



Identifying Future Adopters of Solar, EV, and Green Power

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Identifying Future Adopters

Our Objective...

Identify residential customers most likely to adopt Distributed Energy Resource (DER) measures



Identifying Future Adopters

Evergreen developed propensity models for four measures:



Solar Photovoltaic (PV)



Electricity Storage



Plug-In Electric Vehicle (PEV)



Green Power



Identifying Future Adopters

Our Approach...

Used logistic regression to develop propensity models to estimate probability a customer will adopt a DER measure.



Identifying Future Adopters

Models are then used to “score” customers based on their estimated probability of adopting a DER measure.

The utility can then ...

Target those customers most likely to adopt

Create messaging that appeals to subgroups of customers

Focus resources toward particular subgroups



Identifying Future Adopters

- Utility provided customer information
 - Address, home type
 - Participation in utility programs & services
 - Derogatory payment information
- Evergreen merged additional information
 - Zillow Home value indicators
 - Median income by zip code
 - Temperature data





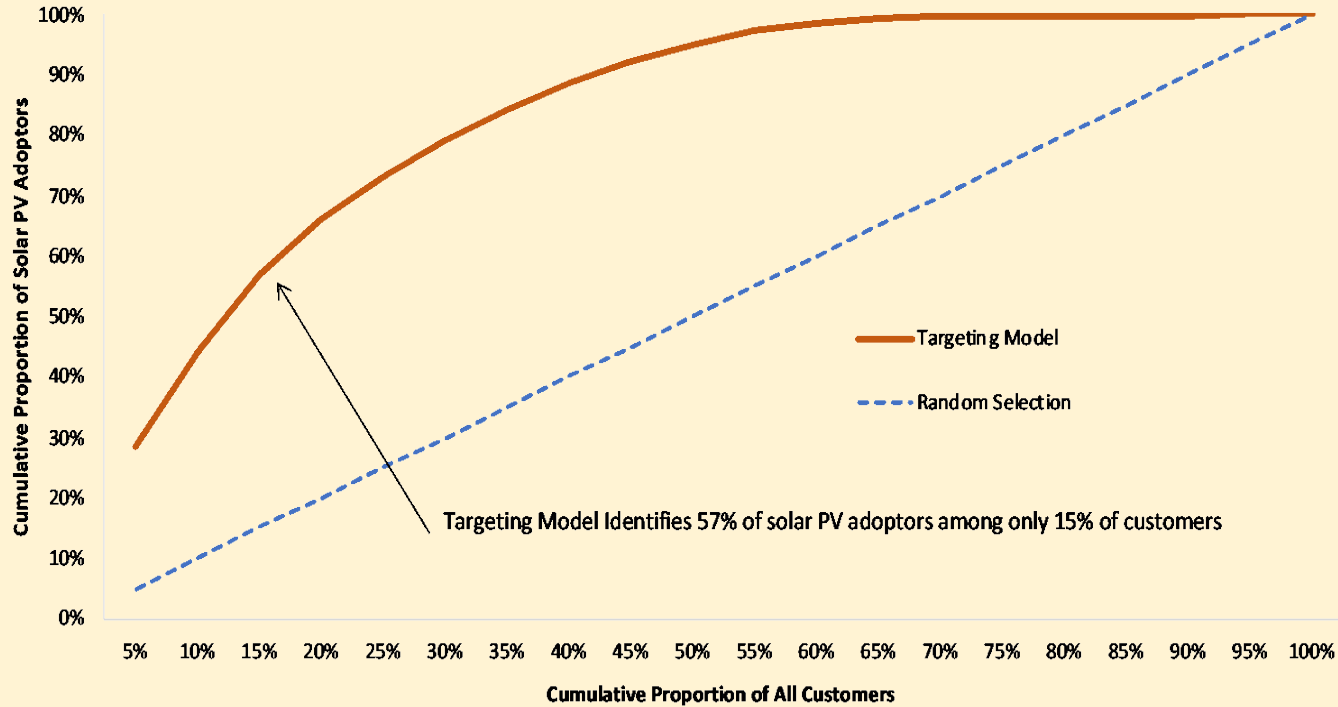
Identifying Future Adopters

What we did...

1. Randomly selected 70% of customers for modeling and 30% for testing
2. Used logistic regression to create scoring models
"probability that customer will adopt a DER measure"
3. Scored each customer in the test group
4. Compared probability scores to actual adoption rates
5. Examined relative importance of factors in a customer's decision to adopt DER measure



Model Validation – PV Adoption





Positive Effect on PV Adoption

- Home area network (HAN)-enabled home
- Enrolled in peak period pricing
- Enrolled in online banking
- Non-English speaker*
- Years of tenure with utility*



Negative Effect on PV Adoption

- Enrolled in payment assistance program
- Derogatory payment history
- Percent rentals in zip code

Strength/Weakness of Propensity Models

Propensity models predict which customers are most likely to adopt *based on the characteristics of customers that have already adopted.*



Which means... scores are highest for customers with similar characteristics to past adopters



To Segment or Not to Segment

Let's focus on low-income customers living in a DAC

Single-Family Customer Segments	Customer Distribution	PV Adoption Distribution	% Adoption by Segment
Low-Income – DAC	9.5%	3.6%	2.6%
Low-Income – Non-DAC	15.2%	8.2%	3.5%
Non-Low-Income – DAC	12.9%	10.6%	5.2%
Non-Low-Income – Non-DAC	62.4%	77.4%	7.7%



Low-Income – Customer received benefits from one or more income qualified assistance programs
DAC – Residence is located in a designated Disadvantaged Community



Propensity Scoring – Option 1

1. Estimate single propensity model for all customers
2. Score customers with that model
3. Select customers with highest propensity scores

Propensity Score Percentile	Proportion of Customers Targeted That Are Low-Income/DAC	Number of Customers (Out of 1,000,000)
Top 1 Percentile	2.4%	235 of 10,000
Top 10 Percentile	4.3%	4,258 of 100,000
Top 25 Percentile	5.4%	13,429 of 250,000





Propensity Scoring – Option 2

1. Estimate segment-specific propensity models
2. Score customers w/ model specific to their segment
3. Select customers with highest scores independent of segment

Propensity Score Percentile	Proportion of Customers Targeted That Are Low-Income/DAC	Number of Customers (Out of 1,000,000)
Top 1 Percentile	0.0%	1 of 10,000
Top 10 Percentile	0.2%	177 of 100,000
Top 25 Percentile	1.0%	2,499 of 250,000





Propensity Scoring – Option 3

1. Estimate segment-specific propensity models
2. Score customers w/ model specific to their segment
3. Select customers with highest scores within each segment

Propensity Score Percentile	Proportion of Customers Targeted That Are Low-Income/DAC	Number of Customers (Out of 1,000,000)
Top 1 Percentile	9.5%	950 of 10,000
Top 10 Percentile	9.5%	9,500 of 100,000
Top 25 Percentile	9.5%	23,750 of 250,000



Accuracy / Efficiency / Equity

Accuracy

Segment-specific propensity models result in more accurate probability scores for individual customers.

Efficiency

Targeting customers with the highest scores (regardless of segment) is the “globally” efficiency approach, but may be at the cost of equity.

Equity

Targeting customers with the highest scores within each segment may be the most equitable and is a “locally” efficient approach.



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