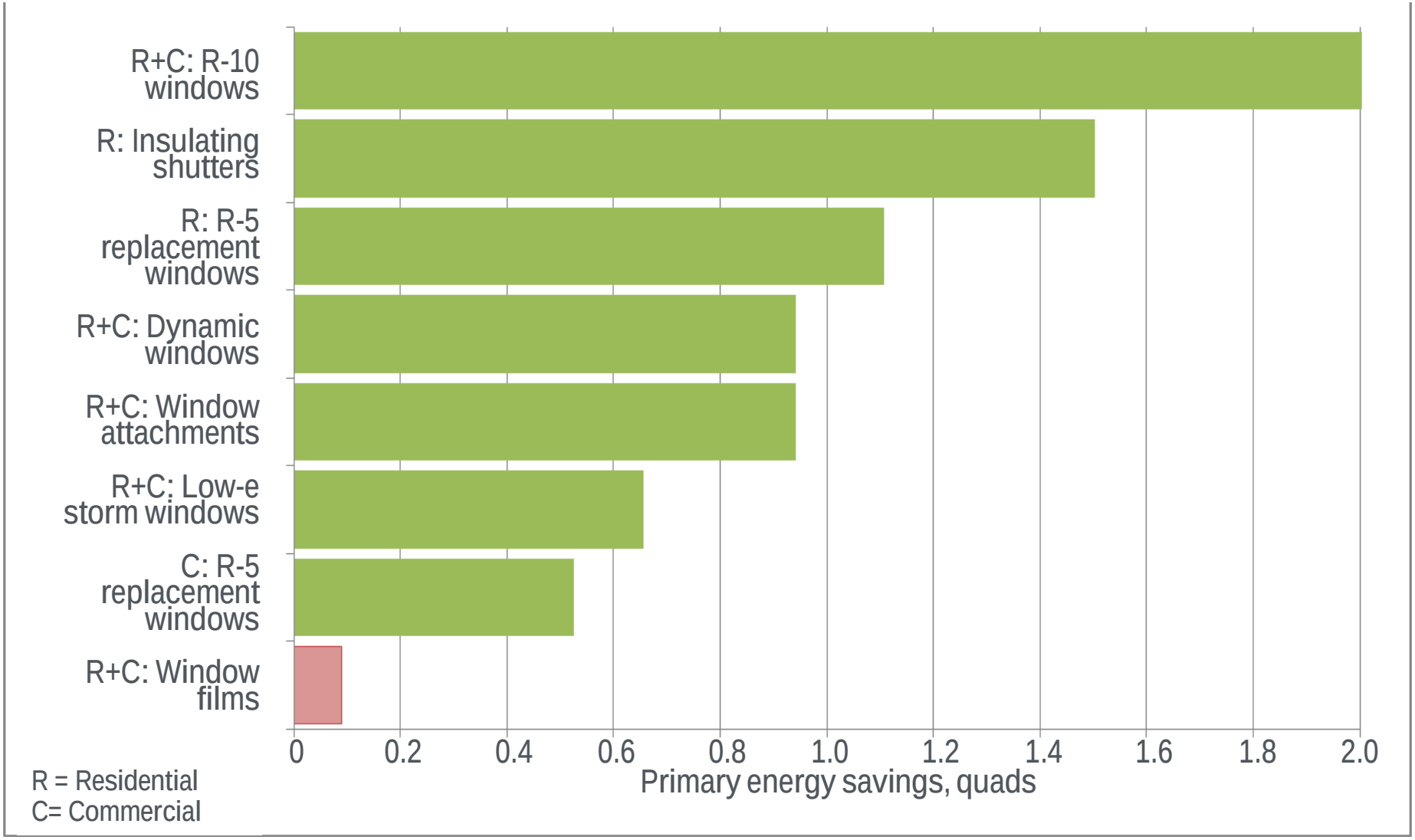
- **Energy savings (technical potential):** maximum technical savings is percent savings multiplied by market energy use
- **Stock and flow dynamics (two family):** end-of-life equipment stock turn-over used to determine practical limit to technology adoption
- **Staging framework:** overlapping savings identified by segmenting energy use; measure with lowest cost of conserved energy stages first
- **Technology diffusion:** innovator/follower dynamics
- **Cost of conserved energy:** present value cost of technology divided by lifetime energy savings (i.e. $/MMBTU)

Outputs

This produces useful outputs (e.g. strategic game board) that can be tested through sensitivity analyses and viewed through various lenses such as:

- Maximum technical potential
- Energy savings vs. cost of conserved energy (no interaction – unstaged)
- Energy savings vs. cost of conserved energy (interaction – staged)
- Adoption adjusted energy savings potential

Technical Potential (maximum energy savings, no cost)



Unstaged Maximum Adoption Potential, 2030 (no interaction among measures)

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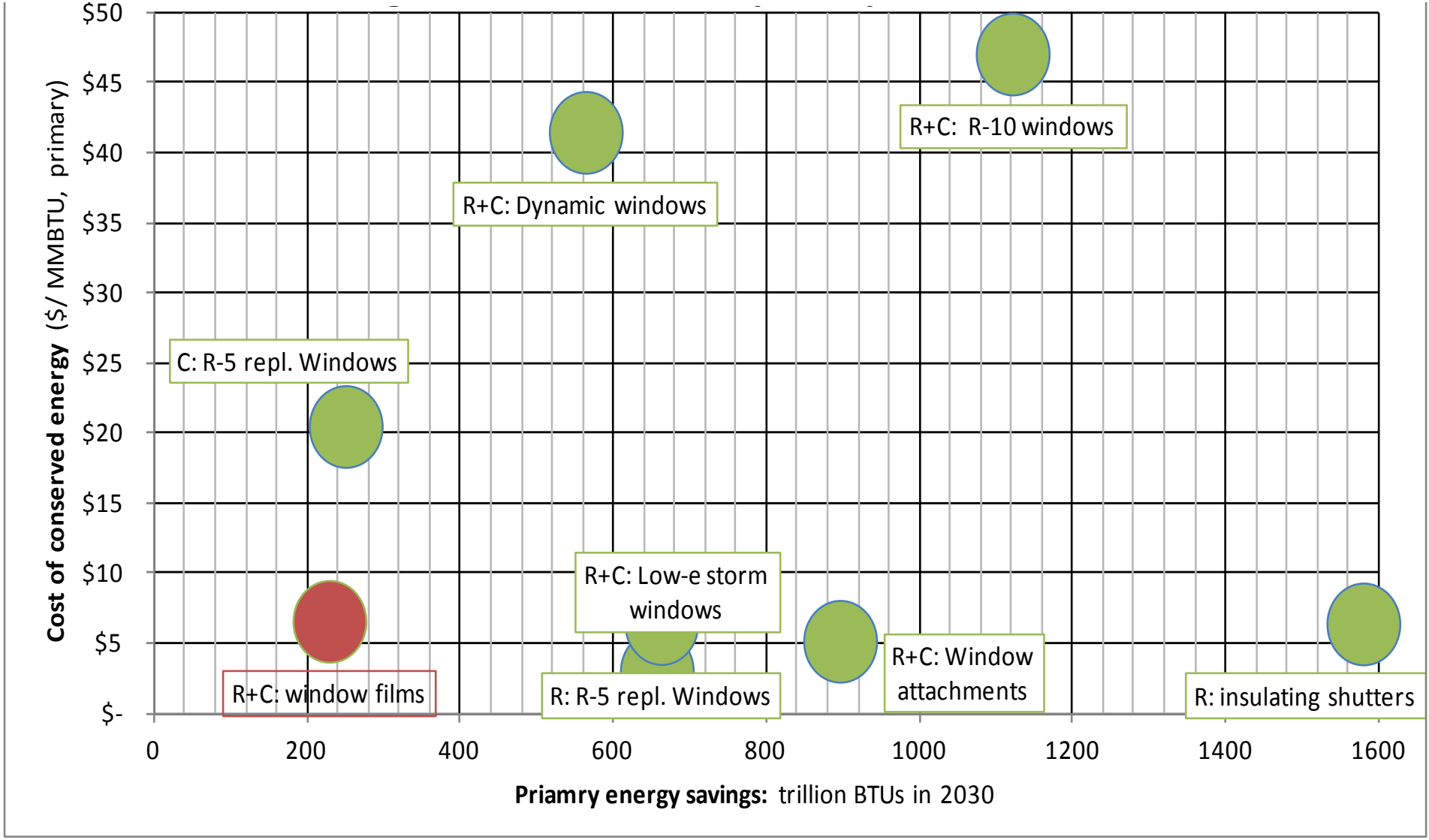

Staged Maximum Adoption Potential, 2030 (low cost measures grab savings first)

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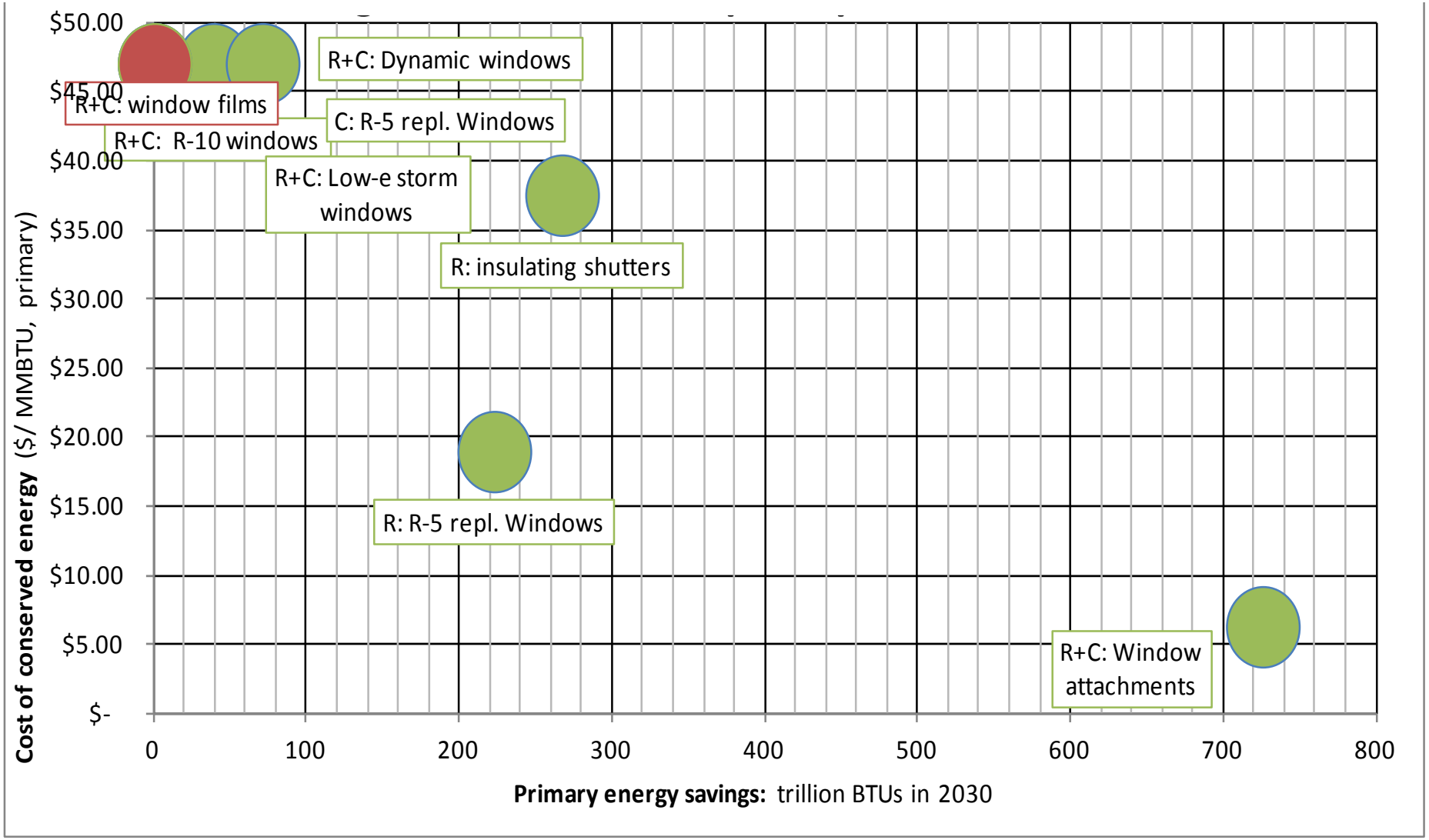

Inputs for review at your leisure… (click on spreadsheet)

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1. Description of the measure
2. Energy savings
3. Incremental price
4. Units & capacity
5. Market description
6. Market size
7. Site energy use (TBTUs)
8. Source energy use (TBTUs), 2030
9. Economic potential (TBTUs), 2030
10. CCE ($/ MMBTU)
11. Lifetime (years)
12. Primary source/other sources
13. Quote
14. Conclusion

Next steps…

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- Review inputs to measures (click on Excel spreadsheet) – if you think they are incorrect, provide a reputable source for alternatives
- Review outputs (charts in presentation) – if you think they are incorrect, help us determine why (e.g. through input review)
- Review NREL report (published summer 2012) to become familiar with methodology approach
- Experiment with 'Prioritization Tool Lite' – in early fall, tool will be released in the form of an "RFI" through Federal Registry
- Send feedback to: prioritization.tool@nrel.gov