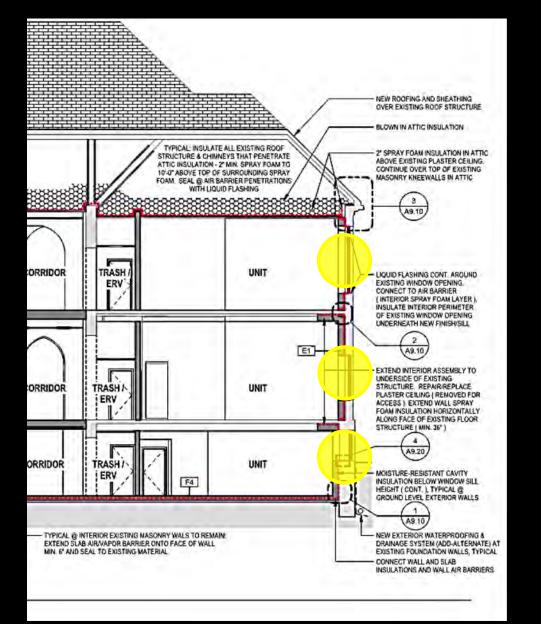
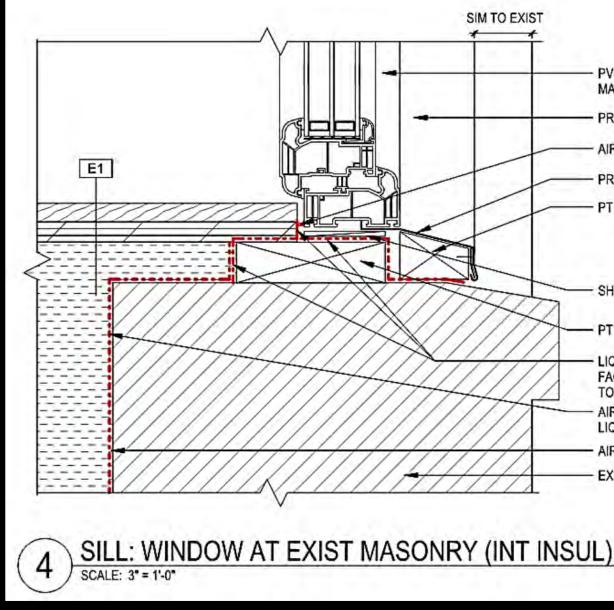
Our 1st Solution







- PVC WINDOW SUBTRACT ±4" FROM MASONRY DIMENSION
- PREFINISHED BRICKMOULD
- AIR DAM SEALANT
- PREFINISHED .040" ALUM BRAKE MTL SILL
- PT SILL SUPPORT
- SHIM
- PT 2x BUCK ALL AROUND
- LIQUID FLASHING, EXTEND OVER INSIDE FACE OF 2x BUCK AND OVER PLYWOOD TO FORM BACK DAM
- AIR BARRIER JOINT: HFO CC SPF LAPS LIQUID FLASHING
- AIR BARRIER (HFO CC SPF)
- EXIST MASONRY WALL

A Wake Up Call







A Wake Up Call





A Wake Up Call

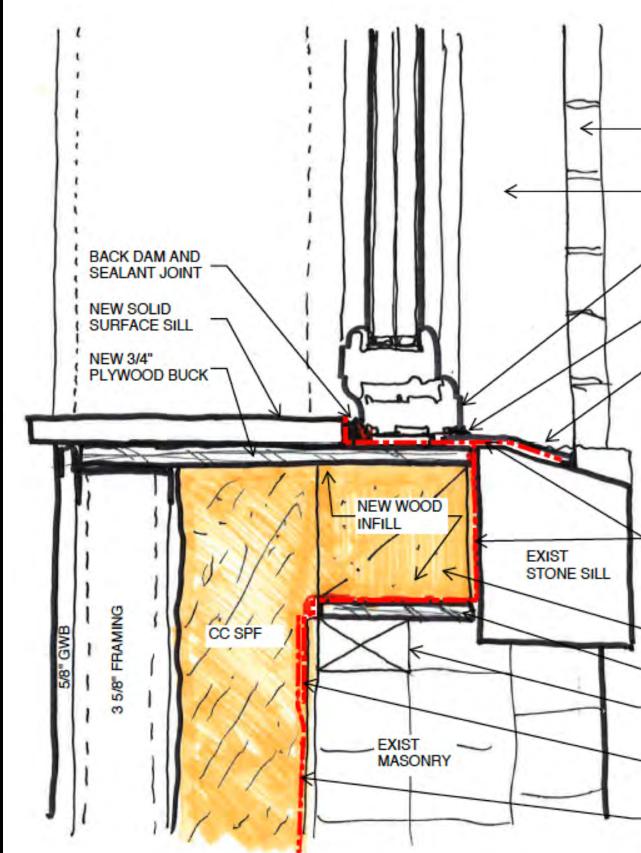








The Evolution





AIR BARRIER (HFO CC SPF)

AIR BARRIER JOINT: HFO CC SPF LAPS LIQUID FLASHING

EXISTING WOOD

NEW 3/4" PLYWOOD

HFO CC SPF (CAVITY)

LIQUID FLASHING

BREAK METAL TRIM @ SILL

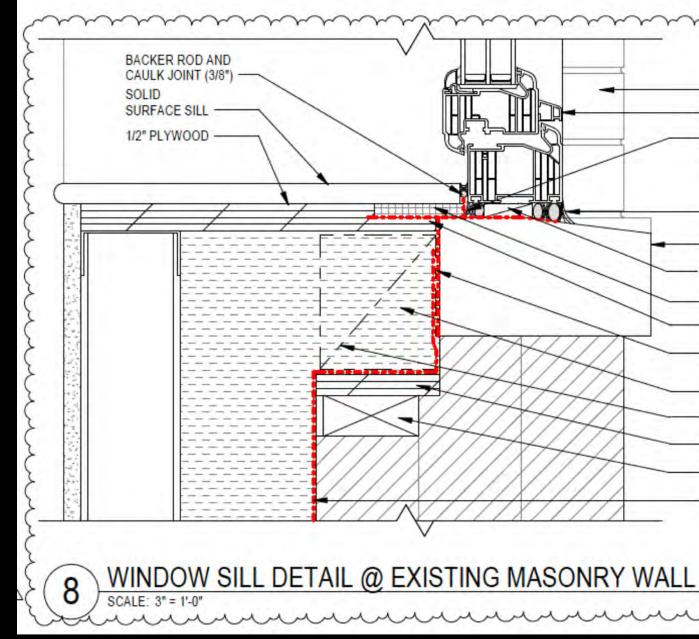
- uPVC FRAME

SEALANT JOINT

BREAK METAL TRIM @ JAMB

EXIST BRICK BEYOND

The Evolution





	- EXIST BRICK (BEYOND)
	- NEW UPVC WINDOW
_	 AIR BARRIER JOINT: BACKER ROD AND "AIR DAM" BY PROSOCO, EXTEND OVER LIQUID FLASHING APPLIED OVER PLYWOOD BUCK EXIST STONE SILL
-	 DOUBLE BACKER ROD AND SEALANT JOINTS EXIST STONE SILL
_	- SHIM
_	- CONTINUOUS XPS INSULATION (1/2" x 4")
-	- 1/2" PLYWOOD BUCK
_	- AIR BARRIER JOINT: HFO CC SPF LAPS LIQUID FLASHING
-	- HFO CLOSED CELL SPF
	- WOOD INFILL
-	- 3/4" PLYWOOD
_	- EXIST WOOD
	- AIR BARRIER: HFO CC SPF

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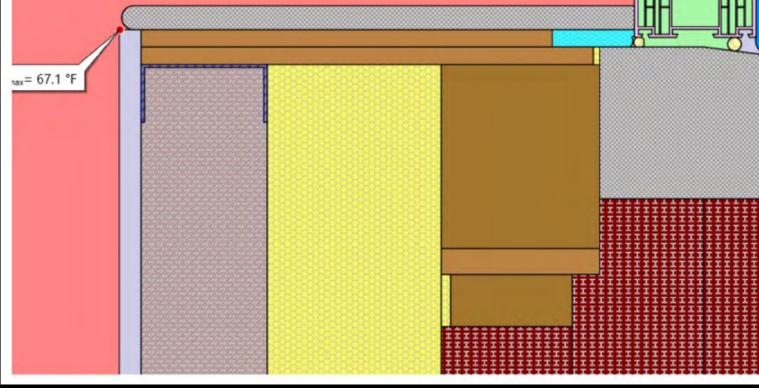
The Evolution

T_{min}= 48.3 °F

T_{RH80% (mold)}= 48.7 °F TRH100% (dew-point) = 42.8 °F

f*_{Rsi}= 0.687 f_{Rsi,RH100%} (dew-point) = 0.599

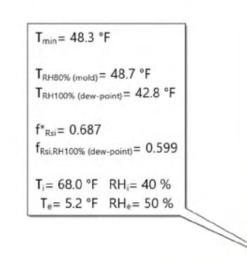
T_i= 68.0 °F RH_i= 40 % Te= 5.2 °F RHe= 50 %



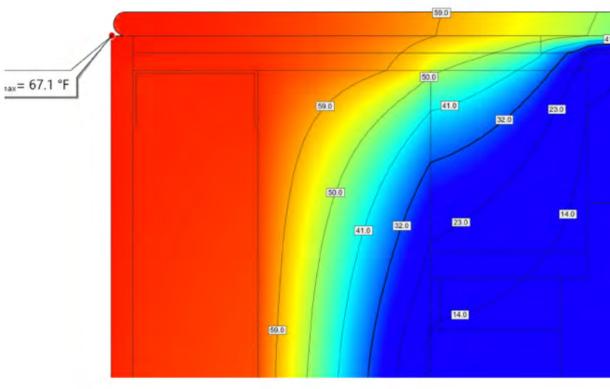


...................... ______________________________ **TTTTTTTTTTTTTTTTTTTTTTTTTTTTT** ******

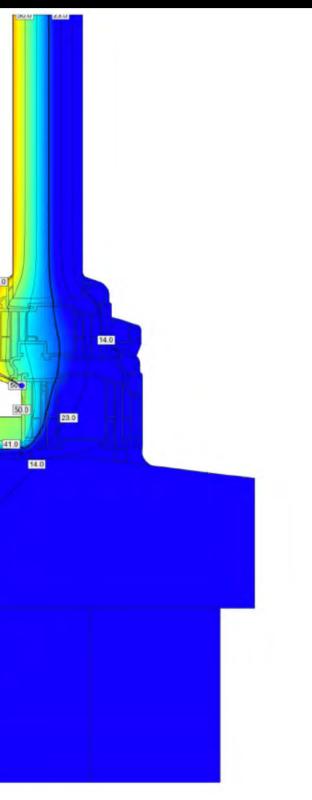
The Evolution



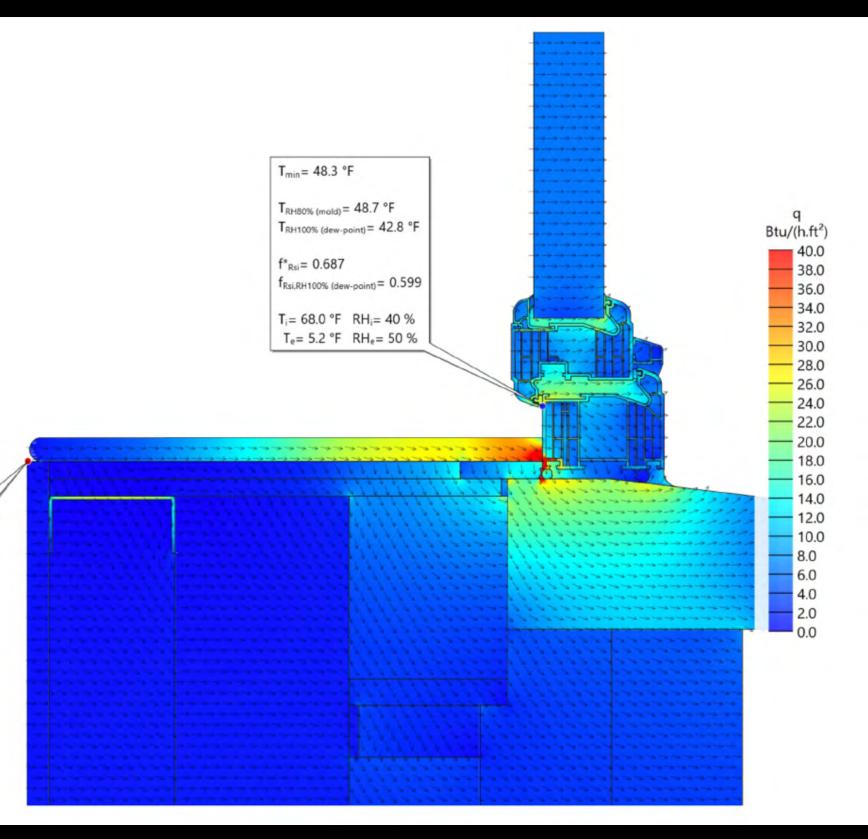
59.0







MORNINGSIDE WINDOW ADVENTURE The Evolution



_{nax}= 67.1 °F





















10	Passive House Premium ROM		PH		PH		3.44		46
11			U	pgrade	Upgrade	Co	ost per		Cost per
12	C.S.I.	Description		Cost	% Delta		SF		Unit
13								6	
14	02	Existing Conditions	\$		No Change	\$		\$	-
15	03	Concrete	\$	91,054	+19.2%	\$	1.55	\$	1,979.42
16	04	Masonry	\$	-	No Change	\$	-	\$	-
17	05	Metals	\$	11,300	+3.8%	\$	0.19	\$	245.6
18	06	Wood, Plastics, and Composites	\$	44,144	+5.0%	\$	0.75	\$	959.6
19	07	Thermal and Moisture Protection	\$	218,432	+26.7%	\$	3.71	\$	4,748.52
20	08	Openings	\$	57,118	+10.1%	\$	0.97	\$	1,241.70
21	09	Finishes	\$		No Change	\$		\$	-
22	10	Specialties	\$	-	No Change	\$	-	\$	•
23	11	Equipment	\$	-	No Change	\$	-	\$	
24	12	Furnishings	\$	-	No Change	\$	- -	\$	-
25	13	Special Construction	\$	-	No Change	\$	-	\$	÷
26	14	Conveying Equipment	\$	÷.	No Change	\$	-	\$	4
27	21	Fire Suppression	\$	-	No Change	\$	-	\$	-
28	22	Plumbing	\$		No Change	\$		\$	÷-
29	23	Heating Ventilating and Air Conditioning	\$	(110,000)	(15.3%)	\$	(1.87)	\$	(2,391.3
20	25	Interrupted Automation	ć		No Change	Ċ.		Ċ.	



12	4" insul + 3" SOG overlay
65	Thermal break steel connections
	Additional flooring overlay, windo
65	bucks, ZIP VB premium
	Roof Insulation 70, Podium
	Insulation 40, Spray insulation @
	attic ceilings 20, Spray at building
	walls ILO fiberglass 42, Exterior
	Additon 2" - 24; misc
52	caulking/sealing 12
70	PH windows premium
-	
- 1	
-	
30)	Ballpark

30	25	Integrated Automation	\$ -	No Change	\$ -	\$ -
31	26	Electrical	\$ - 16-1	No Change	\$ 	\$
32	31	Earthwork	\$ -	No Change	\$ -	\$ -
33	32	Exterior Improvements	\$ 	No Change	\$ -	\$
34	33	Utilities	\$ -	No Change	\$ -	\$ -
35						
36		Subtotal Trades Cost	\$ 312,048	3.6%	\$ 5.30	\$ 6,783.65
37						
38		Fabreeka Pads	\$ 9,481	N/A	\$ 0.16	\$ 206.12
39		Added Sealing Existing Building	\$ 16,839	N/A	\$ 0.29	\$ 366.06
40		Polyiso @ Specific Walls	\$ 16,225	N/A	\$ 0.28	\$ 352.72
41		Ceiling Modifications @ Existing	\$ 8,640	N/A	\$ 0.15	\$ 187.83
42		Insulated Headers	\$ 3,870	N/A	\$ 0.07	\$ 84.13
43		2 pass spray foam	\$ 8,727	N/A	\$ 0.15	\$ 189.72
44		Added Liquid Flashing	\$ 12,840	N/A	\$ 0.22	\$ 279.13
45						
46		Subtotal Cost	\$ 76,622	0.9%	\$ 1.30	\$ 1,665.70
47						
48						
49		Total Cost	\$ 388,670	4.5%	\$ 6.60	\$ 8,449.35

1			
			-

Policy Context: PHFA

Pennsylvania Housing Finance Agency

Passive House confers advantage in competition for LIHTCs (Low Income Housing Tax Credits).

PHFA's LIHTCs are highly competitive: only 1 in 4 project proposals are awarded LIHTCs.

Projects that pursue Passive House earn 10 bonus points out of a total of 130 possible points.

59 of 179 projects pursued Passive House during first two years of PHFA's new policy.

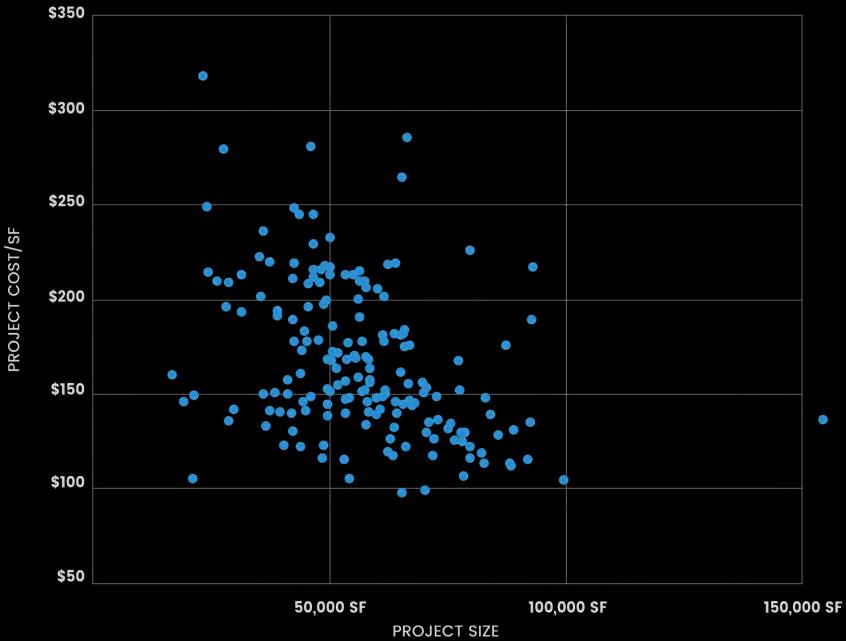
Competition spurred innovation. Innovation cut costs.



Policy Context

179 Projects Proposed to Pennsylvania Housing Finance Agency, 2015-2016.

Projected Construction Cost



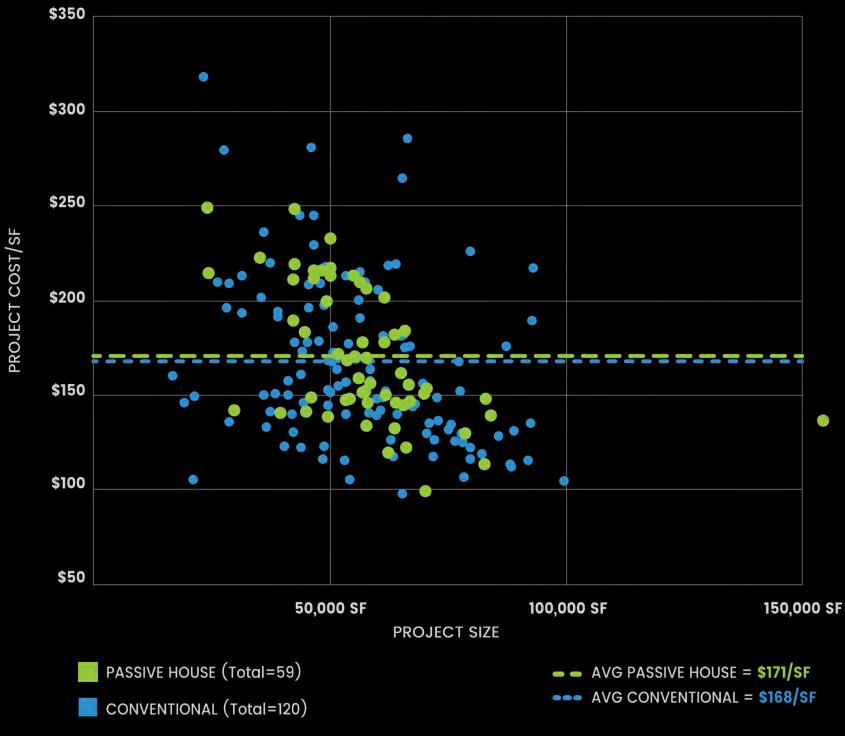
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Policy Context

59 Passive House Projects Proposed to PHFA, 2015-2016.

Passive House vs. Conventional – Less than 2% Difference in Construction Cost.

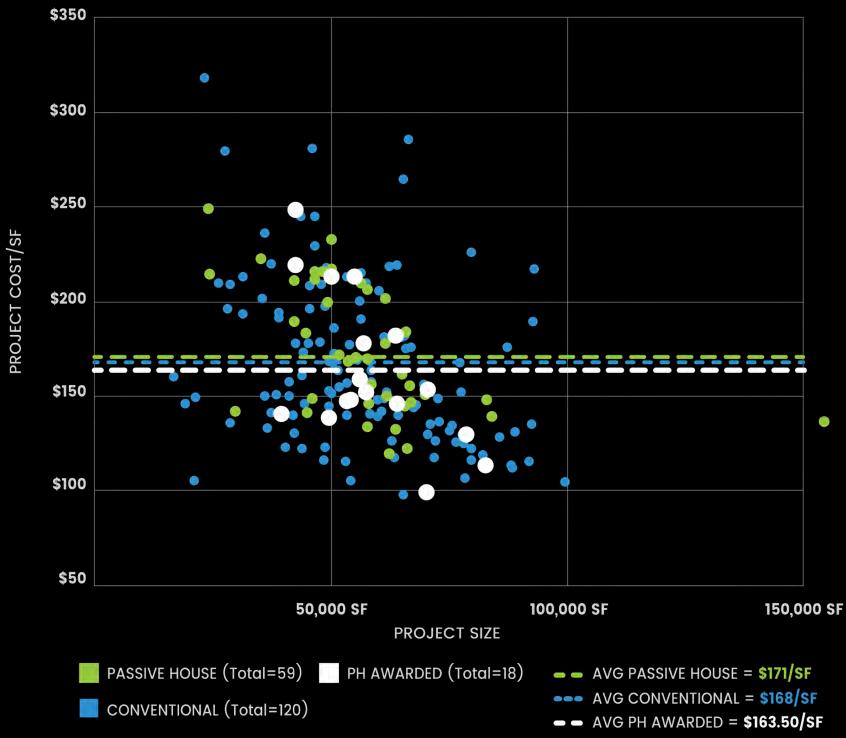




Data Source: Pennsylvania Housing Finance Agency via Onion Flats

Policy Context

18 Passive House Projects Awarded by PHFA, 2015-2016.



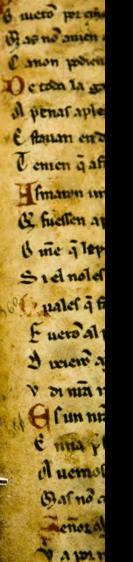


Data Source: Pennsylvania Housing Finance Agency via Onion Flats

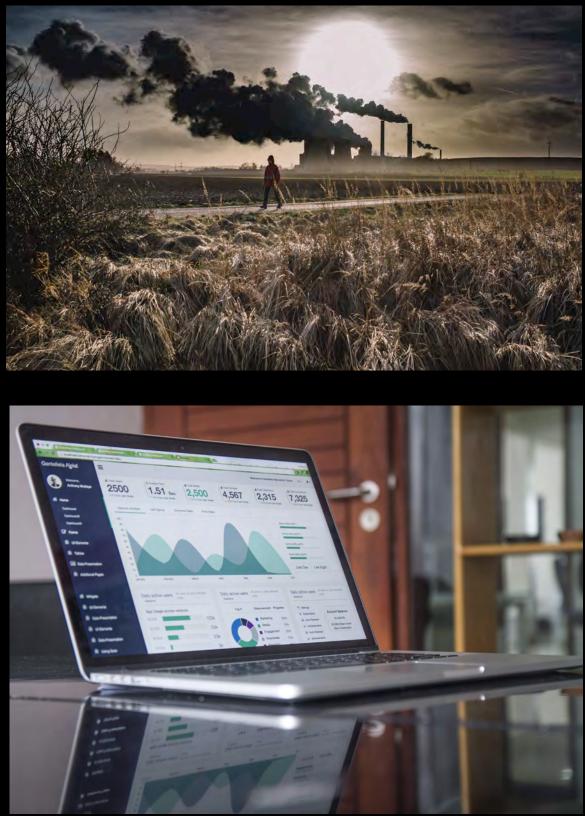
The Market Is Changing...

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The Market Is Changing...



The Market Is Changing...







Registered Company Name for this Licence Number





PH

Passive House Institute US







Athena Sustainable Materials Institute



ESE

STANDARD

ZERO ENERGY READY HOME

U.S. DEPARTMENT OF ENERGY











GREEN GUIDE GGHC for Health Care™

GLOBES







Your Product Your Company

Final Assembly: Dty, State, Country Life Expectancy: 000 YEAPS End of Life Options: Recyclatcie (42%) Tandol



Thank you.



Laura Nettleton, Inet@thoughtfulbalance.com Brandon Nicholson, brandon@nkarch.com

