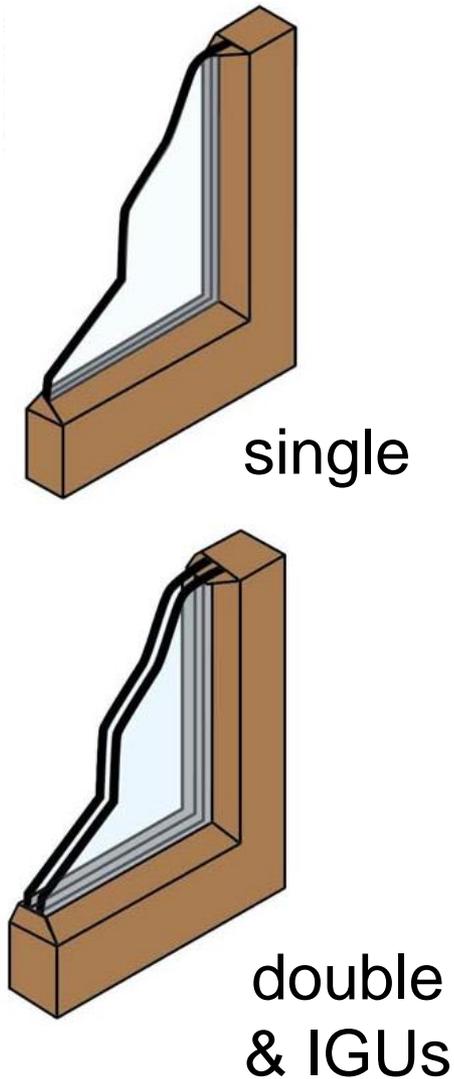


S.H.I.E.L.D. - ARPA-E's Agent for Transforming Single Pane Windows

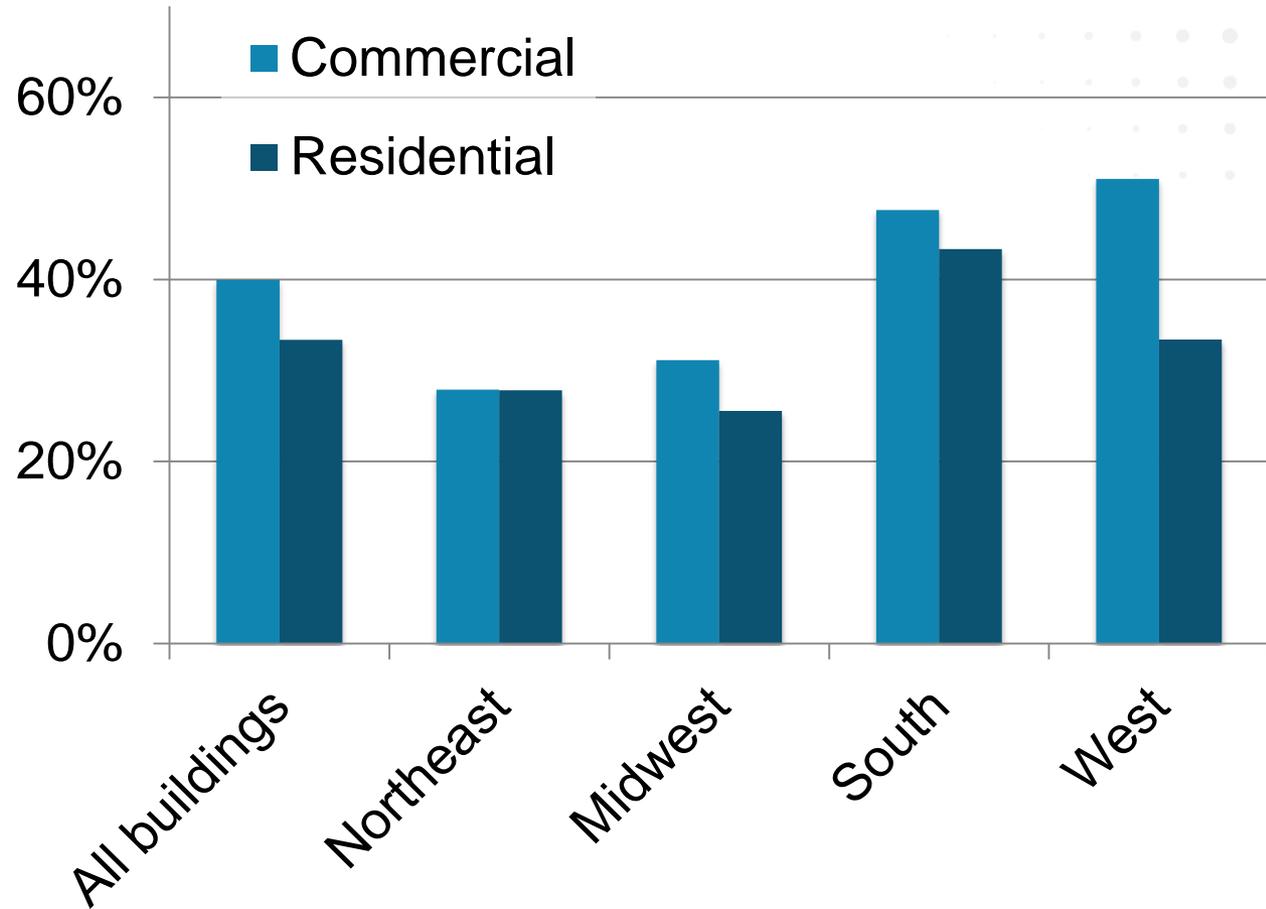
Eric Schiff, Program Director
Graciela Blanchet, Technology-to-Market Advisor



Area fraction of single pane windows

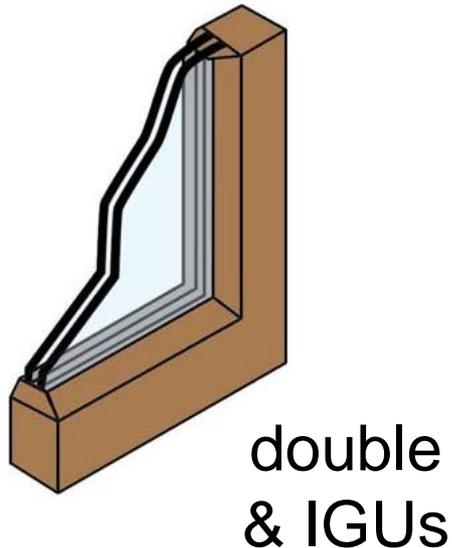
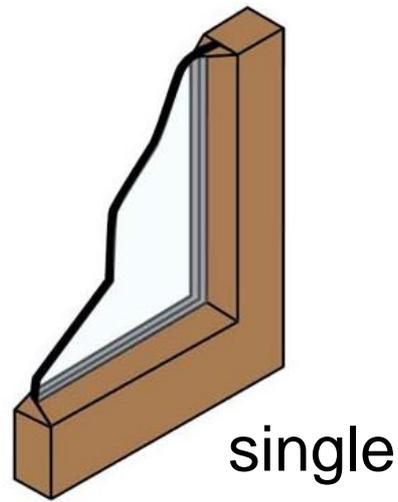


$(\text{Single-pane area}) / (\text{Total window area})$

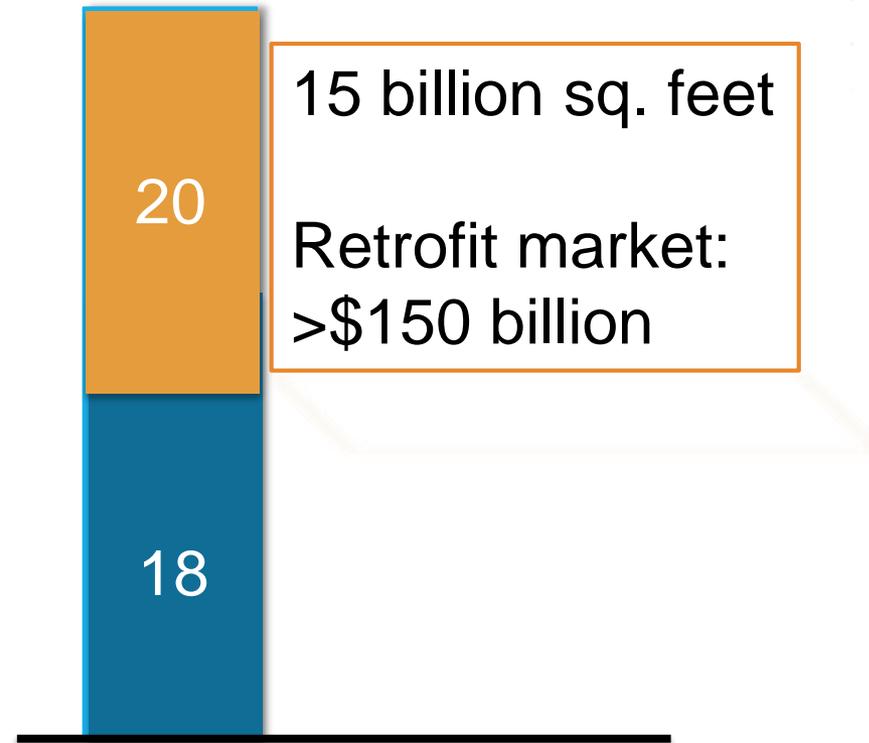


Dan Matuszak, unpublished. Based on EIA 2003 & 2009 surveys.

Single-pane windows: a huge opportunity that could pay for itself



Heating (US)
(\$ billions/yr)

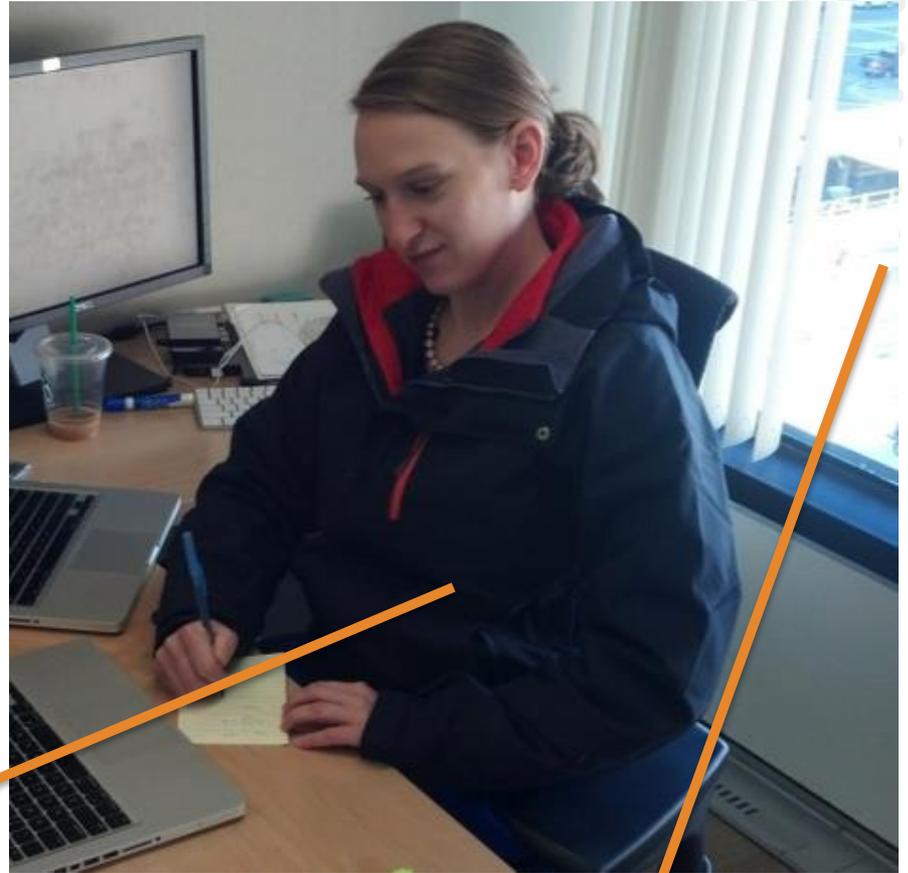


BTO workshop report, (2014) Table 2. Edited by Karma Sawyer. Dan Matuszak, unpublished. \$10/MBTU (nominal)

What needs improving with single-panes?

What needs improving with single-panes?

- Comfort



Radiatively cooled

Large, cold single pane

What needs improving with single-panes?

- Comfort
- Condensation



What needs improving with single-panes?

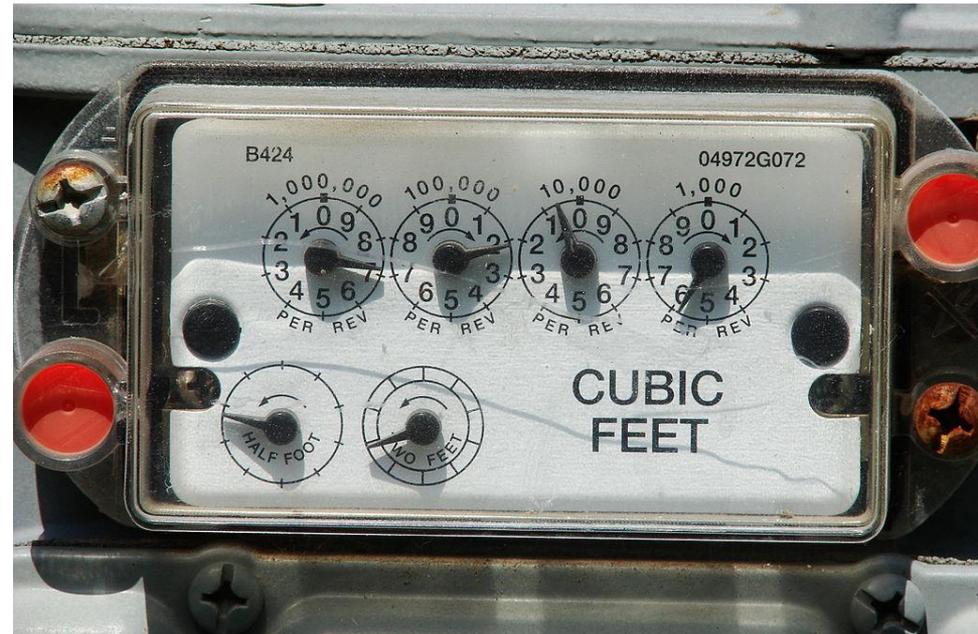
- Comfort
- Condensation
- Soundproofing



commons.wikimedia.org

What needs improving with single-panes?

- Comfort
- Condensation
- Soundproofing
- Economy



commons.wikimedia.org

S.H.I.E.L.D. – single-pane research program

- Mandatory concept papers were submitted in 2015, and Full Applications invited/submitted in early 2016.
- Selections for award negotiations expected by late spring 2016
- Up to \$10 M for small business (SBIR/STTR) projects
- Up to \$20 M for projects open to nearly all entities

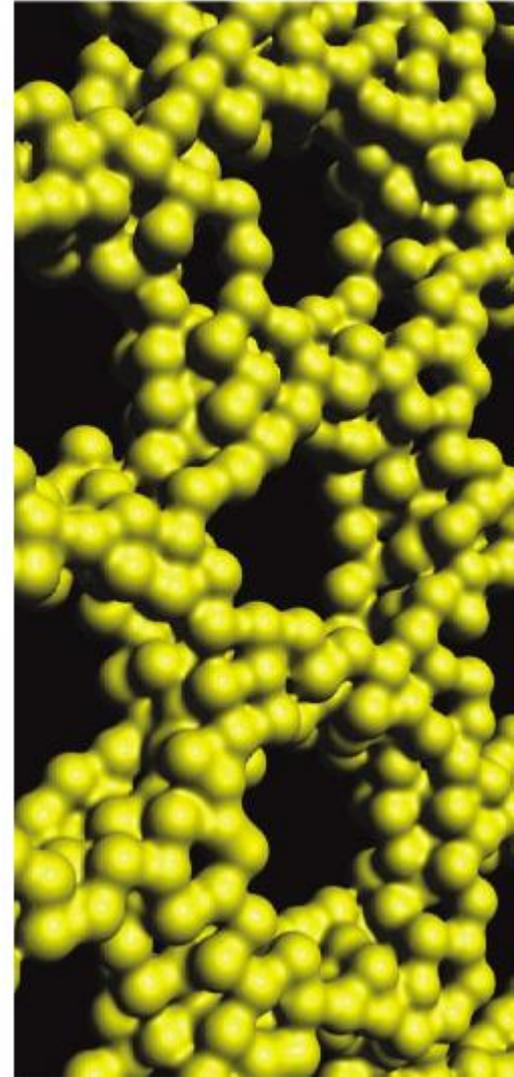
S.H.I.E.L.D.

Single-pane Highly Insulating Efficient Lucid Designs

<https://arpa-e-foa.energy.gov/>

S.H.I.E.L.D. – three categories of research project

- Main research targets
 - Condensation resistance
 - Radiative comfort
 - Insulation
- Three research categories
 1. Improve an existing pane with an applied product
 2. Develop an improved pane for existing single-pane windows
 3. Create innovative technologies that enable 1 & 2



Beyond research – technology-to-market

- ▶ Each project explores commercialization in parallel with its technical work
- ▶ Awardees will be seeking:
 - Industry advisors
 - Licensees
 - Follow-on investors and partners
- ▶ Interested?
 - ARPA-E can facilitate



Graciela Blanchet
Technology-to-market Advisor
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SHIELD's invisible transformation



+
economy, comfort, & health

SHIELD's invisible transformation



+

economy, comfort, & health

+

business and investment opportunities