

Solar PV System Adoption and the
Renewable Energy Standard Offer Program:
A case study of early adopter experiences in Ontario
Report to Stakeholders



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**SOLAR BUILDINGS
RESEARCH NETWORK**



**RÉSEAU DE RECHERCHE SUR
LES BÂTIMENTS SOLAIRES**

Prepared by Chris Adachi, MES
Department of Environment and
Resource Studies
Faculty of Environment
University of Waterloo



Introductory Comments

This report has been prepared for stakeholders and parties interested in the adoption of solar photovoltaic systems and the Renewable Energy Standard Offer Program. The purposes of this report include, though are not limited to:

- To present key findings from the larger research study in an accessible manner;
- To inform participants in the study of other consumers' experiences;
- To provide stakeholders with recommendations for improving the diffusion of solar PV systems; and
- To inform future adopters of PV in Ontario of the potential challenges and opportunities.

The data and findings presented herein represent a summary of Christopher Adachi's M.E.S. thesis entitled *The Adoption of Residential Solar Photovoltaic Systems in the Presence of a Financial Incentive: A Case Study of Consumer Experiences with the Renewable Energy Standard Offer Program in Ontario (Canada)*. The full thesis is publicly available, free of charge, at the University of Waterloo's *UWSpace: Electronic Theses and Dissertations* (<http://uwspace.uwaterloo.ca/handle/10012/4400>) and at the broader project website (<http://www.environment.uwaterloo.ca/research/greenpower/projects/solar.html>). The recommendations made in this report follow from the data and findings presented in this thesis.

The reader should remain aware that the findings presented are based on the results drawn from this study's unique sample, and may not be representative of the greater population.

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Study Details

How were data collected?

All data in this study were collected through semi-structured, in-depth interviews, lasting between 19 and 79 minutes. Interviews occurred both in person and over the telephone and were conducted between July 2008 and December 2008.

Who was interviewed?

Number of participants	Participant type
24*	Residential solar PV system owners registered under the RESOP
2	Solar PV system retailers
2	Co-operative purchasing groups
2	Local distribution companies
1	Third party administrator (<i>an organization that helped to facilitate the RESOP application process</i>)
1	Small-scale commercial solar PV system owner registered under the RESOP
1	Householder who successfully received a Standard Offer Contract, but who chose not to adopt a solar PV system

**Of an eligible 105 RESOP participants, 73 were contacted, 24 of whom were ultimately interviewed.*

The research protocol used received approval from the Office of Research Ethics at the University of Waterloo.

Key Study Findings

RESOP Participant Experiences

When acquiring a Standard Offer Contract and completing the installation and grid connection of one’s solar PV system, the most significant challenges encountered by consumers included: flawed installation processes due to a lack of experienced retailers, a lengthy and cumbersome application process required by the RESOP, and overly bureaucratic and cumbersome grid connection processes were encountered by almost every consumer in the adoption process (Figure 1). The emergence of co-operative purchasing groups appears to have minimized the negative experiences encountered by study participants. Furthermore, despite the myriad of challenges encountered by consumers throughout the execution phase, improvements have been found within retailers and the RESOP application process. Finally, with the exception of continuing administrative fees charged by certain LDCs, once their solar PV system is operating and they are receiving payments from the OPA, consumers are generally content. Six different vendors (for the purchase of the PV equipment) were used by the 24 participants. Participants were distributed geographically across the province, falling under the jurisdiction of nine different Local Distribution Companies (LDC).

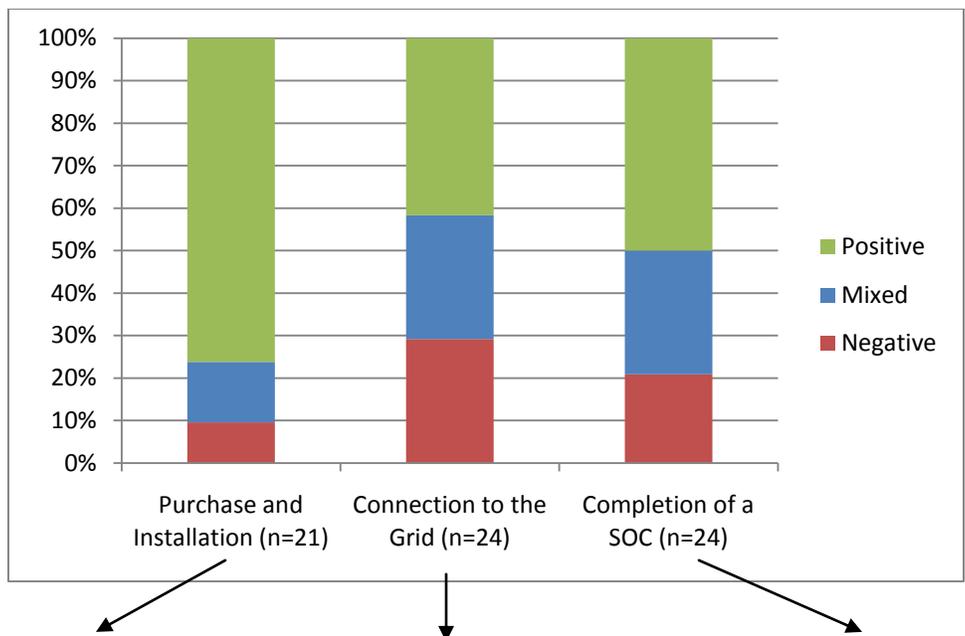


Figure 1

Purchase and Installation:

“They ... did a really fantastic, professional, clean, safe worksite.”

“Since we were so early, I don’t think they even knew what they were doing.”

“... it’s the installer. My installer really screwed up.”

Connection to the Grid:

“Getting them to actually come out, it was actually pretty good communication. In general, it was good.”

“When [LDC] came online with this, everything was ok. But, for like 6 months, they didn’t know what to do.”

“The BS that we got from [LDC] ... that was a real hassle. I left that with [installer]. If it had been up to me, I woulda washed my hands and walked away ... I’ve heard other nightmare stories about them.”

Completion of a SOC:

“The OPA ... they were pretty good.”

“It wasn’t that it was bad, because [retailer] gave me a whole outline on what to fill out ... everything’s on a timeframe. That’s what kinda bugged me ... a lot of paperwork.”

“I ended up reading the instructions for hours and hours and hours ... It was really just a case of bullshit. If the instructions were decent and all the people had their act together, it should be just a Saturday afternoon of work.”

Sample Quotations

Positive Experiences

Mixed Experiences

Negative Experiences

Why have people purchased a solar PV system?

Analysis of the data from this study's sample revealed that, while numerous factors are reflected upon by participants when considering the purchase of a residentially mounted solar PV system in Ontario, the most prominent ones are:

1. High initial capital costs and lengthy payback periods;
2. Concerns regarding the future sustainability of our societies; and
3. The presence of supporting institutions such as community-based co-operative purchasing groups and the RESOP.

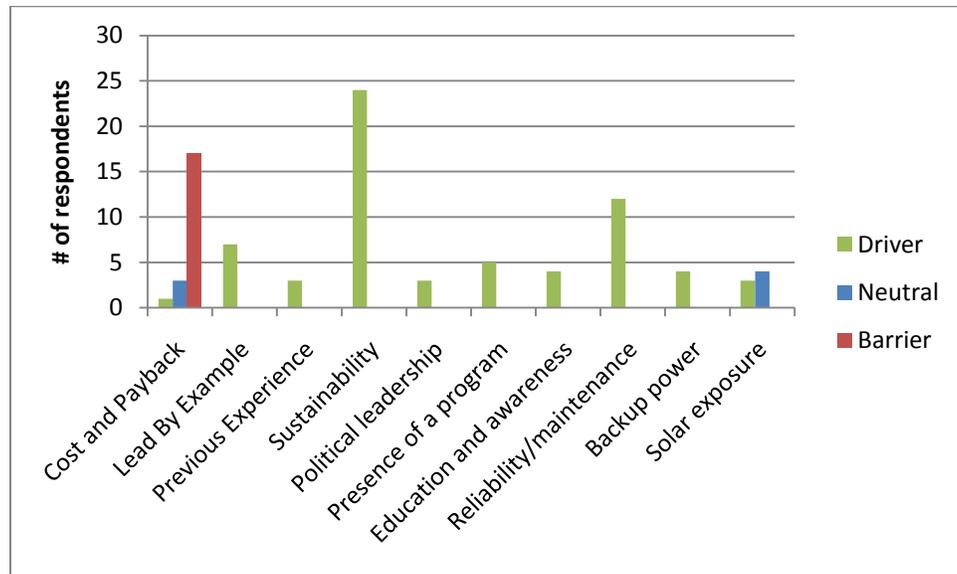


Figure 2 Factors considered by RESOP-participants when deciding to purchase a solar PV system

Cost and payback: *"I guess the only factor against it would be that it costs a lot of money."*

Lead by example: *"To start an example ... once people saw what we had, it would generate interest in the neighbourhood."*

Previous experience: *"We've got a cottage that's off-grid."*

Sustainability: *"I'm worried about the future of the planet ... we related environment to everything."*

- **General environment:** *"It seemed neat to have something that generated power that didn't produce pollution."*
- **Climate change:** *"Since the late 80s, when we first heard of climate change ... we wanna make a difference for our future."*
- **Energy concerns:** *"To get off oil and gas as much as possible."*
- **Air quality:** *"I think the big environmental problem I'd like to be part of the solution of is air quality."*
- **Future generations:** *"I think it was environmentally ... I have a young family here."*

Political leadership: *"[Politician] is a good friend of mine. I have a lot of respect for him/her, and [s/he was] part of this. I wasn't throwing money down the sink. I had a sense it was stable."*

Presence of a program (the RESOP): *"With the introduction of the RESOP, it was now financially feasible."*

Education and awareness: *"It was also a way of communicating or making people aware of the technology."*

Reliability/maintenance: *"Because they make sense. They're reliable. They have no moving parts."*

Backup power: *"My [partner] was interested in participating primarily because we got a backup battery."*

Solar exposure: *"We have a southern exposure, but part of the problem is we have a tree that completely shaded our backyard."*

The influence of the RESOP

While this study sought to understand what factors influenced the original decision of participants to purchase a solar PV system, it also aimed to investigate the role of the RESOP. Of the 24 participants interviewed, ten purchased their solar PV system prior to the creation of the RESOP; all ten subsequently applied to the RESOP. Of the remaining 14 participants, only six noted that they would not have adopted without the presence of the RESOP (Figure 2).

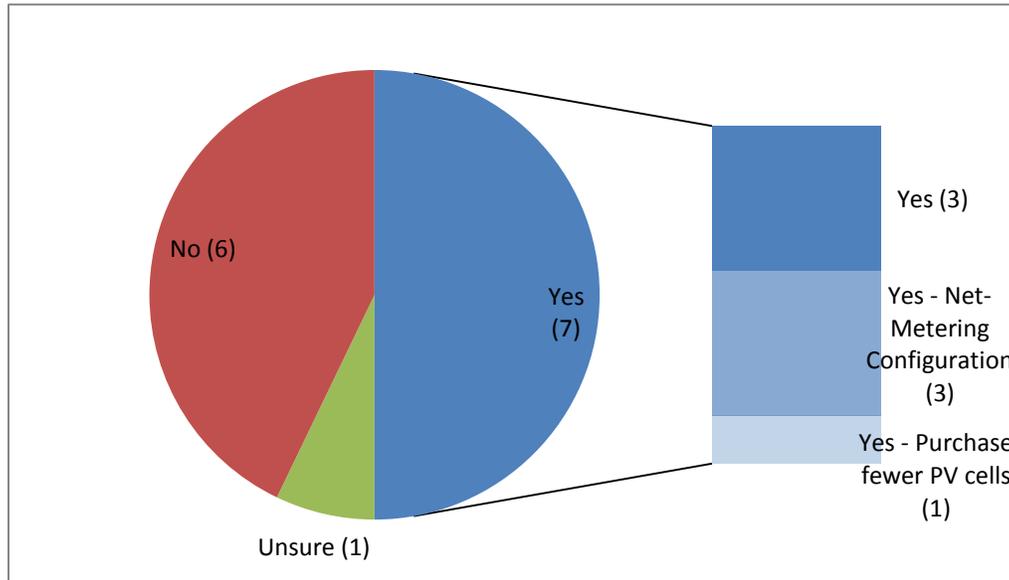


Figure 3 Frequency of responses to "Would you have purchased solar panels had the RESOP not been present?" (n=14)

The influence of the Co-operative Purchasing Groups (CPG)

Ten participants who used as CPG were asked "Would you have purchased solar panels had a CPG not been present?" Nine stated that they would not have purchased a solar PV system had the CPG not been present to reduce the costs and to help facilitate the adoption process.

The use of a CPG implicitly meant that participants would also be utilizing the RESOP, as this was part of the adoption process presented by the CPGs. In theory, utilization of the RESOP by CPGs may have been masking the reason why so many participants were strong advocates for the use of a CPG. To clarify the relationship between the use of the RESOP and a CPG, participants were asked "If [co-operative] had been in place but the RESOP payback was not present, do you believe you would have purchased solar PV panels?"

Results reveal that the presence of the RESOP is closely correlated with the presence of a CPG. Of the 11 participants who adopted through a CPG, nine stated that they would not have adopted in the absence of a CPG; seven of these nine noted that, not only did they require the presence of their CPG to adopt, but that the RESOP needed to be present as well (Figure 3). Stated otherwise, only two of ten participants would have purchased a solar PV system through a CPG in the absence of the RESOP.

It must also be acknowledged that the RESOP played an indirect role in catalyzing action. In the preliminary interview stage, a respondent from a CPG noted that the RESOP was the catalyst for the creation of the CPG. Therefore, while it may have been the CPG, as opposed to the RESOP, that more frequently prompted consumers into action, the existence of some CPGs was predicated upon the presence of the RESOP.

Final Impressions: Participant Recommendations

Would you recommend the purchase of a solar PV system?

When asked whether they would advise a potential consumer to purchase a solar PV system, 18 of 21 individuals stated that they would recommend such a purchase. The three respondents who said that they would not recommend the adoption of a solar PV system identified the initial expense and the emergence of ongoing costs as reasons.

Sample Quotations

Positive

"If you really want to do it, then definitely go for it."

"If you've got the money, go for it. This is what you can do to reduce the carbon footprint of our society."

"I would tell them that we were very satisfied with this and we think it's a good thing to do both for the environment and as an investment in the future, that it's financially ... economically viable."

"Yes, definitely. Especially if it's a collaborative initiative."

"If you can afford it and you're interested in doing it ... we'd say yes."

"My advice would certainly be to do it through an initiative happening in their area."

Negative

"So, we put them up with the idea that we'd get other people going on them too, but now I can't tell anyone about it. Who are you gonna suggest you get that when ... it's going to turn people off about doing anything about the environmental problems we have."

"No, but not because of the paperwork, but because of the [additional] cost of it."

"I wish I had nothing to do with this. Why am I doing this?"

Would you recommend the use of the RESOP in purchasing a solar PV system?

In comparison, when asked whether or not they would advise a household to utilize the RESOP for solar PV system adoption, only 16 of the 21 participants said they would. Of the five participants who stated they would not recommend the use of the RESOP, three were the same who did not recommend the purchase of a PV system. In the case of the RESOP, these three participants were frustrated by the unexpected costs associated with the program, such as high meter costs and a monthly administration fee charged by their LDC. The remaining two participants who would not recommend the use of the RESOP *did* recommend the purchase of a solar PV system. For one participant, the negative recommendation for the RESOP is explained by the following statement:

The solar panels are expensive, but there's no support for doing this at all, in my mind. The utility company's against it ... it's pretty clear. I would never sign up for the Standard Offer Program. Ever. I wouldn't recommend it to anyone. The solar panels I would recommend ... but not the Standard Offer Program. It's too painful. I've been thinking about disconnecting my power completely. I'm frustrated with it. Net-metering would have been a lot simpler; no contracts, no hassle, it would make a lot more sense than this contract. This contract has been a complete failure in my mind.

For the other participant, their disdain for the RESOP did not come in the acquisition of the SOC, but in the grid connection process required under the RESOP, stating: "I wouldn't ... [LDC]'s not very interested ... and maybe it's because they're just too big of an organization."

While 16 participants would advise the use of the RESOP, they did so primarily because of the improved payback. If a potential consumer were to probe further into the experience of RESOP participants, they would be exposed to the SOC acquisition experiences, where 21% of the sample population had negative experiences, and 29% had a mixed experience, the negative elements of which stemmed primarily from the cumbersome nature of the application itself and delays in the approval process.

It should also be noted that while 12 participants (50%) noted a positive experience, 16 participants suggested that one should use the RESOP. Although some experiences have been negative, some element of the RESOP is sufficiently rewarding to merit support of the program by its current participants. While financial incentives are the obvious explanation, such advocacy might also be explained by the willingness of early adopters to act as "guinea pigs." It was not uncommon for participants to make a remark such as "Like I say, I was the guinea pig." Participants frequently noted their acceptance that, in the early stages of any new program or new process, challenges and uncertainties are bound to arise.

Recommended Actions

1. ***Improve the rate of compensation:*** The \$0.42/kWh provided by the RESOP entails a payback rate where consumers are only able to recoup the initial costs of their system after 20-25 years. When one accounts for meter costs and monthly administrative fees charged by Local Distribution Companies (LDC), the adoption of a solar PV system becomes a net financial loss to the consumer. The \$0.802/kWh for solar PV projects <10kW proposed by the Feed-In Tariff will satisfy this recommendation.
2. ***Simplify the RESOP application process:*** Where possible, reduce the amount of information required from consumers. Reduce the use of “jargon.” Where and when technical terms are required, provide definitions and explanations. It may also be useful to consider creating distinct contracts for residential- or micro-generators.
3. ***Simplify and standardize the grid connection process:*** Though it is understandable that grid connection is a new area for LDCs, continued development and improvement of the grid connection experience of microgenerating solar PV systems will help to alleviate the major barriers encountered by adopters. Specifically, improvements should seek to:
 - ***Reduce lead times:*** Where possible, further resources should be devoted to the grid connection process by LDCs in order to increase their ability to complete installations. Specifically, LDCs should: i) target the development of their understanding of *how to connect* microgenerators to the grid, and ii) increase the capacity (i.e. number of employees) able to complete grid connections.
 - ***Address metering challenges:*** Confusion over meter configuration and the coming transition to smart-meters as well as the high cost of meters used by certain LDCs has led to significant costs for consumers. Stakeholders such as LDCs, retailers and installers should seek to identify a limited number of distinct metering configurations. The Ontario Power Authority and Ontario Energy Board may also consider regulating the use of a standardized set of meters.
 - ***Address administrative costs:*** Monthly administrative fees charged by some LDCs are cutting significantly into consumers’ compensation. While consumers should be mindful that LDCs do incur operational costs and may need to recuperate such costs through the use of administrative fees, fees should be set at a fair rate and in a transparent manner.
4. ***Promote and further develop co-operative purchasing groups or purchasing facilitators:*** Study participants found co-operative purchasing groups to be highly supportive in their adoption process. Benefits included reductions in cost, research into the appropriate technologies and vendors, and administrative and technical support when acquiring a Standard Offer Contract and installing one’s solar PV system, respectively.
5. ***Clarify the grid connection process and costs at the outset of the adoption process:*** Many consumers were surprised and disappointed by the lack of knowledge possessed by LDCs with respect to having their solar PV systems properly metered and connected to the grid. Further exacerbating this challenge were surprise costs in terms of expensive meters and monthly administrative fees. At the outset of consultation with potential consumers, interested purchasers, retailers, or co-operative purchasing groups should consult with the appropriate LDC to clarify how the grid connection process will occur and to establish what the cost of grid connection will be.