Developing a toolkit to optimize community choice energy programs

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INTRODUCTION

Community Choice Energy (CCE) agencies are local government agencies that supply electricity to their residents, as an alternative to investor-owned utilities (IOUs). IOUs still handle transmission, distribution, grid maintenance and billing services. CCE agencies typically provide a greater content of renewable energy at lower rates compared to IOUs.

PROBLEM: CCE Agencies lack rigorous decision-making frameworks for deciding between different programs and lack tools to optimize programs they choose to implement.

OBJECTIVE 1: Build an interactive toolkit that CCE agencies can use to predict the costs and benefits of two potential programs.

Electric Vehicle (EV) Rebates: Agencies offer their customers monetary incentives to subsidize EV purchases.

Residential Solar Financing: Agencies offer financing to their customers seeking to install a solar photovoltaic (PV) system for their homes.

OBJECTIVE 2: Create a guide containing successful practices and recommendations for implementing effective programs.

APPROACH

We used technology choice models to create a toolkit that will enable CCE agencies to predict how consumers will respond to various EV incentive levels or solar panel interest rates. These models account for how consumer behavior and preferences influence purchase decisions.

TOOLKIT OVERVIEW

The EV toolkit module allows users to adjust program parameters until they find the optimal incentive level given their budget limitations. The graphs below show the results over a range of incentive amounts for a sample set of parameters.

SOLAR FINANCING

The PV toolkit module allows users to adjust program parameters until they find the optimal incentive level given their budget. The graphs below show the net present value of the program and expected solar PV uptake for a sample set of parameters, over a range of interest rates.

CONCLUSION

CCE agencies are looking for effective ways to decide what programs to implement and how to best design them. Our toolkit allows users to adjust key program parameters to optimally design two potential programs: EV incentives and residential solar financing.

Our models capture non-monetary values to predict how people will respond to economic incentives. As a result, the toolkit modules can accurately gauge expected uptake of an incentivized technology and calculate the resulting financial, environmental, and health impacts. Agencies can then compare the toolkit outputs to the benefits and costs of other programs or ways to green their energy mix to decide which programs to ultimately implement.

Both programs we studied result in GHG reductions, although the impact depends on the agency’s energy mix. Based on our findings, agencies should continue to green their energy mixes to maximize the programs’ environmental and health benefits.

If an agency decides to implement one of the modeled programs, its staff can refer to the successful practices guide we have created through literature research, case studies, and interviews for recommendations on designing the program to increase its success and impact.

ACKNOWLEDGEMENTS

We would like to thank the following people who helped make this project possible: faculty advisor Mark Buntaine; client advisor (Bunting Hardings, external advisor) Buntaine; and two clients who supported us with the project.

Learn more at: https://cfe.cub.edu

References:

Images: Center for Climate Protection, Clean Power Exchange, The Nasi Project

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Electric Vehicle Rebate

Solar Financing

Cost Effectiveness

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