

Behaviourally-informed peer referral programmes can increase the reach of low-income energy policies

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Low-income solar adopters are more likely to refer others to a fully subsidized solar programme when referral rewards are combined with an appeal to reciprocity and a simplified referral process, leading to five times as many solar contracts as when referral rewards are used alone. The findings highlight behavioural science strategies that administrators of low-income energy assistance programmes can use to cost-effectively accelerate programme uptake.

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The policy problem

Low-income households spend a disproportionate amount of their income on energy bills. To address this burden and promote an equitable clean energy transition, many countries have enacted policies that provide efficient and renewable energy technologies at low or no cost to lower-income households. The US Inflation Reduction Act is one recent example. But offering such technologies free of charge may not be enough to attract eligible households. Like other social benefits programmes, many subsidized energy programmes go undersubscribed, owing to distrust of programme providers, high hassle costs for programme enrolment, and lack of information. Low participation rates translate to inefficient use of programme funds, as programme administrators must allocate additional resources for outreach, especially to capture vulnerable, hard-to-reach populations. Emerging research suggests there is promise in tapping existing programme beneficiaries to find new participants, but evidence on how to best do this is scant.

The findings

We identify cost-effective, scalable strategies to improve the efficacy of a peer referral programme for fully-subsidized low-income solar in California. The baseline programme ('control') offered existing programme participants a US\$200 reward for every referral that resulted in a solar installation (Fig. 1). Adding a token gift upfront with a reminder about the programme (to evoke a sense of 'reciprocity') led to 1.7 times the response rate, 2 times the number of referrals and 2.6 times as many

solar contracts. A third 'reciprocity and simplification' group in which the gift was combined with a mailable referral slip (instead of just phone or web referrals) led to nearly 5 times the response rate, 7.5 times as many referrals, and 5.2 times as many solar contracts – making it more cost-effective than the baseline programme. It was also more effective at eliciting referrals from participants who had not previously referred. The results highlight strategies that could be adapted to other energy assistance programmes for electrification measures, heating and insulation upgrades, and electric vehicles.

The study

The data are from a field experiment with all 7,680 homeowners who received fully subsidized solar in California from 2004 to June 2018. Households were sent one of three mailers reminding them that they could receive US\$200 for each nomination which resulted in a solar installation. The 'control' group received the standard postcard, with a website and toll-free number for making referrals. The 'reciprocity' group provided the same information in a letter along with a US\$1 gift to thank clients for being part of the solar community. The 'reciprocity + simplification' group further provided a referral slip and stamped return envelope. We tested for differences in response rates to the mailers, the number of nominations provided, whether nominations lived in subsidy-eligible areas, and the number of resulting solar contracts. As the referral reward was in all conditions, further research is needed to know how important the reward itself was.

Recommendations for policy

- Relying on financial rewards alone to encourage referrals for a low-income solar programme leaves many peer referrals — and subsequently solar installations — unrealized.
- Complementing referral rewards with programme simplification and an appeal to reciprocity can increase the number of referrals and resulting solar contracts by several-fold, at less cost per contract.
- Combining referral rewards, reciprocity, and programme simplification is more effective at attracting first-time referrers than either rewards alone or rewards combined with reciprocity.
- Reciprocity and simplification have trade-offs in terms of the timing, quality, and relative cost of the referrals generated, giving administrators flexibility depending on their programme objectives.



Control N = 2,558	Reciprocity N = 2,558	Reciprocity + simplification N = 2,560
Share GRID with your friends and family and earn US\$200	Share GRID with your friends and family and earn US\$200	Share GRID with your friends and family and earn US\$200
		
Reminder of conditional US\$200 reward	Reminder of conditional US\$200 reward + US\$1 non-contingent gift "We have enclosed a small \$1 gift to thank you for being part of the GRID community."	Reminder of conditional US\$200 reward + US\$1 non-contingent gift "We have enclosed a small \$1 gift to thank you for being part of the GRID community." + Referral slip and stamped return envelope
Refer by: • Phone • Web	Refer by: • Phone • Web	Refer by: • Phone • Web • Mail

Fig. 1 | Illustration of referral programme components. Comparison of experimental conditions. In line with the standard referral rewards programme, the control group postcard reminded existing low-income solar adopters that they could earn US\$200 for each referral that resulted in a solar installation. The reciprocity group received the same reminder in a letter along with a US\$1 gift to thank recipients for being part of the solar community. The reciprocity

+ simplification group included the US\$1 as well as a referral slip and stamped return envelope to make referring easier. Eleven days later, all groups received a postcard reminder about the referral reward programme; for both reciprocity and reciprocity + simplification, the postcard also stated: "We hope you liked the small gift we sent in the mail". Figure is adapted with permission from *Nat. Energy* <https://doi.org/10.1038/s41560-023-01298-5>; 2023.

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Further reading

- Carley, S. & Konisky, D. M. The justice and equity implications of the clean energy transition. *Nat. Energy* **5**, 569–577 (2020).
This work reviews the potential consequences of the clean energy transition for disadvantaged groups.
- Darghouth, N. R., O'Shaughnessy, E., Forrester, S. & Barbose, G. Characterizing local rooftop solar adoption inequity in the US. *Environ. Res. Lett.* **17**, 034028 (2022).
This study examines patterns of inequity in U.S. rooftop solar adoption.
- Fowlie, M., Greenstone, M. & Wolfram, C. Are the non-monetary costs of energy efficiency investments large? Understanding low take-up of a free energy efficiency program. *Am. Econ. Rev.* **105**, 201–204 (2015).

This work demonstrates that low-income households often forgo opportunities to invest in energy efficiency even when they require no out-of-pocket costs.

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Competing interests

The authors declare no competing interests.