

Background

- Large literature on broad determinants of household decision to adopt energy efficiency measures like weatherization
- Less is known about the **process** by which households implement the decision to weatherize
- Energy audits are often the first step in home weatherization
- Past work describes **broad categories** of reasons why audit recipients implement or ignore audit recommendations
- Treats outcomes as **binary**: either something was done or not
- **Little work focused on low-income households**, who in the U.S. live in the least efficient homes

Research Questions

- What steps do households take to weatherization measures recommended in an energy audit?
- What factors enable households to, or prevent them from, completing energy retrofits?

Methods

Recruit 40 single-family households in Wayne and Washtenaw counties in Michigan. Participating households roughly representative of income and racial mix in these counties

Perform energy audit with contractor

Interview participants 12-18 months after audit

Key Take-aways

Only about half the sample completed any retrofit. Reasons for not retrofitting were complex: the uncertainty of long payback periods; inability or unwillingness to borrow; the belief that the audit did not address their concerns

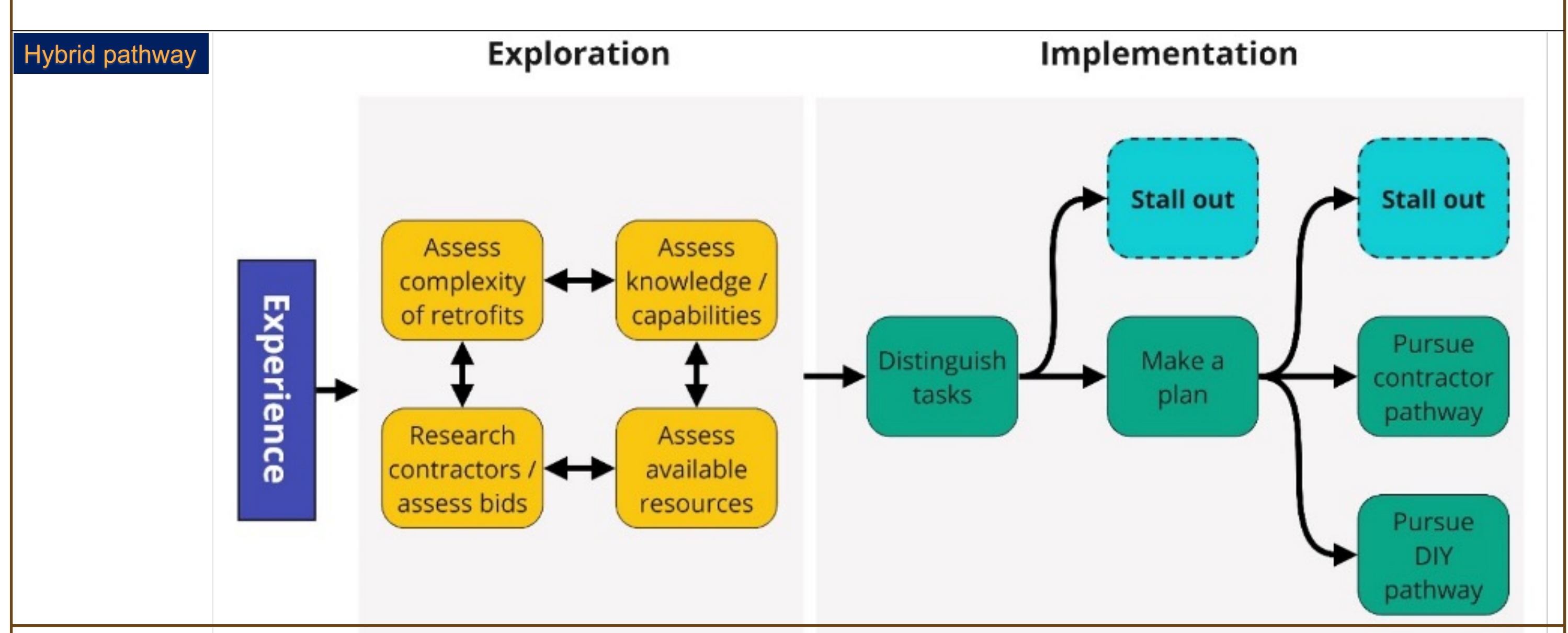
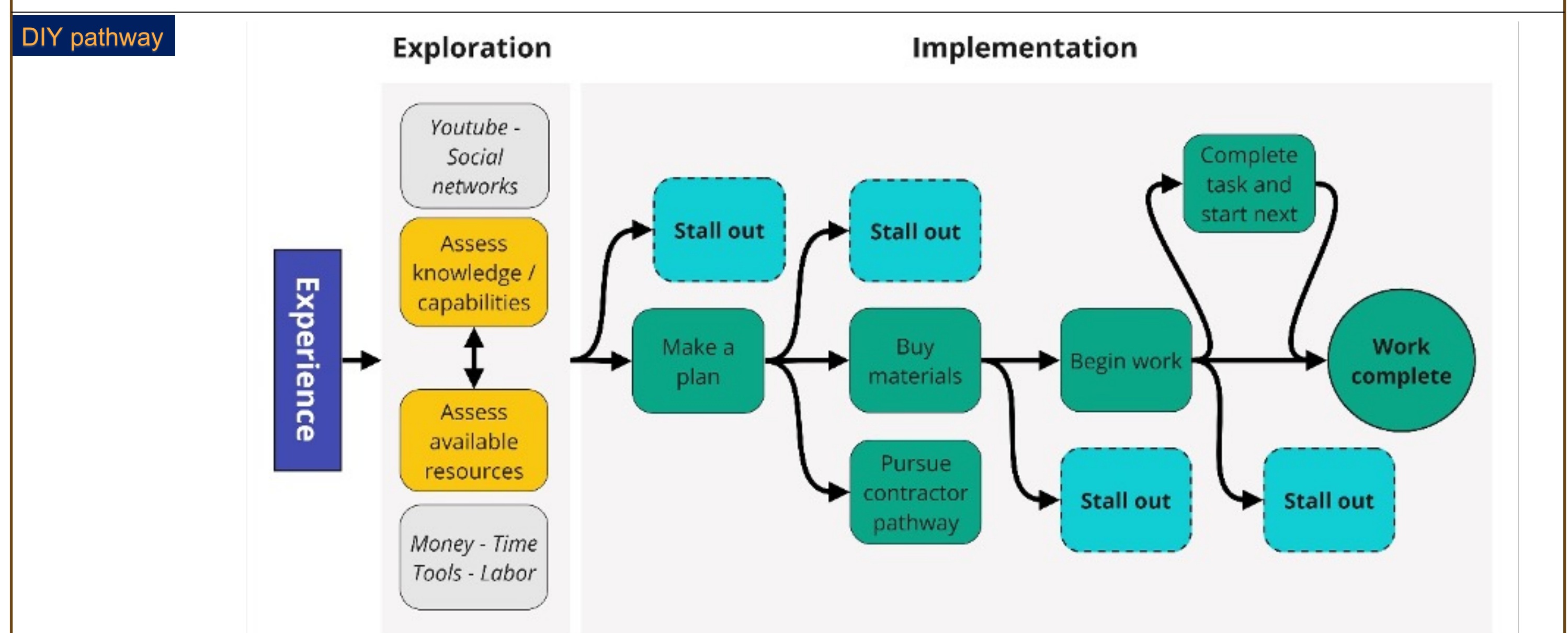
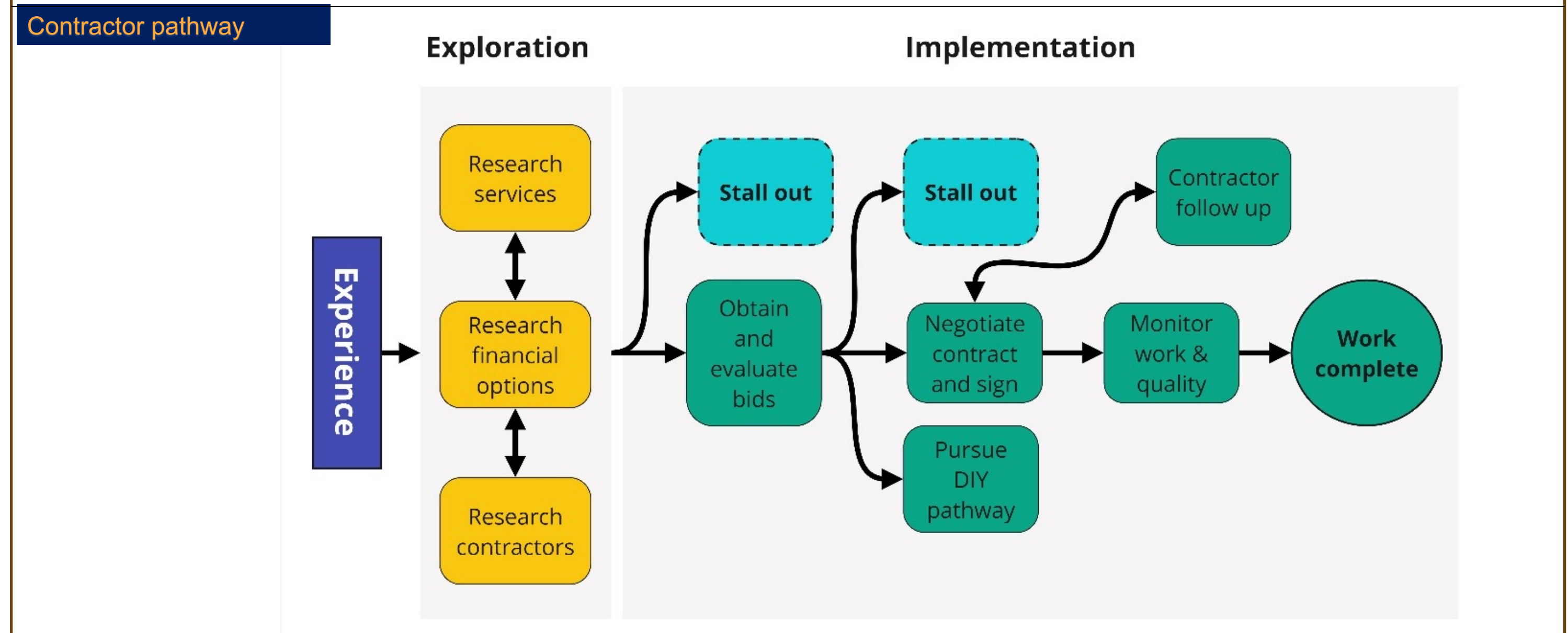
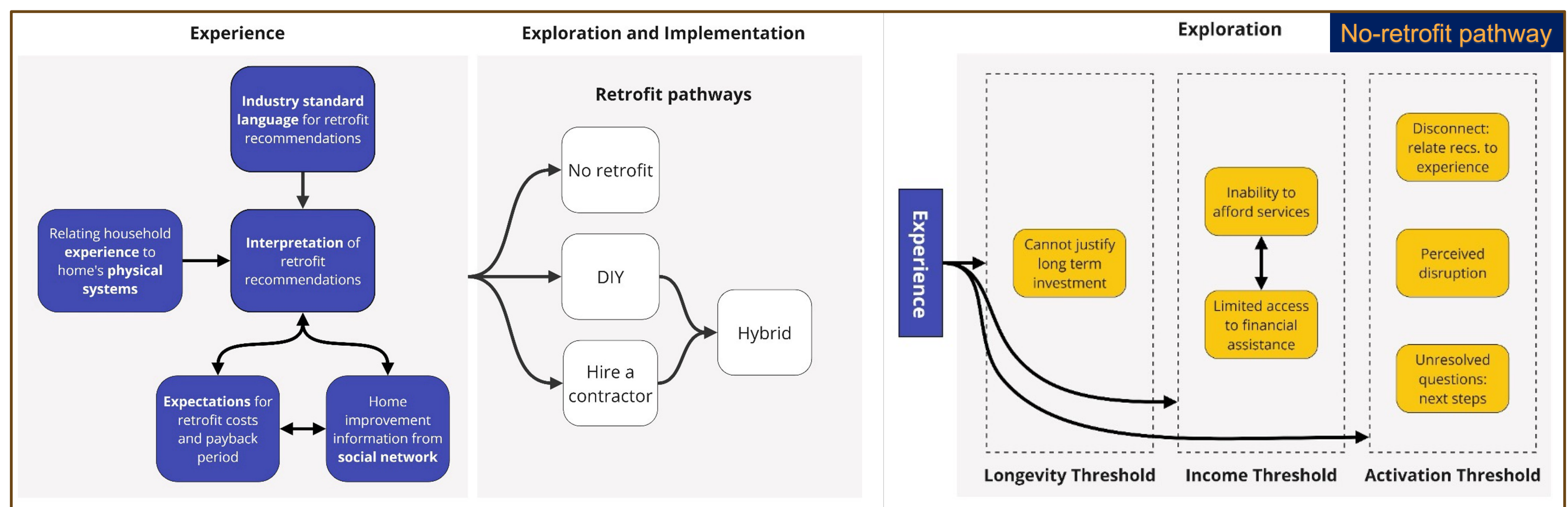
Some participants started a retrofit but did not complete. They stopped at different stages. **It's not all or nothing** and there are benefits to helping those who start with retrofits finish the job.

Participants had questions about audit recommendations but did not themselves approach the contractor to ask. **Making follow-up conversations a standard part of energy audits** could lead to greater adoption of retrofit measures.

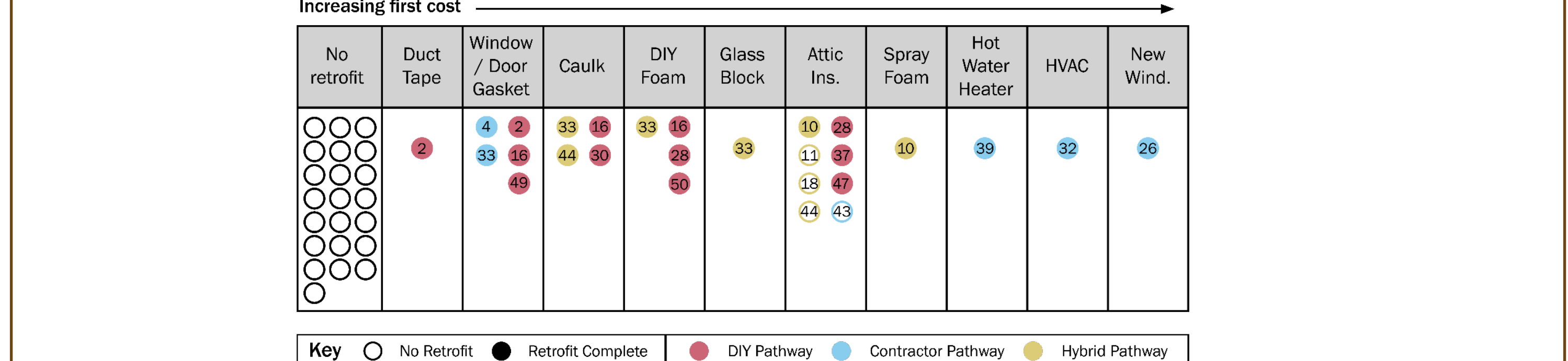
A minority of those who completed a retrofit relied on contractors alone: **most did some DIY or wanted to; others leveraged social networks.** Policymakers must make targeted information and financial incentives available to DIY-ers

Apart from cost, many participants identified trust and the effort needed to choose a contractor as barriers to retrofits and to the contractor pathway. **Standardizing how information about common services (e.g., air sealing or attic insulation) is provided** could lower this barrier and allow easy comparison between contractors and services.

Findings



Energy retrofit tasks attempted and completed by households on each retrofit pathway. Pink circle indicates participant followed DIY pathway; blue circle indicates contractor pathway; yellow circle indicates hybrid pathway. Numbers indicate participant ID; some households pursued more than one retrofit. Closed circle indicates retrofit was complete; open circle indicates retrofit was attempted but not completed.



Summary of barriers and catalysts of home energy retrofits. Economics, having the capacity or means, and access to information were the key factors determining a household's pathway to retrofitting. All of these factors worked as catalysts for some households (moving them along the pathway) and barriers for others (hindering their progress).

Factor	Effect	Related codes	Exemplary quotes
Economic	Catalyst (n=3)	Income	E.1 Luckily, I've got a really great job, and I make really good money. So I don't have to worry too much about the financial aspect. I'm super lucky in that respect. - P19 E.2 For the HVAC system, although it's very expensive, I don't need to do anything. I just need to make a decision and pay the money. Done. - P32
		Employment	E.3 [My wife] lost her job last summer...that might have actually been part of why we didn't get the glass block. I was planning to do the glass block last summer, but then just a number of things happened and it wasn't the time. - P33
	Barrier (n=31)	Income	E.4 People that don't make a lot of money -- you always are afraid, like, oh, boy, now I have an extra bill to pay. I'd rather try to save it myself. Because now there's an ongoing bill until it's paid off. I try to avoid it. For example, [my] credit score, always been very good at 798 all my life, but I don't have the income. - P17
		First cost affordability	E.5 So you get the \$300 rebate, but you still got a kick out like \$5000. That's crazy. I mean, what's your incentive to do that? You know -- if you can afford to do it, this is something that you probably should do, because it is gonna save you money in the long run. But, you know, if you can't afford to do it, you would probably have to take out a loan...it's just not worth it. - P12
		Ongoing payments	E.6 Making those monthly payments for that big investment isn't feasible. Once retired, I'd be on a fixed income. So it doesn't make sense for a senior citizen to go into debt for these things. I mean, it completely writes off a whole class of people that would do this. - P10
	Capacity "Making it happen"	Catalyst (n=18)	Knowledge of home systems
Access to skilled labor			F.2 I'll do some [windows] myself. It's what I used to do for a living. I used to do stuff like put in windows. That was something on that report that we should put in block windows instead of what's there. That's pretty easy. I'll do that myself. - P28
Ability to learn			F.3 I haven't had experiences with too many contractors. It's people that I know that's been able to do different things, and things that I know how to do or YouTube myself. Honestly, just because it's trying to save money...you know, not having the money to do it, but knowing it needs to be done. - P19
Barrier (n=16)		Contractor mistrust	F.4 [The contractor] was like, the sub floor is still uneven, all of this needs to be ripped [up]. Only to find out it was the floor joists that was messed up [and adding concrete didn't work]... so that is why I don't really like contractors. Because when you get someone that is trying to quickly come in, then they risk it being done well. That kind of makes me uneasy. - P25
		Difficulty finding a contractor	F.5 I have specific ideas of the way I want things done or the quality of the work, and that can be a challenge. I just don't trust a lot of contractors. The few that I have had do work, I've vetted and they do a fantastic job. But it takes some time to figure that out. - P4
Capacity "Making it happen"	Barrier (con't)	Difficulty finding a contractor (con't)	F.6 It's hard to know which company to go with. The reviews could be doctored. Then there's Nextdoor, you look at what your neighbors say, and then it's always half and half. Some people had a really good experience and some people...had a really bad experience. - P43
Information	Catalyst (n=22)	Social media	G.1 I would have to either ask my uncle [professional contractor], maybe go on Facebook community boards and say, Hey, who can suggest some companies. - P11
		Family	G.2 Especially with [incentives] being newer, a lot of people that we rely on know how to handle houses because we're new homeowners. We go to family and ask, Hey, okay, who has done this before? - P20
		Neighborhood networks	G.3 I would ask for referrals from folk that live in historic homes, and if they have any suggestions as to who could do the work. - P31
	Barrier (n=21)	Managing overwhelm	G.4 A tutorial or information on how I could do it on my own, like what things I would use and what would be best for the environment. We tried to research the stuff, but there's so many different ways to do it, machines you need. We got a little overwhelmed. So we put it on the back burner. - P44
		Lack of right-size investment	G.5 Now we know what we're looking for, versus when we first got a quote, it was like, oh, insulate everything. And if we just address those two areas, I think would make a huge difference. So maybe now it's just scaling it back and making it a more attainable goal for us. - P18

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