THE POWER OF Community

How community-owned renewable energy can help Ontario create a powerful economic advantage

TREC

TREC

TREC is Canada's leader in the development of community-owned renewable energy. We support co-ops, Indigenous communities and social enterprises with our Community Member & Investment Services, and inform policy through our research and advocacy efforts.

We envision a world where people work together, pooling their resources, to realize and benefit from a democratic, 100% renewable energy economy.

Visit trec.on.ca for more information.

Acknowledgements

Research and writing by:
Judith Lipp, PhD and Brett Dolter, PhD

With many thanks to contributions from:
Brad Cundiff, Rebecca Black, and Linda Varekamp

Graphic design by:
Hello Dear, Design & Illustration

TREC wishes to thank the People, Power, Planet Partnership (PPPP) for supporting the research in this report, as well as the Social Science and Humanities Research Council of Canada for its financial support of PPPP.

TREC is a member of the Federation of Community Power Co-operatives, representing Ontario's Community Power sector. Members include:

AGRIS Solar Co-operative
AMBER Energy Co-operative
The Beach Community Energy Co-operative
Braeside Solar Energy Co-op
Community Energy Development Co-operative
Community Power Northumberland Co-operative
GECO — Green Energy Co-operative of Ontario
Green Energy Nexus 2 Co-operative
Green Life Co-operative
Green Timiskaming Development Co-operative
LIFE — Local Initiative for Future Energy Co-operative
OREC — Ottawa Renewable Energy Co-op
Queen Street Solar Co-operative
RECC Hamilton Co-operative
Simcoe County Community Energy Co-operative
SolarShare Co-operative

Table of Contents

Community Power refers to the direct participation in, ownership of, and sharing of collective benefits from renewable energy projects. It represents a form of ownership and production of renewable energy by and for a local community. Projects may be owned in-part or in-full by co-operatives, First Nations, Métis communities, charities and non-profits, other community groups and/or municipal entities, including schools, health centres, etc.

Executive Summary

Facing a growing climate crisis, the world has rapidly embraced renewable energy and sources like wind and solar are now providing most of the new electricity generation capacity worldwide. Solar power alone provided more new electricity generation capacity in the United States than natural gas in 2015.

But when it comes to maximizing the economic benefits and public support for clean energy sources like wind and solar, **community participation and ownership matters**. Studies conducted internationally consistently report multiple positive impacts of community-owned renewable energy projects in comparison to commercially developed projects, including higher job creation, stronger economic impacts and better social license to develop projects.

A U.S. think-tank study found that local ownership increased the economic benefits of renewable energy projects by 50-240% by keeping money and jobs in local communities. The British government said community projects will result in 12-13 times as much community value reinvested back into local areas as would be achieved through 100% commercial models, before factoring in wider social and environmental returns. And in Germany it was found that local ownership can dramatically increase support for often controversial wind energy — resulting in a 77% shift toward the positive in public support for wind energy projects.

These findings hold true in Ontario too. In recent polling done for the Federation of Community Power Co-ops (FCPC) by Ekos Research, 53% of respondents said that community ownership would make them more likely to support a wind energy project and 66% said it would make them more likely to support a solar project.

Overall, **78% thought it was important for Ontario to increase community ownership of renewable energy projects**.

Thanks to the *Green Energy and Green Economy Act* with its Feed-in Tariff program and specific encouragement for community participation, Ontario boasts a growing community power sector engaging a broad range of participants. This diverse group, which includes community co-ops, First Nations, local municipalities, non-profit housing agencies, school boards, public utilities and religious organizations, is poised to play a central role in the province's green energy transition provided the same effective policy mechanisms are maintained.

Today, after five years, Ontario has just over 1,000 MW of renewable energy generation that includes some portion of community ownership and participation. It's a respectable start but lags far behind Germany, where over 25,000 MW — nearly half of all renewable energy capacity — is community owned after 20 years of development. The potential for community power in Ontario is still largely untapped: a 50% community power target is not only doable, but also can deliver many additional complimentary environmental, economic and social benefits.

Community-owned power is an important entry point for communal and individual action on climate change: as communities come together around renewable energy, they also think more deeply about other ways to address their climate impact. And as they develop collective capacity and expertise through the co-operative development process, they feel able to take on additional challenges, like developing community energy plans or driving their communities to go 100% renewable. These aspirations and capacity building opportunities will be critically important to the success of actions set out in the Ontario's new Climate Plan. Similarly, because most community-owned power projects are embedded in local power grids, they increase the resiliency of these systems while reducing power transmission costs, and better position communities to ride out increasingly severe weather events.

Solar energy is, of course, technically well suited to meeting the demand for power that peaks on hot sunny days when air conditioners are running full out, thereby avoiding polluting emissions on some of the province's worst air quality days while helping control peak power costs.

And as polling has shown, community-ownership of renewable energy projects increases support for the urgent and necessary transition to green energy.

Equally important, community-ownership amplifies the economic benefits of renewable energy investments. Economic modelling done for TREC shows that every dollar invested in a typical community solar project in Ontario drove an additional $1.45 in economic activity. When the full range of economic impacts are included, such as wages paid by suppliers and returns spent in the community by investors, **every dollar of the FIT rate spent on community energy results in more than $2 in additional economic activity.**

Additionally, research shows that when capital came from local investors and local firms were used to develop the project, **the economic impact on the local economy increased by 47%** compared to a project without these local components.

Despite its relatively modest size, the **community power sector will drive an estimated $5.2 billion of additional economic activity** over the life of its current FIT contracts.

Community power is also a growing source of jobs. The Institute for Local Self Reliance has found that community-owned renewable energy projects generally create twice as many jobs as corporately owned projects.

Many Ontarians are already voting with their wallets to support community energy. The 24 member co-ops of the Federation of Community Power Co-ops (FCPC) have raised more than $84 million from members. These funds have been invested in hundreds of local projects all around the province. Continuing to build the community power sector is one of the most effective ways for Ontario to address climate change, strengthen local economies, create new economic opportunities, finance climate action and support the work of important local institutions, such as schools, hospitals and housing providers.

In fact, with Ontario's new Climate Plan and commitment to increasing use of renewable energy by public institutions and in public buildings, there is a tremendous opportunity to build partnerships between experienced community groups and public bodies to ensure we maximize the benefits of going green.

Keeping renewable power local is a great way to build the economy and make all Ontarians part of the solution to climate change. To continue to ramp up the power of community, Ontario needs to:

Maintain the FIT program for qualified community organizations

Raise the capacity cap for FIT projects to 1 MW to help increase economies of scale

Introduce a FIT for community wind to allow community groups to lead projects

Provide provincial loan guarantees for co-op and other non-profit projects, an extremely low-cost way to support green energy development

Help to export our community expertise to other provinces just getting started with the transition to green energy

Background

Facing a growing climate crisis, the world has rapidly embraced renewable energy, and sources like wind and solar are now providing most of the new electricity generation capacity worldwide. Solar power alone provided more new electricity generation capacity in the United States than natural gas in 2015.[1]

The advantages of green energy are well known: zero polluting emissions and a free and endless supply of fuel for solar and wind. Less well known is the fact that renewable energy is also a major economic opportunity. Studies have shown that renewable energy development is significantly more jobs intensive than conventional oil and gas development[2] and, with the world racing toward a trillion-dollar renewable energy marketplace, demand for renewable energy is soaring.

But when it comes to maximizing the economic benefits and public support for clean energy sources like wind and solar, community participation and ownership matters. Studies conducted within Canada and internationally reiterate similar messages about the positive impacts of community-owned renewable energy projects including job creation, economic value-add and social license to develop projects.

When it comes to maximizing the economic benefits and public support for clean energy sources like wind and solar, community participation and ownership matters.

Community Power Project: WindShare Co-op, Toronto

U.S. think-tank Institute for Local Self Reliance found that local ownership increased the economic benefits of renewable energy projects by 50-240% by keeping money and jobs in local communities.[3] And a report for the British government concurred, stating "The community projects installed will offer between 12-13 times as much community value re-invested back into local areas as would be achieved through 100% commercial models. The estimate is based purely on an assessment of economic value, when full social and wider environmental returns are factored in the benefits will be substantially higher."[4]

A German study found that local ownership can also dramatically increase support for often controversial wind energy — resulting in a 77% shift toward the positive in public support for wind energy projects. Similar findings were recently confirmed in Ontario too, in polling done for the FCPC by Ekos Research, with 53% of respondents saying that community ownership would make them more likely to support a wind energy project and 66% saying it would make them more likely to support a solar project. Overall, **78% thought it was important for Ontario to increase community ownership of renewable energy projects.**

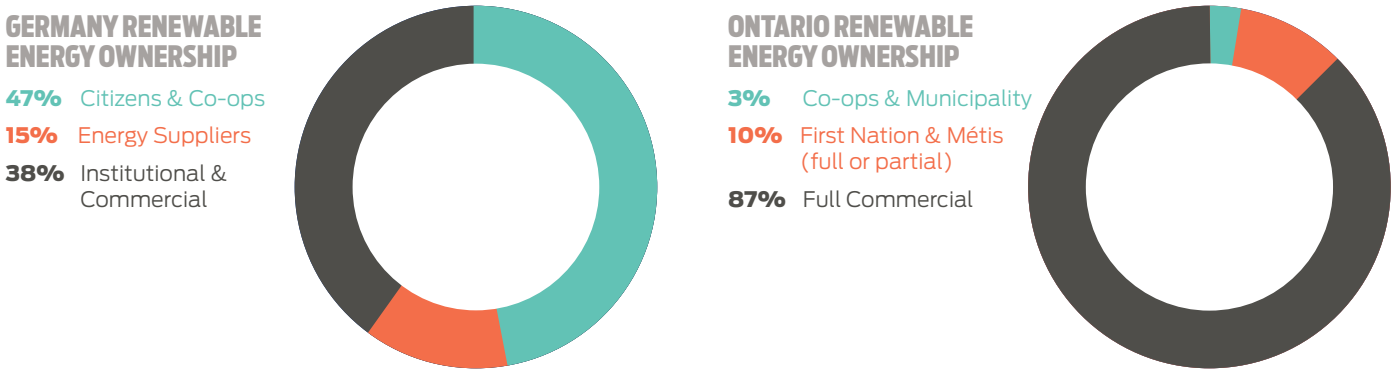
Ontario boasts a growing community power sector engaging a broad range of participants including community co-ops, First Nation and Métis, local municipalities, non-profit housing agencies, school boards, public utilities and religious organizations. Supported by the province's *Green Energy and Economy Act* and Feed-in Tariff program, including its system of price adders and capacity set-asides for community-owned projects, this diverse public sector is poised to play a central role in the province's green energy transition provided the same effective policy mechanisms are maintained.

In fact, Ontario now has close to 2.5 times as much community-owned renewable energy capacity as the entire United States (approximately 210 MW vs. 106 MW) if projects developed by municipalities and local utilities are included alongside projects that qualify for community set-asides and price adders.[5] Projects with Aboriginal investment (First Nation and Métis) add another 850 MW, amounting to more than 1000 MW of renewable energy generation in Ontario with some level of community involvement and/or control.

But Ontario still lags far behind Germany, where more than 25,000 MW and close to 50% of all renewable energy capacity is community-owned (see Figure 1).[6] In Ontario, the figure for local community and co-op involvement is closer to 10% of all solar project capacity and 3% of all the combined wind and solar capacity added in the past decade. Including projects with full or partial ownership by First Nations brings full or partial community ownership of all green energy projects up to a still modest 13% in Ontario (also shown in Figure 1).

As a direct result of the Ontario feed-in tariff program, Ontario has close to 2.5 times as much community-owned renewable energy capacity as the entire United States but less than 1% of what Germany has achieved.

FIGURE 1: COMPARISON OF COMMUNITY OWNERSHIP LEVELS FOR RENEWABLE ENERGY IN GERMANY AND ONTARIO



There are significant environmental, social and economic benefits of community power: this report captures these benefits both qualitatively and quantitatively. For the first time, the economic contribution of community power in Ontario is calculated using standard economic modelling tools. Polling data is presented that demonstrates the importance of community ownership for driving acceptance of green energy and the transition to a low-carbon economy. Finally, recommendations are outlined that explain how Ontario can continue to grow its community power sector and make provincial expertise available to other jurisdictions, such as Alberta and Saskatchewan, that are just beginning to transition away from fossil fuel-fired generation.

Community Power Project: ZooShare Biogas Co-operative, official groundbreaking

Benefits of Community Power

Community power refers to the direct participation in, ownership of, and sharing of collective benefits from renewable energy (RE) projects. It represents a form of ownership and production of renewable energy by and for a local community. It is a phenomenon that has seen wide uptake and government support in select European countries; elsewhere the extent of its benefits remains greatly underappreciated and under-realized. While there is some community power activity in most Canadian provinces and a decent start in Ontario and Nova Scotia, the full potential of community power is undermined by conventional, centralized energy planning and massive centralized generators.

The appeal of community power is worth pursuing not only for its environmental merits. It has also proven an ability to unleash innovation in community development, social finance, wealth creation, energy security and at the energy system level.

Across Canada, communities and decision-makers are grappling with the cost of climate adaptation, green infrastructure and climate mitigation and curtailing other environmental destruction, as well as maintaining or creating community wealth. Community power, where supported with enabling policies, represents a tried and tested approach to meeting all of these objectives. The multiple benefits of community power are explored qualitatively in this section. Later in the report the quantitative impacts that community ownership has had in the province of Ontario are addressed.

Community Power Project: Guelph Renewable Energy Co-operative (Photo: Evan Ferrari)

Environmental Attributes of Community Power

Delivering Greenhouse Gas Emission Reductions

Greenhouse gas (GHG) intensity varies by Canadian province and so the carbon impact of community power will vary from one province to the next. Ontario still relies on natural gas-fired electricity for about 10% of its annual electricity supply.[7] Gas-fired power is often used to meet demand in peak periods as well as being used to replace power from nuclear plants when they are offline for repairs or maintenance (about 25% of the time on average for Ontario's nuclear fleet over the last decade).

Solar power is particularly useful for replacing natural gas fired power on hot summer days when air conditioning usage drives up power demand. The combination of wind, sun and water power is also an increasingly attractive low-carbon alternative to the costly process of rebuilding old nuclear reactors, which produce toxic and radioactive waste that must be securely stored for thousands of years.

Currently, Ontario is planning to more than double the output of its natural gas fired power plants as it starts the process of rebuilding old nuclear reactors.[8] Increasing community power, produced closer to where energy is needed, is a viable alternative that reduces our carbon footprint while financially benefitting First Nations, municipalities and community members.

A Gateway to Action on Climate Change

Community power leads to community empowerment: community ownership of renewable energy projects has been shown to be a gateway for a wide array of emission reduction actions and an important motivator for increasing uptake of energy conservation programs such as home retrofits. As communities come together around renewable energy projects, they also think more deeply about other ways to address their climate impact. And as they develop collective capacity and expertise through the co-operative development process, they feel able to take on additional projects, whether it is developing community energy plans or challenging their communities to go 100% renewable.

Addressing Other Environmental Impacts

The impacts of fossil fuel use extends well beyond climate disruption, having significant upstream (extraction) and downstream (waste management) implications for air, land and water quality. The same is true of uranium extraction and nuclear spent fuel and the risk of nuclear accident associated with nuclear power. Although climate change is arguably the biggest collective environmental problem we face globally, we cannot underestimate the health impacts at the individual, community and regional level when air, soil and water quality is compromised, not to mention devastating impacts on other species.

Given the cocktail of toxins that are released from fossil fuel extraction and the uncertainty and lack of long-term of nuclear waste storage solutions, it is short-sighted to avoid factoring these costs into the equation when weighing up the relative impacts of various energy options. Renewables like wind, solar, small hydro and some biomass applications all represent far less impactful environmental alternatives when we consider the full life-cycle cost of all energy options.

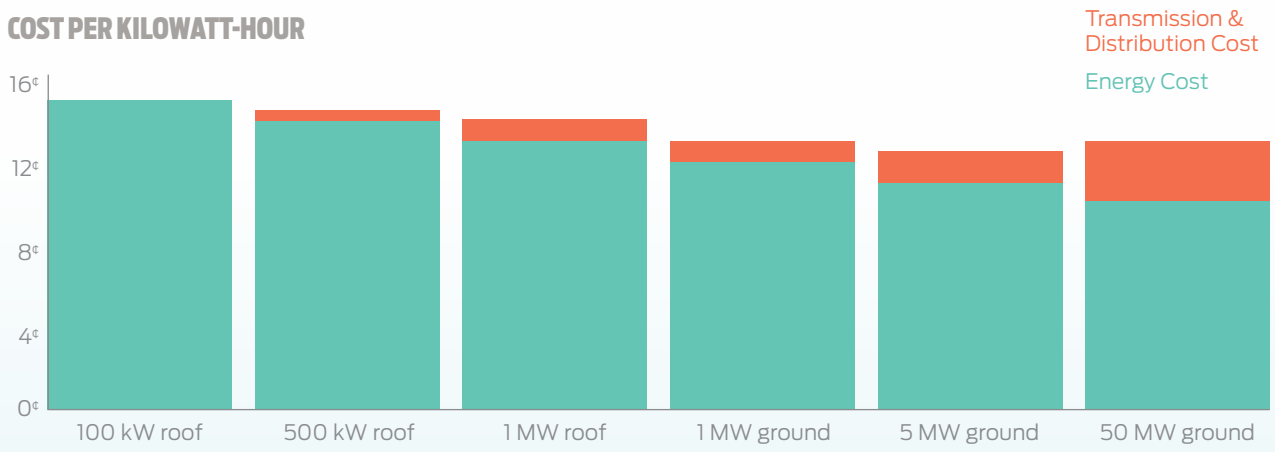
Locally Generated Electricity System Benefits

Given their size, a majority of community-owned solar energy projects are connected to local power distribution systems. This means the power they supply is consumed locally, which provides a number of benefits:

- It avoids the need to build costly new transmission infrastructure to bring power to market from distant power plants, reducing infrastructure impacts on the environment;
- It helps to reduce the stress on local systems at peak times — when demand is highest — by supplying peak power locally; and
- It improves the resiliency of the local grid by creating a local distributed supply of power that can be used when large centralized power plants encounter problems or the long distance transmission system (or even local grid sections) are knocked out by extreme weather or other events.

These benefits have been quantified in Figure 2, which shows how smaller rooftop systems can be cost competitive with large utility scale systems when transmission costs are factored in.

FIGURE 2: COST COMPARISON OF SMALL ROOFTOP SYSTEMS AND UTILITYSCALE SOLAR WITH INCLUDED TRANSMISSION COSTS



SOURCE: CLEAN COALITION

Reinforcing Public Support for Going Green

Increased Public Support for Climate Action

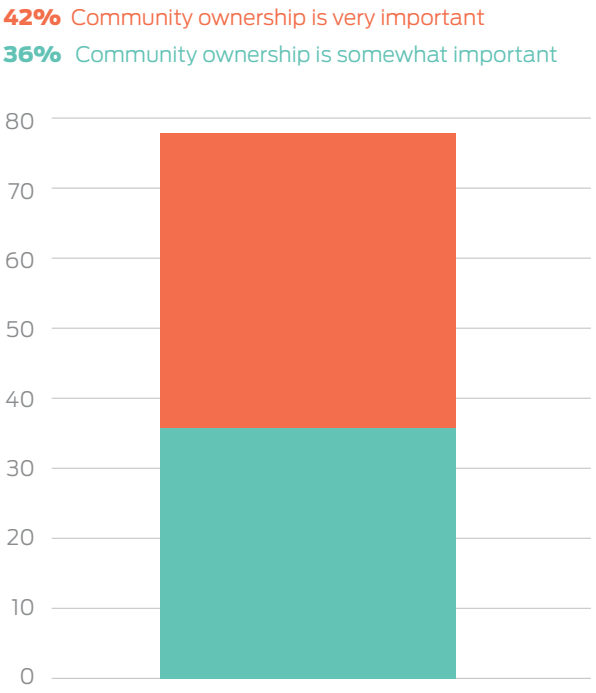
People in Ontario have often felt cut off from decision making around energy projects. This has led to a significant backlash against the province's efforts to develop green energy. As one author put it "Many wind power projects have come under fire from nearby residents . . . often claiming ill health effects from the turbine noise or shadow. It's not that people are made physically ill by new renewable energy projects. Rather, they are sick and tired of seeing the economic benefits of their local wind and sun leaving their community."[9]

Polling done for the FCPC by Ekos Research found that Ontarians overwhelmingly (78%) support the community ownership model, with 42% strongly supporting greater development of community-owned green energy projects and 36% seeing it as somewhat important. Similarly, the poll found that support for renewable energy projects was likely to be significantly higher if these projects were community-owned.

It is unfortunate that many Ontarians are not aware of just how dominant community projects have been in the latest FIT rounds and how these projects are helping everything from local schools to arenas by providing badly needed new revenue to fund repairs, renovations and expansions. Virtually every project approved in the FIT 3.0 program either qualified for a community set-aside as a co-op or First Nation or Métis project or included a First Nation or Métis equity component. In particular, municipalities and public sector entities such as school boards were big winners under FIT 3.0.

> It's not that people are made physically ill by new renewable energy projects. Rather, they are sick and tired of seeing the economic benefits of their local wind and solar energy leaving their community.

FIGURE 3: MORE THAN THREE-QUARTERS OF ONTARIANS SEE COMMUNITY OWNERSHIP OF RENEWABLE ENERGY AS IMPORTANT



Levelling the Playing Field

Another way that community energy increases support for renewable energy is by making access to renewable energy opportunities more equitable. The Rocky Mountain Institute (RMI) calculates that in the U.S. less than half of residents or businesses could physically accommodate a solar power system on their structure.[10] A Deloitte report calculates that three-quarters of U.S. households are either renters or high-rise residents, lack roof space on their homes, have too much shading or lack the financial resources to install their own rooftop solar system, but contrasts this with rapidly growing interest in tapping into solar power, with 64% of American consumers describing "increasing use of solar power" as one of their energy goals.[11]

By providing an opportunity to invest in shared-ownership projects, the community sector gives many people interested in renewable energy — but without the means to install their own system — a way to benefit from the renewable energy revolution.

Community Power as an Economic Driver

Economic Gains

In Ontario, most energy dollars flow out of local communities. In London Ontario, for example, only 14% of the dollars spent in the community on electricity stay in the community.[12] Developing local community-owned renewable energy projects can keep more of these energy dollars in the local economy, and if a significant share of the funding for the project is also raised locally, investment returns are also more likely to be recirculated within the community rather than being deposited outside the province or country.

Currently, the member co-ops in the Federation of Community Power Co-ops (FCPC) are paying investors more than $9 million per year in investment returns. Co-op members are essentially investing in infrastructure in their own community and using returns to support their local economy — a win-win for the province and local communities. The FIT program has made it possible for average investors, and not just foreign corporations and giant pension funds, to take advantage of the pressing need to renew our crumbling infrastructure in a sustainable manner.

Co-op members are essentially investing in infrastructure in their own community and using returns to support their local economy – a win-win for the province and local communities.

The economic analysis research illustrates that the community power sector will drive an estimated $5.2 billion of additional economic activity over the life of its current FIT contracts, with every dollar earned through the FIT program resulting in another $2.2 being spent in the provincial economy. Further economic analysis details are revealed on page 18 of this report and a full analysis is presented in the Appendix).

As well, in many cases, community energy projects — such as solar rooftops on schools or arenas — ensure that dollars paid out through the FIT program flow directly back to local governments and other taxpayer-supported institutions, thereby reducing the financial burden on all local taxpayers.

More Local Jobs

The Institute for Local Self Reliance calculates that locally owned projects can generate on average twice as many jobs as corporately owned projects.[13] Community project developers may be more motivated to use local contractors and local suppliers on their projects and their projects generally have a higher local multiplier effect. Moreover, when First Nations, municipalities and co-ops hire locally, they help build skills and capacity that can be deployed for future infrastructure and community projects.

Value Based Investment Opportunity

Options to invest locally and socially are extremely limited, but many Ontarians are looking for ways to invest savings and retirement funds outside the volatility of the stock market and in line with their social values, including reflecting their growing concern about costly climate change. Recent polling carried out by Ekos Research for FCPC found that 37% of respondents would consider looking for investment vehicles that were divesting from fossil fuels in the near future, an early indication of a growing investment trend.

The community power co-op sector provides Ontarians with secure investment opportunities and competitive returns from an investment that directly benefits their province and community. As Ontario's government works to make it easier for residents to save for retirement, building momentum behind this smart investment opportunity just makes sense.

The community power sector will drive an estimated $5.2 billion of additional economic activity over the life of the current FIT contracts.

Community Power Poised for Growth

Examples abound that illustrate that community power is poised for growth. Community-owned projects dominated the list of renewable energy generation contracts awarded in Ontario's FIT 3.0 process, reflecting both the growing interest from First Nations and Métis communities, school boards, and other municipal institutions in renewable energy and the increasing sophistication of community co-ops that now have significant project development experience.

The Toronto District School Board, for example, has now been awarded contracts for solar projects on 323 schools and would like to develop more once it has successfully completed construction on its current projects (which it expects to do by the end of 2016). These projects are offsetting 70% of the cost of the board's large roof repair backlog while providing power equal to 15% of board-wide usage.

The Rocky Mountain Institute (RMI) says that community power is poised for strong future growth south of the border, stating "between traditional behind-the-meter (e.g., residential rooftop) and utility-scale solar exists a substantial untapped opportunity, one that can expand the U.S. solar market and provide affordable solar energy access to millions more Americans." They go on to explain, "Community-scale solar is at a sweet spot between utility-scale and behind-the-meter solar. It is neither too big nor too small; it is just the right size to capture community and distributed energy benefits on one hand and utility-scale solar's economies of scale on the other."[14]

Meanwhile, others are just waking up to the opportunity that renewable energy development represents. Ottawa councillor David Chernushenko notes that his city has been slow to embrace opportunities like solar power rooftops on city facilities and worries that the opportunity will be gone before the city decides to act. "Does the city want to be in a process of bidding against corporations for contracts? No, that's not our business," he states. Having to partner with large energy companies in a competitive bidding process rather than being able to simply put forward qualifying projects in a standard offer program will "make us takers rather than players," he notes, thereby emphasizing the importance of the FIT program for municipal actors.

Adding up the potential market for shared solar systems, including low-income households, condo and high-rise residents, homeowners and local businesses with unsuitable roofs, Rocky Mountain Institute projects that shared solar could tap into a 750 gigawatt (GW) market in the U.S. Obviously, the opportunity is smaller in Ontario, but in proportion to population, RMI's figures suggest **Ontario's community solar potential is in the neighbourhood of 30 GW: With only about 1 GW under development, Ontario has barely scratched the surface of what could be done at the community scale in the province.**

Community Power Project:
SolarShare Co-op - Hotlby, Brampton

The Co-op Sector

One of the most successful areas for community ownership in Ontario has been the development of community power co-ops. Between 2010 and 2015 there were more renewable energy co-ops established in Ontario than all other types of co-ops combined. These co-ops have emerged across the province and cover different technologies and offer members varying participation and investment options. Here's a sampling of a few co-op leaders in the province:

- One of the early participants in community solar was the Agris Solar Co-operative, spun out from a conventional agricultural co-op, which brought together 1,000 farmers and rural landowners in the development of hundreds of farmyard and other land-based solar systems.
- The SolarShare Co-operative is one of North America's largest energy co-ops and has raised more than $15 million from members through bond sales, financing the development of 17 large rooftop and 17 smaller ground-mount solar systems. In many cases, SolarShare leases roof space from landlords of large commercial buildings, adding to its local economic impact as well as improving building energy performance by shading large flat roofs.
- The Ottawa Renewable Energy Co-op (OREC) has partnered with two local school boards to develop shared ownership solar systems on school roofs, and has also installed systems in cooperation with local non-profit housing providers and innovative local business partners. "We saw that our roof space could be put to good use. Innovation and supporting local business is part of our company philosophy," explains Marco Campagna, President of Hovey Industries and one OREC project partner.

Co-operative housing providers, meanwhile, see co-operative solar as a natural fit. "When we heard about the Ottawa Renewable Energy Co-op and the opportunity to rent roof space, we knew that partnering was the right solution for us," says Mary-Ann Schwering of Co-op Lafontaine.

The member co-ops in the Federation of Community Power Co-ops (24 co-ops) have to date secured 212 FIT contracts and 1,000 microFIT contracts, for a total project capacity of 75 MW (including only projects with at least 50% community equity). This total shows the co-op sector accounting for roughly one-third of community-owned power development in Ontario.

Ontario co-ops have raised more than $84 million in community capital (shares and bonds) to support the development of solar, wind and biogas projects across the province. As of 2015, they had more than $100 million in assets under management and were paying out more than $9 million per year in returns to investors.

Currently, more than 7,000 people across Ontario have become renewable energy co-op members, a number that is growing steadily as investors seek out stable returns from local, green and ethical investments.

While co-ops have worked hard to make it easier for local citizens to invest in their projects, hurdles remain. Long project application and development lead times present a significant challenge to raising community capital, and lack of simple RRSP eligibility for investments remain. Co-ops also often have higher financing costs than large multinational companies, which is why community adders and capacity set-asides in the FIT are important to the continued growth of this sector.

Despite the challenges, renewable energy co-ops have demonstrated that they can cost-effectively and reliably develop projects, while offering competitive returns. They are attracting increasing attention in an investment market hungry for fossil-fuel free opportunities.

First Nations Leadership

Youth from Kettle & Stony Point First Nation, installing solar

Indigenous involvement in wind and solar projects is a fairly recent phenomenon since the FIT program was introduced in Ontario. Strong interest has resulted in participation in — and leadership on — a growing number of projects, with more than 850 MW of RE projects with First Nation or Métis participation and over 600 projects including wind, solar and hydro.

In Ontario's wind power heartland, two First Nations — the Aamjiwnaang First Nation from the Sarnia area and the Bkejwanong First Nation from Walpole Island — have partnered with Northland Power on a large wind power development in the Grand Bend area. The 100 MW project consists of 48 turbines and had a capital cost of $383 million. Ed Gilbert, the project manager for the First Nations, notes that "the economic benefits are very good" and in particular, a valuable new source of revenue to support community development and economic diversification.

Gilbert says that First Nations have a strong direct interest in Ontario's efforts to develop green energy. "Virtually all of these projects are located in the traditional territories of First Nations," he points out.

Overall, Gilbert says "the opportunities for First Nations have been absolutely great" thanks to the Green Energy Act. The challenge has been making First Nations aware of the opportunity and helping them navigate the process. Gilbert would also like to see more emphasis on getting more First Nation people employed in the sector. But, he adds, "the foundation has been laid and there is growing excitement for moving forward."

That is certainly the case for the Six Nations Development Corp. representing First Nations in the Brantford area. Six Nations will add to its already extensive renewable energy project portfolio, which includes interests in four wind and six solar projects, with partial ownership of a new solar facility that will replace the now closed Nanticoke coal plant.

"The project aligns with our community values of sustainability and environmental prosperity. Investing in clean energy benefits the people of Six Nations economically without compromising our children's future," Six Nations President and CEO Matt Jamieson told the Simcoe Reformer.

Direct participation in renewable energy projects is also a critical opportunity for First Nations and Métis capacity building, providing communities with an opportunity to develop the experience and expertise needed to undertake bigger and more complex projects whether in renewable energy or other businesses. These sentiments were recently shared at a waterpower workshop by First Nations leaders from Pic Mobert First Nation and Moose Cree First Nation, who have a direct stake in hydro project developments on their respective territories.

The project aligns with our community values of sustainability and environmental prosperity. Investing in clean energy benefits the people of Six Nations economically without compromising our children's future

Community Power Project: AMBER Energy Co-operative, Elgin County

Case Study: The Economic Benefits of Community Ownership

To illustrate the benefits of Ontario's investment in community-owned power, TREC commissioned an economic analysis of a representative community co-op solar project (the full analysis is presented in Appendix A). TREC worked with SolarShare, one of the largest community power cooperatives in North America, to gather data on a typical industrial rooftop solar project. SolarShare has now developed 17 such community solar projects in different parts of the province.

Analysis found projected revenues of $3.6 million from power sales from a 297 kilowatt rooftop solar system over a 20-year period. Over the project's lifetime, approximately $1.1 million would be returned to investors through interest payments on solar bonds or shares and other project financing, while $656,000 would be paid out in wages and salaries as a result of project-related spending.

The analysis also looked at the economic impact of the project in terms of goods and services purchased and the economic multiplier effect of these purchases (e.g., a solar racking supplier purchases fasteners and bars from other suppliers to produce the racks). For this typical rooftop system, this broader economic impact amounted to $5.2 million. This means for every dollar SolarShare received through the FIT program, the co-op generated another $1.45 in economic activity.

Next, the analysis took into account "induced" impacts such as wages paid by suppliers or returns paid to investors that are then spent in the community. It found that these induced effects resulted in an additional $2.2 million in economic activity.

In total, the typical community solar project resulted in $2.06 in economic activity for every $1 in electricity purchases made by the FIT program, **a 2:1 economic benefit ratio.**

TREC's analysis also looked at the difference in economic impact between locally owned projects and projects developed by outside commercial entities. It was found that in a scenario where capital came from local investors and local firms were used to develop the project, **the economic impact on the local economy increased by 47%** (see Table 3 on page 29). If local ownership was combined with locally manufactured solar panels and inverters, the economic impact jumped by 77%. These results clearly indicate the major economic benefits to be had by encouraging local community ownership of renewable energy projects.

Applying the figures from the SolarShare project to the broader community sector is more challenging as the costs and revenues of each individual project are unavailable. But if the SolarShare example is used as a general rule of thumb, the development of 210 MW of local community and co-op owned power in Ontario can be valued as generating approximately $4.1 billion in total local economic impact, and $1.6 billion in induced economic impacts, for an **economy-wide impact of $5.2 billion.**

A quantitative analysis of Aboriginal renewable energy projects was not included in the analysis, as the equity participation structure varies significantly between groups making a generalized quantification unreliable.

... for every dollar SolarShare received through the FIT program, the co-op generated another $2 in economic activity.

Community Power Project:
SolarShare Co-op - GoodMark, Toronto

Keep Community Power Growing

Despite capturing only a modest share of Ontario's green power investments, it is clear to see both anecdotally and in hard numbers that community power is having a positive economic impact in the province. And while the studies done by RMI and Deloitte focus on the United States, the case they make for community power being in the "sweet spot" for renewable energy development is equally applicable to Ontario, thanks to a strong correlation between rapidly declining technical and system costs and the strong value-added component delivered by community power, including greater local retention of dollars spent on energy.

Recently, Ontario started moving away from a feed-in tariff regime to competitive bidding in the interests of reducing costs for renewable energy. But while it seems intuitive that a competitive bidding process would lead to lower costs, studies and real world experience suggest this is not always the case. Moreover, community power in particular cannot compete and thrive in a tendering system marketplace.

Tendering systems raise "transaction costs" by making it costlier to prepare and submit project proposals and by lowering the odds of success. In Ontario's recent Large Renewable Procurement process, only 16 of 119 proposed projects were approved. By raising risks and creating greater uncertainty around potential project revenue, tendering processes can also raise financing costs, especially when financing relies more on equity investments, as with community co-ops. Simply put, higher risk equals an expectation of higher returns by investors. Similarly, infrequent and tightly constrained bidding rounds can weaken local supply chains by severely limiting opportunities for ongoing business.[15]

In keeping with these factors, prices in recent auctions for wind power in Brazil have actually been on the rise, increasing 12% between August and November 2015[16], and a study by the German Institute for Economic Research found that a responsive feed-in tariff system — a system with frequent price adjustments based on achievement of capacity targets — was better able to ensure continued development of cost-effective small and mid-sized renewable energy systems than a tender system.[17]

Community Power Project:
Ottawa Renewable Energy Co-op

And while Germany is moving toward a tender system for large renewable energy procurement, it is also working to ensure that citizens remain involved as project owners even in large projects. As one observer noted, "This aspect is seen as vital to allow citizens' involvement in the expansion of wind energy, which in turn helps maintain public acceptance for the big changes and costs involved in the Energiewende — the transition to increasing reliance on renewable energies in the German energy supply."[18]

While Ontario municipalities, school boards, First Nations and co-ops may have experience running their own procurement systems, few of these institutions and organizations have the experience or, in most cases, the capacity to participate in competitive bidding processes to be suppliers of green energy.

Moreover, competitive procurement processes like Ontario's new Large Renewable Procurement (LRP) discriminate against smaller players, essentially relegating their participation to, at best, the role of minority partners. To be eligible to even participate in the LRP bidding process requires the deep pockets of a large corporation. Corporations therefore control who gets a minority stake (if anyone) in their projects.

No co-ops were solicited to participate alongside companies in the latest LRP process despite a clear public preference for increased local control and benefits in renewable energy development.

For municipalities and other community interests, this means that under a competitive bidding process, they will simply have to accept being subordinate partners of large energy companies and see a smaller share of benefits, or cease to develop renewable energy projects altogether, forgoing revenues and emission reduction opportunities as well as the direct economic, capacity building and system benefits described earlier.

For First Nations, the FIT program is also easier to navigate. As aboriginal energy consultant Ed Gilbert notes, the FIT program "is tested and the kinks have been worked out." The FIT program also offers First Nations and Métis a greater opportunity to develop direct project development expertise and new businesses, as opposed to simply being passive investors alongside large corporations.

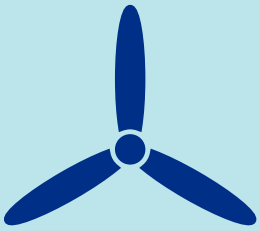
Community Power Project: ZooShare Biogas Co-op members, Toronto

Recommendations to Keep Community Power Growing

To continue to grow the increasingly important community energy sector, and using the research outlined in this report as strategic guidelines, TREC and the Federation of Community Power Co-ops recommends that the Ontario government should:

Maintain the FIT program for qualified community organizations, including co-ops, First Nations, Métis, municipalities, public utilities, school boards, non-profit institutions, religious organizations, and other authentic community-based entities.

Raise the capacity cap for FIT projects to 1 MW to help increase economies of scale, to increase local distributed power supply and therefore local grid resiliency in the face of increasingly erratic weather patterns, and to benefit from new technology trends such as energy storage.



Introduce a FIT for community wind that allows community groups to lead projects. In 2014 the FIT for wind projects over 500 kW was cancelled and replaced with a competitive procurement process called the Large Renewable Procurement (LRP). The LRP is only open to bidders with deep pockets and extensive experience and therefore not inclusive of community proponents, even while community ownership has been proven to decrease local resistance. While the LRP does encourage Indigenous participation, there are no incentives for developers to work with co-ops. The community power sector needs a level playing field to participate in wind projects. A FIT for wind up to 20 MW can address the current imbalance introduced by the LRP.

Recommendations to Keep Community Power Growing CONT'D

Provide provincial loan guarantees for co-op and other non-profit projects.
With actual technology costs falling rapidly, one of the largest cost barriers for community-owned renewable energy projects is now the cost of financing. Community co-ops, in most cases, cannot borrow at the same rates as large established companies. Provincial loan guarantees could quickly reduce the cost of raising funds for co-op projects while adding little financial risk for the province thanks to the depth of experience co-ops have developed over the last decade in project deployment. As Joe Romm, the former assistant secretary of U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, has written "Low or zero-interest loans and loan guarantees can leverage money 50-to-1" (since default rates are 2 percent or less).[19]

Help to export community expertise.
With a number of other provinces and U.S. states now looking to rapidly increase use of renewable energy, Ontario can share the lessons it has learned around the benefits of community power development while creating new opportunities for Ontario-based suppliers and co-ops. Working with the federal government, Ontario could emulate the National Community Solar initiative[20] developed by the Obama administration in the U.S. to share technical knowledge, advance new financing approaches, and improve project planning and management at the community level.

The many benefits of community power are clear. The foundation for success has been laid. The time for on-going policy support is now. Communities are ready and poised for action. We hope readers will lend their voice in calling for the continuity and expansion of community power in Ontario and beyond.

Endnotes

1 https://www.greentechmedia.com/articles/read/us-solar-market-sets-new-record-installing-7.3-gw-of-solar-pv-in-2015

2 Global Green Growth: Clean Energy Industrial Investment and Expanding Job Opportunities, Global Green Growth Institute (GGGI) and the United Nations Industrial Development Organization (UNIDO).

3 Institute for Local Self Reliance. Advantage Local Why Local Energy Ownership Matters. September 2014.

4 Peter Capener. Community Renewable Electricity Generation: Potential Sector Growth to 2020 — Report to Department of Energy and Climate Change. January 2014.

5 We have included all FIT contracts awarded to community co-ops, community organizations (school boards, religious institutions, health care facilities) and municipalities and local utilities in our calculation of the size of Ontario's community power sector. Some of these projects do not qualify for community adders or capacity set-asides, which is the criteria used by the IESO. These figures are based on FIT contract offers and we have assumed a 10% non-completion rate. U.S. figure is from Rocky Mountain Institute Insight Brief. Community-Scale Solar: why developers and buyers should focus on this high-potential market segment. March 2016.

6 ClientEarth. Community Power: Model legal frameworks for citizen-owned renewable energy, 2014. p. 7 Accessed at http://www.clientearth.org/reports/community-power-report-250614.pdf

7 http://www.ieso.ca/Pages/Power-Data/Supply.aspx

8 IESO, Preliminary Outlook and Discussion: Ontario Supply/Demand Balance to 2035. Prepared for discussion with the IESO Stakeholder Advisory Committee. March 23, 2016.

9 Institute for Local Self Reliance. Advantage Local Why Local Energy Ownership Matters. September 2014.

10 Rocky Mountain Institute Insight Brief. Community-Scale Solar: why developers and buyers should focus on this high-potential market segment. March 2016.

11 Deloitte. Unlocking the value of community solar. 2016.

12 QUEST. Community Energy Planning: The Value Proposition — Environmental, Health and Economic Benefits, February 2016 p. 18.

13 Institute for Local Self Reliance. Advantage Local Why Local Energy Ownership Matters. September 2014.

14 Rocky Mountain Institute Insight Brief. Community-Scale Solar: why developers and buyers should focus on this high-potential market segment. March 2016.

15 http://www.windpowermonthly.com/article/1357307/analysis-regulatory-changes-present-two-different-challenges-germany

16 https://www.cleanenergywire.org/news/auctions-set-price-wind-and-solar-debate

17 Thilo Grau, Deutsches Institut für Wirtschaftsforschung. Comparison of Feed-in Tariffs and Tenders to Remunerate Solar Power Generation, 2014

18 http://www.windpowermonthly.com/article/1357307/analysis-regulatory-changes-present-two-different-challenges-germany

19 http://thinkprogress.org/climate/2016/02/23/3752421/bill-gates-wrong-energy-miracles/

20 https://www.whitehouse.gov/the-press-office/2015/11/17/fact-sheet-administration-announces-68-cities-states-and-businesses-are

Appendix A: Economic Impacts of Community Solar FIT Projects

By Brett Dolter

Introduction

In 2009 the Government of Ontario introduced the *Green Energy and Economy Act*. This act enabled the Ontario Government to introduce a 'feed-in-tariff' (FIT) program for renewable energy projects, including solar photovoltaic (PV) projects. The FIT program provides eligible solar-PV projects with twenty year contracts to sell electricity at fixed rates.

FIT contracts are awarded through a competitive call for project proposals. The FIT program has awarded contracts through seven rounds of applications since 2009. In each call for project proposals a certain amount of generation capacity is set aside for projects with participation from Aboriginal, community, or municipal and public sector entities.

The SolarShare Co-operative is one community group that has secured multiple FIT contracts and as a co-op has qualified for the community participation set-aside by issuing solar bonds to attract community investment.

To date, SolarShare has developed 17 rooftop solar-PV projects, ranging in size from 100 to 500 kilowatts (kW), with contracts from the FIT program, and 17 smaller 10 kW projects with contracts from the microFIT program.

This report presents a summary of the direct and indirect economic impacts that result from a typical SolarShare project. It also presents an estimate of the direct and indirect economic impacts created to date by FIT projects that involve community participation.[1]

Direct Economic Impacts

Direct economic impacts can be calculated in two ways. First, total revenues can be calculated. These revenues will vary based on when the FIT contract was signed (Table 1 shows how FIT rates have declined over time). The weighted average price received by SolarShare projects is 57.7 cents/kWh.

TABLE 1: FIT RATES FOR ROOFTOP SOLAR-PV

Rooftop Solar-PV FIT Rates (cents/kWh)

Size	Sep-09	Apr-12	Aug-13	Jan-16
<= 10 kW	80.2	54.9	39.6	29.4
100 kW	71.3	54.8	34.5	24.2
500 kW	63.5	53.9	32.9	22.5

Community Adder (cents/kWh)

>50%			1.0	1.0
>15% <= 50%			.5	.5

Second, we can focus on expenditures. When profit or loss is accounted for, expenditures will equal revenues. To understand both the direct and indirect economic impacts of community solar it is useful to track the expenditures paid out by SolarShare when developing, operating, and maintaining a solar-PV project. These costs can be broken out into installation cost, operations and maintenance costs, and returns to investors.

[1] According to the IESO, "A Community Participation Project is a Project where a Community Investment Member has a direct equity or equity-like interest in the Applicant or Supplier equal to at least 15% of the total equity or equity-like interest issued by the Applicant or Supplier, or where the Community Investment Member is itself the Applicant or the Supplier." Report available online at: http://fit.powerauthority.on.ca/sites/default/files/version4/GD-Community-Participation-Projects-FINAL.pdf.

Installation Costs

Table 2 (below) summarizes the typical installation costs for a solar-PV project.

Larger solar-PV projects generally cost less than smaller projects due to economies of scale. The lower costs in the second column of Table 2 are representative of a 500 kW solar-PV system, while the higher costs in the third column are representative of a smaller 100 kW system.

Operations and Maintenance Costs

Solar-PV projects have a life expectancy of at least 20 years. In that time, they must be maintained, repaired, and cleaned. Expenditures on operations and maintenance (O&M) create a stream of direct economic impacts over a project's lifetime.

Returns to Investors

The development of a SolarShare project proceeds in three stages:

Pre-Notice to Proceed: In this stage the FIT application is created and submitted. If the project receives a conditional offer of approval the project proponent is required to meet conditions like conducting a transmission and distribution analysis. Costs incurred at this stage are financed using capital from the Community Power Capital pool. Investors receive a return of 10%/yr on their investment;

Post-Notice to Proceed: If the FIT application is accepted and conditions are met, a FIT contract is issued. The FIT contract acts as security, allowing investment funds to be raised for the installation of the solar-PV project. Costs incurred at this stage are financed using a combination of equity from the Community Power Capital pool and debt-financing from a financial institution. Community Power Capital investors receive a return of 10%/yr on their investment.

Post-Commissioning: Once the solar-PV project is installed and commissioned it can begin to generate revenue by selling electricity under the FIT contract. The bridge loans from the Community Power Capital pool are paid back using funds raised by an issuance of SolarShare bonds. These bonds are paid at a rate of 5%/year for a five-year bond, and 6%/year for a fifteen-year bond. Debt-financing from a financial institution may also remain in place.

In each of these three stages, returns paid to investors are part of the direct economic impacts created by the solar-PV project.

TABLE 2: SOLAR-PV INSTALLATION COSTS IN ONTARIO, 2016

Project Cost Data	**500 kW**	**100 kW**
Installation Costs	Low $/Watt	High $/Watt
Materials & Equipment		
Mounting (Rails, clamps, fittings, etc.)	0.15	0.35
Modules	0.70	0.85
Electrical (Wire, connectors, breakers, etc.)	0.15	0.25
Inverter	0.12	0.20
Labour		
Installation	0.25	0.67
Other Costs		
Permitting	0.01	0.02
Engineering	0.05	0.10
Business Overhead (% Return)	8%	15%
Sub Total	1.54	2.67
HST (13% on Materials and Labour)	0.20	0.35
Grand Total ($/Watt)	**1.75**	**3.01**

Indirect Economic Impacts

Indirect economic impacts are created as project expenditures drive further activity in the local economy. For example, when installing a solar-PV system on a flat commercial roof, a solar developer may purchase metal racking from a local supplier. In turn, the local racking supplier may have purchased aluminum to manufacture the racking and the aluminum supplier purchased inputs like electricity, and so on. The initial expenditure creates a 'multiplier' effect that cascades throughout the local economy.

Using data on the production processes of firms in Ontario we can track the indirect economic impacts created by expenditure in the local economy. Statistics Canada provides make-use tables that work well for this purpose. The make-use tables outline the production recipes of firms in Ontario.

In this report the 2011 Ontario make-use tables are used to create a 'Leontief' matrix, which in turn is used to generate economic multipliers for each commodity produced in Ontario.[2] The multipliers report the total economic activity created in the local economy when $1 is spent on a specific commodity. For example, when $1 is spent on a local 'fabricated metal product' like racking, $2.88 worth of economic activity results in the local economy.

To calculate indirect economic impacts, the direct expenditures paid during the life of a solar project are multiplied by the corresponding multiplier value for that commodity.

Wages and Salaries and Returns to Investors

Once direct and indirect impacts have been calculated, it is possible to estimate the amount that was paid as wages and salary to labour, and the amount that was paid as returns to investors. To make these calculations the 2011 Ontario make-use tables were used to calculate labour income intensities and value-added intensities.

The labour income intensities indicate the wages and salary paid to labour for an expenditure of $1 on a given commodity.

The value-added intensities similarly indicate the value-added or profit paid to investors for an expenditure of $1 on a given commodity.

The intensities can be multiplied against an expenditure on a given commodity in order to estimate the wages and salaries or returns to investment included in the expenditure.

Induced Impacts

As a further step we can assume that local wages and salaries and a portion of the returns to investment are spent on goods and services in the local economy. This creates another round of 'induced' economic activity.

To understand induced economic activity it is necessary to calculate a multiplier representing the additional economic activity that results from the average $1 spent by a consumer. This calculation is carried out in the following steps:

First, the total consumption of local goods and services by residents of Ontario is found in the 2011 Final Demand matrix for Ontario.

Second, each entry in the final demand vector is divided by the expenditure total to calculate the proportion of goods and services purchased per dollar of final demand by Ontario consumers.

Third, this normalized final demand vector is pre-multiplied by the 'Leontief' matrix to calculate the total economic activity that results in order to satisfy the vector of final demand.

Fourth, entries in this vector are summed to obtain a multiplier for final demand in Ontario.

This calculation reveals that each $1 spent by consumers in Ontario creates $2.21 of economic activity in the local region.

[2] The Leontief is generated using an industry-based technology assumption, and results in a commodity-by-commodity Leontief matrix. Multipliers are generated for each of 66 commodities. A detailed explanation of this approach can be found in Chapter 5 of Miller and Blair (2009).

Economic Impacts of a 297 kW SolarShare Project

SolarShare operates 34 solar-PV projects of various sizes (see Appendix A). A 297 kW project was selected as a representative SolarShare project.

Over its lifetime a 297 kW rooftop solar-PV project, paid at a FIT rate of 53.9 cents/kWh, generates $3,607,483 worth of revenue, with $3,564,014 paid out as FIT revenue and the remainder collected as membership returns, with a small residual retained for project maintenance and co-op overheads. This is the direct economic benefit created by the project.

The direct local economic impact of the project is slightly less at $3,125,982 because some of the components, like solar modules and invertors, are imported from other countries. Of the direct local economic impact, $655,993 is paid as wages and salaries and $1,138,635 is paid as return to investors and profit.

By tracing the expenditures made over the lifetime of the project and using the multipliers calculated for the purpose of this report, it is possible to calculate the total local economic impact generated by the project.

The total local economic impact of a 297 kW project, including both direct and indirect economic impacts is $5,170,486. This means that for every $1 paid out by the FIT contract, $1.45 worth of economic activity was created in the local economy.[3] This total impact includes $1,079,734 paid out as wages and salaries and $1,425,185 paid out as returns to investors or profit.

When the induced impact of the wages and salaries is considered, an additional $1,238,614 of economic activity is generated in the local economy.[4] When the induced impact of returns to investors is considered, an additional $940,857 of economic activity is generated in the local economy.[5] The local economic activity that results over the lifetime of a 297-kW SolarShare Project, including direct, indirect and induced local economic activity is $7,349,957. This means that each $1 of FIT revenues paid out to the project creates $2.06 worth of local economic activity.

Economic Impacts of Community Solar

It is estimated that a total of 210 megawatts (MW) of local community and co-op majority owned solar projects have been built in Ontario (see page 8 of the main report).

By multiplying the results of the representative SolarShare project to the project MW total we can estimate the total impact of the Community Solar FIT program. We find that the existing Community Solar projects will create $2.2 billion worth of direct local economic impact, and $3.66 billion worth of total local economic impact in the local economy over the life of the projects.

When induced impact is added to total economic impact, the 210 kilowatts of installed Community Solar is estimated to create $5.2 billion worth of economic impact in the local economy.

Sensitivity to Local Ownership and Content Assumptions

The analysis above was conducted assuming local ownership of the solar developer that installed the solar-PV project, local financing for the development of the project, and a local co-op that manages the project once it is in operation. It was assumed that inverters and modules were not purchased locally. Approximately 10-20% of solar projects built in Ontario will, however, purchase local inverters and modules (Endura, 2016). These local purchases increase the local economic impact of a community solar project. Other non-community-owned projects in Ontario are developed without a high percentage of local ownership or financing.

[3] Note that the Leontief multiplier approach is a partial equilibrium analysis, which assumes that all other factors remain the same. A general equilibrium analysis may return different measures of economic impact.

[4] In this analysis, it is assumed that 97% of wages and salary are spent in the local economy.

[5] In this analysis, it is assumed that 75% of returns to investors are spent in the local economy.

Table 3 compares the economic impacts that result in three scenarios:

- **Project A** assumes non-local ownership and non-local inverters and modules.
- **Project B** is identical to the analysis above and assumes local ownership, but non-local inverters and modules.
- **Project C** assumes local ownership and the purchase of local inverters and modules.

The results indicate that local economic impacts vary widely depending on the local ownership and local content of a solar-PV project, with Project C resulting in a 77% greater impact than Project A (Table 3).

TABLE 3: SENSITIVITY OF LOCAL ECONOMIC IMPACT TO OWNERSHIP ASSUMPTIONS

Assumptions	Project A	Project B	Project C
Local Ownership	0%	100%	100%
Local Financing	0%	100%	100%
Local Developer	0%	100%	100%
Domestic Content for Inverters	0%	0%	100%
Domestic Content for Modules	0%	0%	100%
Project Size (kW)	297	297	297
20-year Electricity Generation (MWh)	6,612	6,612	6,612
FIT Rate ($/kWh)	0.539	0.539	0.539
FIT Revenue 20-year Total ($ Undiscounted)	$3,564,014	$3,564,014	$3,564,014

Economic Impact	Project A	Project B	Project C
Direct Local Economic Impact includes:	$1,950,316	$3,125,982	$3,533,222
a) Wages and Salaries	$556,371	$655,993	$711,244
b) Returns to Investors and Profits	$319,123	$1,138,635	$1,176,296
Total (Direct & Indirect) Economic Impact includes:	$549,403	$5,170,486	$6,344,573
a) Wages and Salaries	$896,635	$1,079,734	$1,274,572
b) Returns to Investors and Profits	$549,403	$1,425,185	$1,564,745
Additional Induced Impact			
Induced Impact from Wages and Salaries	$1,028,572	$1,238,614	$1,462,120
Induced Impact from Returns to Investment	$362,697	$940,857	$1,032,990
Grand Total	$5,006,022	$7,349,957	$8,839,683
Local Impact / FIT	**1.40**	**2.06**	**2.48**

Appendix A References

Endura Solar (2016) *Personal Correspondence with Cameron Steinman*. February, 2016 and April, 2016.

Miller, Ronald and Peter Blair (2009) *Input-Output Analysis: Foundations and Extensions*. Cambridge University Press: New York.

About the Authors

Judith Lipp, PhD

Dr. Judith Lipp is a recognized national leader in community energy development, advocacy and renewable energy education. She is the Executive Director (ED) of TREC Renewable Energy Co-operative (since 2008), President of the Federation of Community Power Co-operatives (FCPC), and the founding ED of TREC Education, a charitable foundation that delivers innovative, hands-on renewable energy education and capacity building programs. Under her leadership, TREC has emerged as a social finance manager for a variety of social enterprises and a sought out voice on critical energy policy discussions in Ontario and beyond.

Judith has more than 15 years of research, education and project development experience in sustainable energy issues, spanning four continents. She completed her PhD at Dalhousie University in 2008 where she examined the role of public policy in promoting renewable electricity, drawing lessons from other jurisdictions for the Canadian context. She has served as a consultant on both energy demand and supply-side issues, producing more than 20 publications and presenting her work orally to a variety of audiences on many occasions.

Brett Dolter, PhD

Dr. Brett Dolter is an economist specializing in climate and energy policy research. He has published in journals such as Energy Policy and Ecological Economics. He is the Vice-President of Research and Education for the Canadian Society for Ecological Economics. His PhD dissertation focused on pathways for Greening the Saskatchewan Grid. Prior to his PhD studies Brett worked as a senior policy analyst for the Saskatchewan Ministry of Environment. Brett is currently a Postdoctoral Research Fellow at the University of Ottawa's Institute of Environment.

401 Richmond St. W., Suite 240
Toronto, Ontario M5V 3A8

416.977.5093
info@trec.on.ca

Visit trec.on.ca for more information

TREC