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Toolkit for Turbines: Wind Energy Development in Ontario and Nova Scotia, Canada

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Executive Summary

[To be written following review and comment period]

Introduction

The use of wind as a resource dates back to 5000 BC, when it was used to help propel boats along the Nile River (Shata and Hanitsch, 2006). Though it was not until much later (1300-1875) that the first modern, horizontal windmills appeared in Netherlands and the Mediterranean- typically used to pump water (Fleming and Probert, 1984). Today, modern wind turbines are used to create electricity typically in the range of 2 megawatts (MW) but some are as large as 8 MW- or enough output to power more than 7200 households.

Modern wind energy development in Canada is fairly new to our landscape and has dramatically increased during the past decade. As of December 2015, Canada had 11 205 MW of installed capacity- a more than 16x increase from 2005 (CANWEA, 2016). Ontario has been a leader in this growth and now has 39% of total capacity across the country. With 552 MW, Nova Scotia is home to 5% of Canada's capacity- though because the overall supply in much smaller in the province, wind energy now represents 12%[1] of all electricity used in the province. Growth of the wind energy sector in both provinces has been spurred by energy policy which among other things was designed to give increased prices for electricity generated through renewable means like wind and solar, to give them a stronger foothold in the marketplace. Recent policy changes in both provinces seem to reflect the goal to scale back these favourable pricing programs and allow these technologies to compete more or less on their own over the long-term (i.e. through competitive bidding processes)

In Ontario, the main mechanism for development was created following the 2009 Green Energy Act (GEA) which took away local planning authority to site wind energy and vested it with the province. The associated Feed-In Tariff program gave favourable rates to renewable energy producers including wind turbines. Despite some attempt at boosting community-owned projects, the large majority of projects developed were done so by large national and sometimes foreign-based corporations.

Pressures to stop (new) wind energy production in Ontario have increased significantly since the controversial GEA. For example, though the Ontario Federation of Agriculture in principle

[1] This number represents the 2016 year-to-date estimate provided by Nova Scotia Power. In 2007, wind energy in Nova Scotia only generated 1% of total electricity used.

supports the GEA, they have asked for a moratorium on new turbines until issues like greater municipal involvement in decision making and impacts of turbines are addressed. The Conservative party in Ontario has likewise come forward supporting a moratorium. Further, several municipal councils have passed resolutions telling the province that that they are officially "unwilling hosts"– 90 as of December 2nd 2016.

A key limitation of the Ontario system is the lack of municipal sovereignty in the siting process under the GEA. Technically speaking, municipalities cannot stop turbines from coming to their community and developers need only limited community information sessions to satisfy the conditions of environmental assessment. Though such a framework has resulted in exponential growth in the wind turbine industry in Ontario, it also runs contrary to a well-developed literature highlighting the value of participatory siting[2].

In Nova Scotia, the expansion of green energy infrastructure resulted from the 2010 Renewable Energy Plan which in part, introduced the Community Feed-In Tariff program. Much like the policy program of Ontario, it gave favourable prices to those proponents creating wind energy. Unlike Ontario's strategy, Nova Scotia successfully encouraged community-based or owned development through the requirement that all projects be majority (51% or more) owned by the people of Nova Scotia. Groups eligible for ownership as part of the program include: municipalities, first nations groups, Universities, Non-Profit Organizations, and Community Economic Development Investment Funds (CEDIFs).

In the following pages, this "toolkit" will outline the major and practical findings resulting from Western's Communities Around Renewable Energy Projects studies from 2014 to 2016 looking at facility siting processes of wind energy development in Ontario and Nova Scotia, Canada. The focus here is on two topics in particular. First, we discuss the issue of procedural justice- or the perceptions of fairness during the planning process. Second, is a discussion of distributive justice or fairness after wind turbines are built. This topic is investigated with particular reference to the economic benefits (or lack thereof) experienced by those living close to wind energy development in their communities. In light of these two issues, Walker's dissertation research aims to address both issues through providing local residents with: i) the strategies to engage collectively with developers and ii) the tools to collectively work through their benefits preferences.

What the "toolkit" adds is empirical, in-depth, comparative research on how a range of stakeholders view turbine siting, after the fact.

[2] Devine-Wright,P. (2011) *Renewable Energy and the Public: From NIMBY to Participation*. Earthscan, London.

The research that makes up the findings of this report was created though a mixed-methodology where the research team combined in-depth, face to face interviews with residents, developers, policy-makers and other relevant stakeholders with surveys that were completed by residents and developers across Ontario and Nova Scotia, Canada.

Why a "toolkit"?

The toolkit is a summary of research focused on the state of wind turbine facility siting from the point of view of those who have experienced it relatively recently and first-hand. It was created to help share the experiences of local residents and other stakeholders involved in the process of wind energy development in Ontario and Nova Scotia, Canada. It marks a moment for reflection on policy in the dynamic renewable energy sector.

The toolkit is also meant as a springboard for empathetic and constructive discussion on turbines and turbine siting to allow stakeholders to situate their own concerns and preferences with those of other stakeholders. The ultimate goal is fairer and much less divisive turbine facility siting outcomes. There are already guides and websites for landowners like the Ontario Sustainable Energy Association's 2005 *Ontario Landowner's Guide to Wind Energy*, a similar guide for Albertan landowners from the Pembina Institute, and the "For Landowners" page of the Ontario Wind Resistance website. What the "toolkit" adds is empirical, in-depth, comparative research on how a range of stakeholders view turbine siting, after the fact. The research asks stakeholders to suggest and reflect on alternatives to the current system so that others, who might be facing the prospect of turbines in their community, may benefit from their wisdom and experiences.

Under the Green Energy Act the current wind turbine facility siting system allows developers to negotiate individual lease agreements with landowners ($8K+/yr/turbine), but *potentially* offer neighbours nothing. Though the lessee has the turbine physically placed on their land, their neighbour also has to live with the same negative externalities like noise, vibration, and potential property value loss. With so much media attention on health effects, the lease agreement issue is the "elephant in the room" of public discourse on turbine facility siting leaving neighbours of turbines, and some lease holders themselves, unhappy. Indeed, we find that the issue of facility siting itself makes most stakeholders frustrated.

The COAREP team also publishes research in peer reviewed journals and we are currently in the process of publishing the toolkit study data as journal articles. We hope to publish three such papers - one paper is now "in press" (soon to be published) and two others are under review. These papers are available upon request from the research team. The journal articles and the

toolkit overlap, yet there is much that is new in the toolkit that does not appear in the journal articles – e.g., Figures 1, 2 and 3.

Methodology: What we did

Research began in the spring of 2014 with qualitative, in-depth interviews with residents living close (within 2km) to wind turbines in communities in Ontario and Nova Scotia. Interviews were also completed with municipal politicians, developers, and what we call policy experts-academics, provincial politicians and others well versed in Canadian wind energy policy. In total, 54 interviews were completed in both provinces and most (31) were with residents. All interviews were transcribed (word for word) and analyzed for themes present using NVivo qualitative analysis software.

Using the preliminary findings of the interviews as a starting point, we then designed and administered a survey which was sent to more than 1300 homes within 2km of a wind turbine across the 3 Ontario and 7 Nova Scotia-based communities. In total, 240 resident surveys were returned and completed for a response rate of approximately 18%. The survey was made of questions regarding siting practices, financial compensation, experiences dealing with the developer, local impacts (i.e. perceived property value losses), and attitudes toward wind energy. It also included some sociodemographic variables such as gender, income, and political affiliation which were used as control variables throughout quantitative tests.

The Case Studies

Ontario

Three communities were studied in Ontario. Two (Adelaide-Metcalfe and Wainfleet) are rural communities with existing wind turbines operational for approximately one year before research began in 2014. Adelaide-Metcalfe is located just

Adelaide-Metcalf wind energy development, Ontario

west of the small town of Strathroy, Ontario while Wainfleet is located on the north shore of Lake Erie in the Regional Municipality of Niagara. Adelaide-Metcalfe was home to a large wind energy project (40 MW) developed by Suncor Energy. The Wainfleet Wind Energy Project is relatively small compared to others in Ontario, with just five wind turbines totaling 10 MW. The third Ontario site chosen was located in Norwich township, just south of the City of Woodstock, ON. Though wind turbines were not erected at the time of the research, their Gunn's Hill Wind Farm was approved and construction began in the summer of 2016. What makes the Gunn's Hill project unique in the Ontario context is that, similar to the COMFIT communities in Nova Scotia, 49% public-equity was offered and taken up by community investors in the project. The proponent (Pro Wind Canada) is part of a partnership with the Oxford Community Energy Co-operative and Six Nations of the Grand River Development Corp (renews, 2016).

Nova Scotia

A total of seven communities were studied in Nova Scotia. Most (6/7) were built under the COMFIT program or had some degree of community ownership. These included Sable Wind (Canso), Littler River Harbour (Wedgeport), the Gaetz Brook Wind Farm, Fairmont Wind Farm, Watt Section and Chebucto-Pockwock Community Wind. The sole project to be built under an entirely developer-led model was the South Canoe Wind Farm in New Russell. With 34 turbines totaling 102 MW it was the largest wind farm studied within the entire COAREP project.

Wind energy development, Nova Scotia

Results: What we found

The need for a toolkit - "might come in handy"

During the interviews with both residents and developers, we heard what they thought of our toolkit idea. The notion that the research would lead to the creation of a toolkit piqued the interest of participants like "James" (a pseudonym):

"James" (Ontario): *That's what intrigued me about your letter, was a toolkit of some sort…what we knew then and what we know now… as people who live around these things… a toolkit might come in handy.*

Even "Joanne", who is strongly opposed to wind energy, felt that toolkits could help with the problems around wind energy. She explains to a colleague who walked into the room near the beginning of the interview why Chad was there for an interview:

"Joanne"(Ontario): *[He's] creating toolkits for future projects- for municipalities and wind developers… to have so that there can be a kind of consensus I guess and not so much conflict and blah blah… so if [community] can be part of that and create something that's going to help… because we know with a majority government we're… I mean…they're going to be a reality.*

Developers also saw the potential benefits in creating a toolkit for wind energy development. This was in spite of the fact that they are obviously knowledgeable about wind energy technology, policy and planning procedures. "Brian" from Nova Scotia and "Graeme" from Ontario both agree that toolkits would be welcomed by industry.

"Brian" (Nova Scotia): *From the community side of things so…a toolkit for communities, I think there could be some improvement there. I think there's room for that. I think education is key…It's good to see research happening on this…I think it's so important to slow down and continue the dialogue and look at the past, look at mistakes that have been made. How can you make policy better? How can you refine your development to make it go better? And I think this plays a big role, this research...asking these questions.*

"Graeme" (Ontario): *I think if [residents] had the information from independent sources prior to… We try to give them fact sheets and everything else but then the 'antis' make up a flier that your property price is going to drop 20-40%. And the thing is, all it takes, you can get rid of a mountain of information with one story, one bad story in the newspaper.. all it takes is "Oh Mary said that John up the road got headaches because of wind turbines." "Oh really?" and then all of that scientifically, technically responsible information just goes out the window.*

"I think it's so important to slow down and continue the dialogue and look at the past, look at mistakes that have been made. How can you make policy better?" Brian, Nova Scotia

Most developers we spoke with supported the idea of a toolkit for turbine dialogue - for various reasons. These reasons were complex but, were centered on the

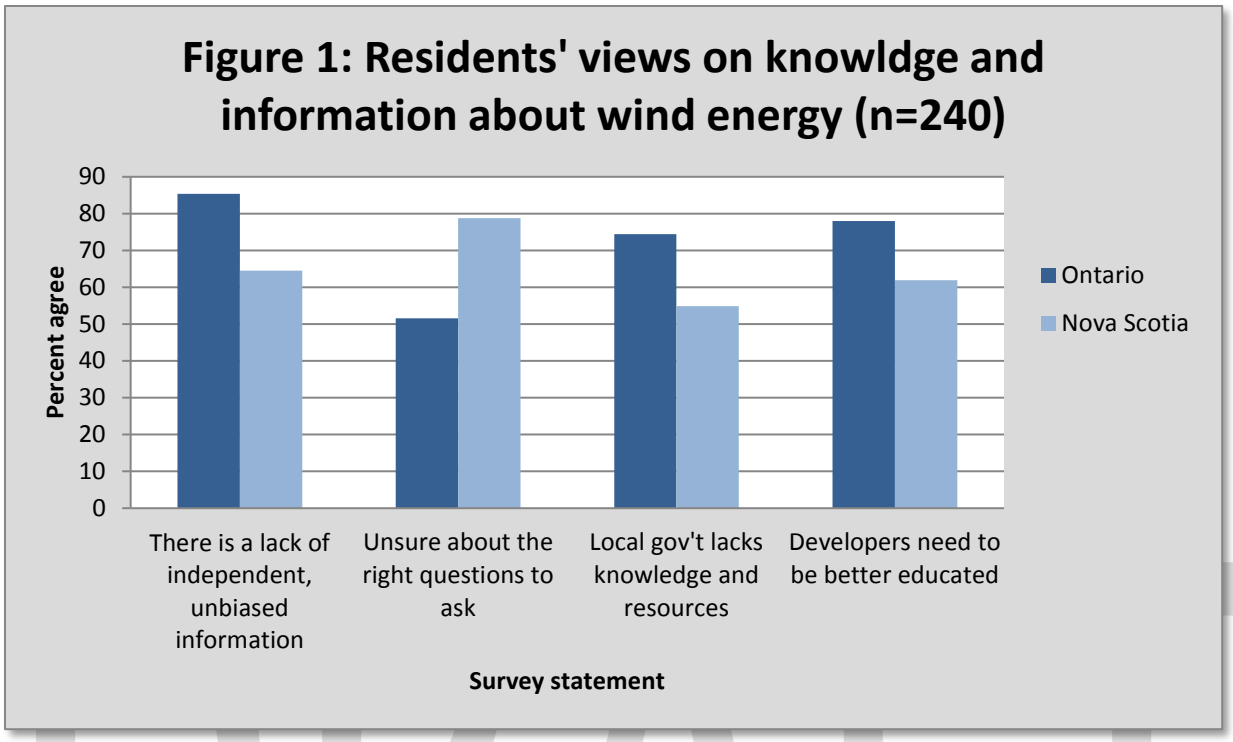
ideas of education and general knowledge about wind energy. Through the surveys we received back from developers in both provinces, Table 1 sums up this theme.

Table 1: Twelve Developer's Views on Knowledge and Education about Turbines (Cell values are percentages)

	Strongly agree	Somewhat agree	Neither	Somewhat disagree	Strongly disagree
Information about the true impacts of wind energy development needs to be put into plainer language	50	10	20	10	10
Local government lacks the knowledge and resources needed to make good decisions about wind energy	0	0	30	30	40
Local residents who support wind development need to be better educated about the disadvantages of wind energy	70	20	10	0	0
Local residents who oppose wind development need to be better educated about the advantages of wind energy	50	40	10	0	0

Most developers agreed information needs to be put into 'plainer language' (60%), but they also had greater faith in local governments than one might expect – that is a majority (60%) disagreed that local governments *lack* knowledge. In terms of education, developers agreed that both those supportive of (90%) and opposed to (90%) wind energy need to be better educated.

Similar questions about information and education were also asked of residents in the case communities. Though the toolkit study is clearly about opinions/views, it is the source of the research that seems to matter most to residents. That is, survey data show that most residents felt more "unbiased" (independent) information needs to be given across rural communities and that developers and local governments need to be better educated about wind energy. In Figure 1 below, results are shown across four questions we asked of residents.



In general Ontario residents are more sensitive to information issues. Across three of the four statements asked of residents, people from Ontario were generally more inclined to agree there is a need for more (and unbiased) information regarding wind energy. The exception was the statement, "I am unsure about the right questions to ask regarding wind energy…" where almost 80% of Nova Scotians admitted they were unsure. This likely reflects overall less concern about wind energy development in Nova Scotia. In all cases though, the majority of residents indicated a lack of education or information surrounding development and local impacts on rural communities.

The interview results show there was also a clear sense of interest from residents in both provinces that publicly available research like the COAREP toolkit studies would be a welcome source of independent information on turbines. "Angelo" is a board member of a project in Ontario and he explains how it is difficult to trust information provided by anyone - while "Anne" suggests a toolkit may be the only way to create easily accessible information in rural communities:

> ***"Angelo" (Ontario):*** *there's the anti-wind movement that is providing a biased opinion. Then there's the developers that are providing a biased opinion. Then there's the government that's providing a biased opinion*

> ***"Anne" (Nova Scotia):*** *Yeah, [but] not scientific documents. It's hard…when you're talking about rural communities and there's a lot of people that aren't scientists and, to read a scientific document is very hard. So to have common sense documents or someone that had interpreted the documents [would help] you know?*

Even during interviews with those strongly opposed to wind energy, there was clear feelings that toolkits may help with some the problems being experienced. "Joanne" was a municipal councilor in Ontario and when a colleague walked into the room near the beginning of the interview, she explained what Chad (the interviewer) was doing there.

> ***"Joanne" (Ontario):*** *[He's] creating toolkits for future projects- for municipalities and wind developers… to have so that there can be a kind of consensus I guess and not so much conflict and blah blah… so if [community] can be part of that and create something that's going to help… because we know with a majority government we're… I mean…they're going to be a reality.*

"To read a scientific document is very hard. So to have common sense documents or someone that had interpreted the documents [would help] you know?" Anne, Nova Scotia

Support for local projects in Ontario and Nova Scotia

We expected support to be higher in Nova Scotia than in Ontario given the focus on community-based development in Nova Scotia; but how residents in particular talk about turbine support also matters. The working hypothesis was mainly driven by the idea that the Community Feed-In Tariff (COMFIT) program of Nova Scotia was designed and implemented in a way to create more public involvement, greater sharing of benefits and perhaps greater acceptance as a result. In general those familiar with COMFIT spoke very positively about it suggesting such a policy may be a better way to develop wind energy than the approach used in Ontario at the time. For example, "Mitch" who is a resident of Canso, Nova Scotia suggests that the "community based wind farm" in his community seemed to lead to high levels of support:

> ***"Mitch" (Nova Scotia):*** *While there were distractors, the process appears to have worked. The fact that the community not only shares the risk but also the benefits, again, appears to have satisfied more or the residents and rate payers.*

In other communities in Nova Scotia, we spoke with those who claimed they were 'well-connected' in their community and they suggested that they have heard nothing except for local support and excitement surrounding recent wind energy development.

> ***"Caroline" (Nova Scotia):*** *I haven't heard anything negative…I really honestly, and I'm not naïve. I really don't think there's any [conflict or opposition]. This is the right sized project for the community for this time, and I believe that because of open communication and because of the size of the project I think that that made it…a lot of those conflicts be dealt with prior to the project starting.*

Quantitative analysis analyzed through survey work more or less confirmed many of these ideas which included questions that differentiated the type of support – see Figure 2. To begin then we present a simple cross-tab which shows responses to a set of two questions of support (local support and future (local) support; figure 2). Statistically significant differences were seen across both questions as participants from Nova Scotia significantly more likely to support wind energy than those from Nova Scotia. In fact, on the question of their local project, those from Nova Scotia were nearly three times more likely to support wind energy (80%) than those from Ontario (27%). Significant differences amongst provinces were also seen when respondents were asked if they supported more wind energy development across Canada (not shown) giving some suggestion that the NIMBY (not in my backyard) hypothesis is not applicable across our quantitative sample as a whole.

Table 2: Local support for wind energy (Residents; n=240)

	Province	% Agreed	% Neither	% Disagreed
I support the existing wind power project in my community.	Ontario	27	12	62
	Nova Scotia	80	8	12
I would support building more turbines in my community.	Ontario	20	8	72
	Nova Scotia	66	10	23

An even more interesting theme emerged during conversations with Ontario residents unfamiliar with COMFIT and other community-based initiatives. In fact, most of the residents we spoke with in Ontario were unaware of the COMFIT program of Nova Scotia. In order for them to have something to compare their experiences to, I would describe the basic characteristics of COMFIT and how ideas of community-based ownership work in other jurisdictions. Whether one was supportive or opposed to wind energy, community based initiatives generally sounded like a "good idea" compared to the Ontario system. "James" is a resident and "Michael" is a resident and politician of Adelaide-Metcalfe where large corporations have been responsible for development.

"James": *That [community-based development idea] sounds better than what's going on here. It's kind of every man for himself you know what I mean? So if it was a more community-oriented thing that would be great… Getting the community involved at the outset, that's a good idea.*

"Michael": *I'm not in favour of the [current] approach that is takes for them to be established... There should be more open communication with the municipality….That would have kept people better informed and it would have been a more positive conversation I think with the municipality…So…coming up in the future, if there's the opportunity for a, like a cooperative type program, I'm not sure it should be initiated by the municipality but I think the municipality could be a partner in it.*

In Nova Scotia some interviews were scheduled with developers, people deemed to be policy experts and others generally well aware of the details and successes of COMFIT. One such person is "Paul" who works in policy in Halifax. In his experience, the CEDIF structure for COMFIT investment and development has worked exceptionally well in the province. In Paul's eyes, the sense of personal ownership in the project created by COMFIT is a major reason why turbines and local projects have been supported across the province.

"Paul" (Nova Scotia): *I think the CEDIF component is like brilliant. I think that's working really well for Natural Forces and Wind4All and those guys. They've, I think every project they've put forward they've gotten the money that they need and that makes people feel more, you know, when they drive by they're like "hey look I'm making money off that thing."*

"It was good that it's municipal owned because that gives you a set of brakes…that you can say "hey let's stop this right here until we get this in place." Caroline Nova Scotia

According to our interviews with various stakeholders, COMFIT has also allowed for a greater degree of control and input into the matter of development. When discussing the merits of COMFIT, this was the most popular component people like "Caroline" cited.

"Caroline" (Nova Scotia): *Well there's things that didn't work in our project that had to be corrected but it was good that it's municipal owned because that gives you a set of brakes…that you can say "hey let's stop this right here until we get this in place."*

As the quotes above show, interview data with all types of stakeholders pointed to the idea that what has 'created' higher levels of support in Nova Scotia was one of two things: i) a greater degree of public input and participation during planning and/or ii) more financial benefits or incentives with regard to those living closest to wind turbine development. That is to say, support for local development was so entrenched within themes of procedural and

distributive justice. For this reason, these two issues became the cornerstones of Walker's dissertation research and this Toolkit.

Siting Processes and procedural justice

Issues of procedural justice quickly became apparent throughout the early stages of research in Ontario and Nova Scotia. This occurred through interviews were we asked residents in both Nova Scotia and Ontario to comment on the COMFIT process in Nova Scotia. Unfortunately, most of the residents we spoke with in Ontario were unaware of Nova Scotia's COMFIT program. In order for them to have something to compare their experiences to, Walker would describe the basic characteristics of COMFIT and how ideas of community-based ownership work in other jurisdictions. Whether one was supportive or opposed to wind energy, community based initiatives generally sounded like a "good idea" to the Ontario residents compared to the Ontario system. "James" and "Michael" are both residents near the Adelaide-Metcalfe development in Ontario where large corporations have been responsible for development.

> ***"James" (Ontario):*** *That [community-based development] sounds better than what's going on here. It's kind of every man for himself [in Ontario] you know what I mean? So if it was a more community-oriented thing that would be great… Getting the community involved at the outset, that's a good idea.*

> ***"Michael" (Ontario):*** *I'm not in favour of the [current] approach that is takes for them to be established... There should be more open communication with the municipality….That would have kept people better informed and it would have been a more positive conversation I think with the municipality…So…coming up in the future, if there's the opportunity for a, like a cooperative type program, I'm not sure it should be initiated by the municipality but I think the municipality could be a partner in it.*

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> ***"When they drive by they're like, "hey look I'm making money off that thing."***
> Paul, Nova Scotia

> ***"Caroline":*** *Well there's things that didn't work in our project that had to be corrected but it was good that it's municipal owned because that gives you a set of brakes…that you can say "hey let's stop this right here until we get this in place."*

Though positive conversations about COMFIT dominate discussions about this process, there were some concerns about the COMFIT program. The most prevalent negative comment was that not all COMFIT projects were actually owned by the local community. There are two key issues involved: i) residents seemed to be unaware of the opportunity to invest in their local project and ii) there was a strong sense of uncertainty as to where exactly actual investors were from.

> ***"Shannon" (Nova Scotia):*** *I wonder who the investors around that [turbine]…Who are they and what's their investment? I know they've got a financial investment but what are the risks to other people and what investment do they have? Do they live here?*

Indeed under the CEDIF model, there needs to be only 25 local investors, and the rest can be from anywhere in the province. "Kathryn", a policy expert describes how CEDIF investors are generally from outside the local project.

> ***"Kathryn" (Nova Scotia):*** *Yeah…but let's be frank, we could have a minimum of 25 investors and maybe the investment is a minimum of 20 bucks- but you're raising five million dollars... If you have 2500 dollars local investment you've got your numbers. So you could be 25 bankers in Sydney and that could theoretically be your community involvement for wind turbine development, you know, in South Harbor, which is nowhere near Sydney.*

In a conversation with small-scale developer, "Roger", he notes that COMFIT has also led to more 'red tape' and is thus a more expensive way to build wind turbines in the province.

"You could be 25 bankers in Sydney and that could theoretically be your community involvement for wind turbine development, you know, in South Harbor, which is nowhere near Sydney."

> **"Roger" (Nova Scotia):** it's like piling on high levels of complexity and complication in business dealings that don't really need to be there… So I just think that COMFIT is causing extra expense, it's not delivering any more money in communities' hands than before…

In contrast to the positive COMFIT experiences felt by most in Nova Scotia, interviews with those residents living close to non-COMFIT projects, such as one in South Canoe revealed much more concern about community input and control during the siting process. "Nancy" was

involved in the planning process and felt the companies responsible for the turbines did not care about anything except "doing it legally".

> ***"Nancy":*** *Minas has come in kind of like with that steamroller attitude like "lets just get the job done. We know what we need to do." …It's got nothing to do about community, it's going nothing to do…it's about how do we do it…make sure we do it legally*

Survey analysis

Tables 3-7 below break down key elements of procedural justice that first emerged in the interviews, but was then was measured through the survey. The responses show display the percentage of each provincial sample that indicated agreement and disagreement with each statement. The first thing to note is that besides the first question looking at overall approval (Table 1), there is not majority agreement for any of the measures in either province- that is they all have values below 50%. This suggests dissatisfaction with specific elements of procedural justice, but with some elements more troublesome to residents than others and most (12/13) showing statistically significant provincial differences.

Table 3: Procedural justice by province	Prov.	% Agree	% Disagree	Significant Provincial Differences
General approval				
Overall, I approve of the way the wind energy development was planned and built in my community	ON	21	69	Yes
	NS	66	23	

In Table 2 above, residents from Nova Scotia were more than 3x more likely to indicate agreement that they approved of the way wind energy was built in their community. A significant majority in the province (66%) indicated this.

Table 4: Procedural justice by province	**Prov**	**% Agree**	**% Disagree**	**Significant Provincial Differences**
Information				
I was provided with enough information on the existing wind power project before it was approved.	ON	31	61	Yes
	NS	49	41	
	ON	17	51	Yes

The information provided by the developer on the existing wind power project has been trustworthy	NS	35	23	
The plans relating to the wind turbines were always transparent to local residents.	ON	32	48	Yes
	NS	41	36	

In Table 3, we look at survey responses dealing with "Information" provision related to wind energy development. In sharp contrast to the responses from Nova Scotia residents in particular from Table 2, there seems to be much more disapproval of the way information was provided during planning and siting processes.

Table 5: Procedural justice by province	**Prov**	**% Agree**	**% Disagree**	**Significant Provincial Differences**
Opportunity				
I felt encouraged to take part in the planning process for the local wind energy development.	ON	28	51	Yes
	NS	32	39	
Local residents were made adequately aware of the opportunity to participate in the planning process for the local wind project(s).	ON	40	45	Yes
	NS	46	39	
I had ample opportunity to voice concerns about the existing wind power project before it was approved.	ON	44	42	Yes
	NS	46	36	

Table 4 examines resident responses to questions of "Opportunity"- or chances to be involved in the siting processes in both provinces. Though we see significant differences between provinces (e.g. 4-6% in agreement), in both Ontario and Nova Scotia there is a minority of respondents who felt opportunities to take part were made just.

Table 6: Procedural justice variables by province	**Prov**	**% Agree**	**% Disagree**	**Significant Provincial Differences**
Dealing with the developer				
The wind energy developers in my area were always truthful in its dealings with the community about the project.	ON	26	48	Yes
	NS	40	19	

The wind energy developer in my area used bullying tactics.	ON	31	29	Yes
	NS	9	52	
The wind energy developer seemed to go the "extra mile" in listening to and engaging with the local community.	ON	22	50	Yes
	NS	36	23	

Another set of procedural justice elements we studied were grouped under the "Dealing with the developer" frame and can be found in Table 5. Through these questions we see some of the largest inter-provincial differences. For example, Ontario residents were more than three times more likely to report that the developer in their area used bullying tactics (31% in Ontario, 9% in Nova Scotia).

Table 7: Procedural justice variables by province	**Prov**	**% Agree**	**% Disagree**	**Significant Provincial Differences**
Ability to affect the outcome				
Overall, participation in the siting process lead to meaningful changes in the siting outcome.	ON	13	36	No
	NS	10	23	
Local residents' concerns about the wind power project were adequately dealt with before it was approved.	ON	17	63	Yes
	NS	36	32	
Turbines were set back further away from homes in some cases when concerns arose.	ON	16	38	Yes
	NS	33	19	
I felt in control in terms of whether or not the turbine(s) were going to be built in my community.	ON	6	81	Yes
	NS	11	61	

The final group of procedural justice variables we studied (Table 6) quantitatively were grouped under "Ability to affect the outcome" and was comprised of questions related to just that- residents' perceptions of their ability to make changes through their involvement in planning and siting. Here we see some of the lowest percentages in agreement among all procedural justice questions (i.e. only 6-11% felt in control). The question of "participation…lead to meaningful changes" is also the only variable we looked at that fails to show a significant difference when comparing by province.

Financial Benefits: Community investment and distributive justice

There were a number of conversations that concerned the distribution of benefits and the connection to lower levels of concern about negative impacts experienced by locals. In a

conversation with a policy expert in Nova Scotia, "Kathryn" hypothesized that the greater degree of local benefits brought through COMFIT projects is a major reason why there has been less opposition to wind turbines in some areas.

> **"Kathryn" (Nova Scotia):** There doesn't seem to be the opposition and maybe…it's just hard for someone to stand up and say, "I don't want my community to benefit." (Laughing) Whereas if it's NS power then…well it's easy to throw rocks at a corporation because they have a terrible reputation and a lot of it is earned.

Across both provinces, residents generally shared the view that smaller, locally owned projects are preferable to ones owned by large and/or international corporations. "Angelo", a member of the Gunn's Hill Co-operative in Ontario believes in giving local citizens a chance to invest in the project is the best way for the public to "get behind it".

> **"Angelo" (Ontario):** The general public does need to see an economic benefit from a project like that in order to get behind it and get involved and we're able to do that with our project. The benefit to the community comes from various sources. The greatest influence that the community has over it is owning the project, right? And that's the opportunity we give them.

"It's easy to throw rocks at a corporation" (Kathryn, Nova Scotia)

Community-based development is rare in Ontario and so investigating the impact of development at Gunn's Hill gives us a unique chance to see how public investment opportunities can work in Ontario. Though interview data suggested that this chance for public investment would lead to higher levels of support, it did not. In fact the survey results show that there was less support among residents living close to Gunn's Hill (21%) compared to residents near the remaining wind developments we studied in Ontario on average (27%). This finding is somewhat puzzling as across every measure of perceived economic benefit, Gunn's Hill is higher (i.e. more benefits) than the Ontario average – three of them being statistically significantly different (Table 7).

Table 8: Community-based development in Ontario – Gunn's Hill (GH) vs. the rest of Ontario (ON)	**Area**	**% Agree**	**% Disagree**	**Significant Provincial Differences**
Adequate economic benefits	GH	19	32	No
	ON	16	59	
Positive benefits distributed fairly	GH	9	32	Yes
	ON	4	73	

All residents have been adequately compensated	GH	6	51	No
	ON	5	70	
More financial benefits should be given to the local community	GH	56	11	Yes
	ON	70	12	
I was aware of opportunities to invest in the local project	GH	45	29	Yes
	ON	9	69	

What is most striking about this table is that there seems to be fairly universal concern that financial benefit distribution is unfair, regardless of whether a co-op "community-based" or traditional siting model is used in Ontario. This suggests more work needs to be done to ensure the co-op model is accomplishing all of the positive impacts it is meant to, especially in a province where rural communities are now highly sensitized to and cautious about wind turbines.

Regarding this apparent uneven distribution of benefits, there were stories of companies – mostly in Nova Scotia- who were attempting to make financial benefits tangible to all or most residents living near wind turbines. Especially under COMFIT and the CEDIF programs, most projects required at least 51% equity to be owned by the public. "Peter" works for a developer in the province and says the opportunity for people to receive returns and very important in the sense that it leads to much higher levels of support.

> ***"Peter" (Nova Scotia):*** *I think the biggest thing is if you can allow people to take on some ownership in the project and provide them with financial returns- it gets a lot more support.*

Likewise, during a conversation with Policy expert "Kathryn" we learn that the lack of opposition in Nova Scotia is likely because it is more difficult to oppose projects that more directly benefits local communities.

> ***"Kathryn" (Nova Scotia):*** *There doesn't seem to be the opposition [in Nova Scotia] and maybe…it's just hard for someone to stand up and say, "I don't want my community to benefit." (Laughing) Whereas [in other places]…well it's easy to throw rocks at a corporation because they have a terrible reputation and a lot of it is earned.*

In order to quantitatively test the idea that higher perceptions of distributive justice are leading to greater levels of local support, a simple one-stage regression analysis was performed. Regression analysis estimates the relationship between a dependent variable (in this case, local support) and one or more independent (predictor) variables (measures of distributive justice). It is different from correlations which also show relationships between sets of variables because regression analysis controls for the effect of all variables within the model. This allows

for a more sophisticated and perhaps more trusted look at the relative importance of each variable. Thus, if a variable is not in the model, its predictive power is diminished by the presence of the other variables in the model – that is, the ones that "leave" the model are not as important statistically-speaking. The following table shows that of six variables modelled, five predictors of local support are statistically significant with "positive impacts are distributed fairly" being the most important and "more financial benefits to locals" being the least important all others are unimportant – statistically speaking. That is those who are supportive of local turbines: agreed that positive impacts were fairly distributed, disagreed (negative signt before 0.241) that a fund should be established to pay fair market value for homes, agreed it is fair to only compensate landowner with turbines, agreed all residents have been adequately compensated and agreed that more financial benefits should be given to the community.

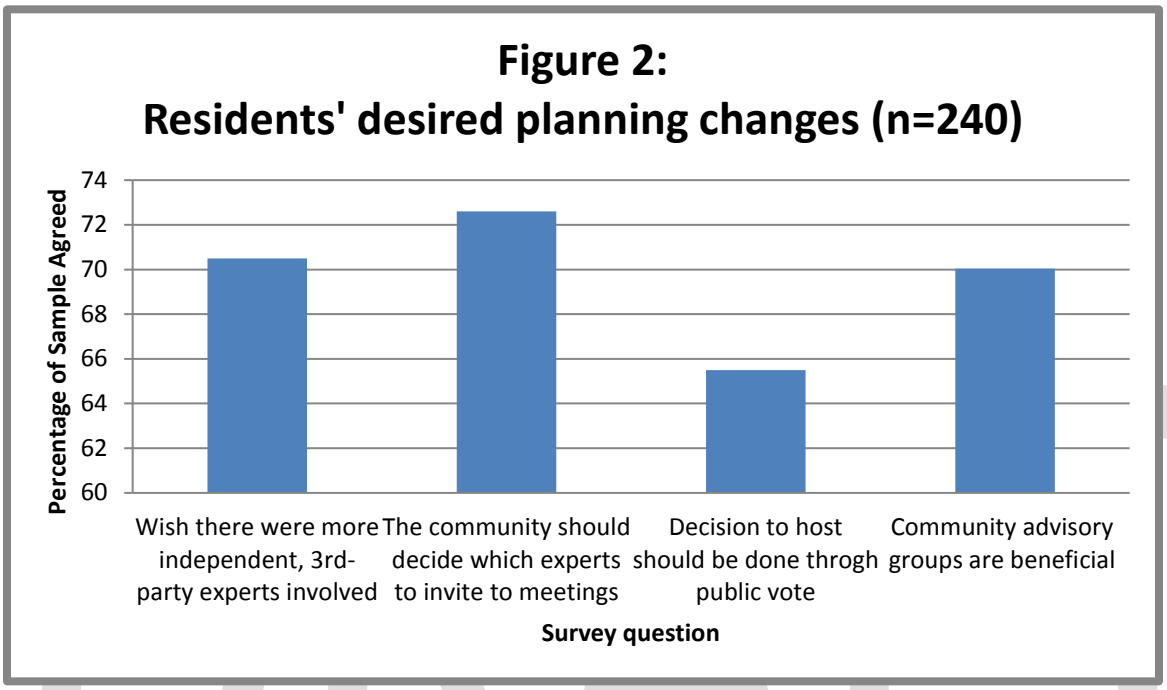
Table 9: Predictors of local support for wind turbines (linear regression; R^2= 0.414)

Only significant predictors are shown	**Standardized Coefficients (Beta)**
The positive impacts of the existing wind power project are distributed fairly within the local community.	.322**
A fund should be established to pay fair market value to households who must move because they cannot tolerate the negative impacts of turbines.	-.241**
It is fair that financial payments are only given to the landowner who has a turbine(s) on their land.	.173**
All residents have been adequately compensated for the negative impacts of the existing wind power project.	.164*
More financial benefits should be given to the local community for having turbines.	.150*

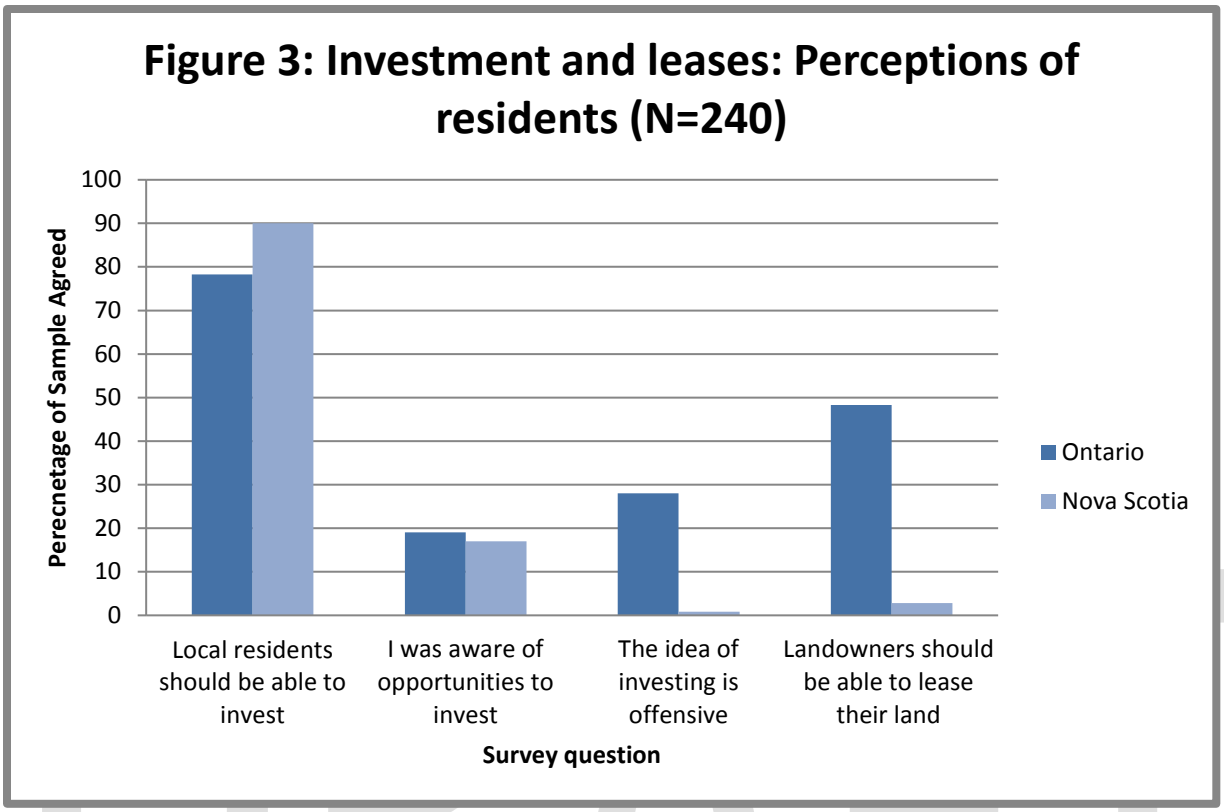
Wind turbine siting: Residents' preferences

Finally in the survey we also asked questions regarding residents' preferences for wind turbine siting- ideas that were in many cases derived from the interviews. Specifically we asked four questions to elicit their preferences related to planning and siting. Figure 2 shows results from both Provinces. The main finding is that a majority of residents agree that changes are desired in all four areas – greater 3rd party expert involvement, community power over expert involvement at meetings, community vote on hosting turbines, and that community advisory groups are beneficial. Even more interesting is that despite policy programs that differed in many ways seen above) most (3/4) of the questions shown in Figure X do not significantly differ by province. The exception is the final question which states "Community advisory groups are beneficial…". Among the other three, we fail to see such differences by province which

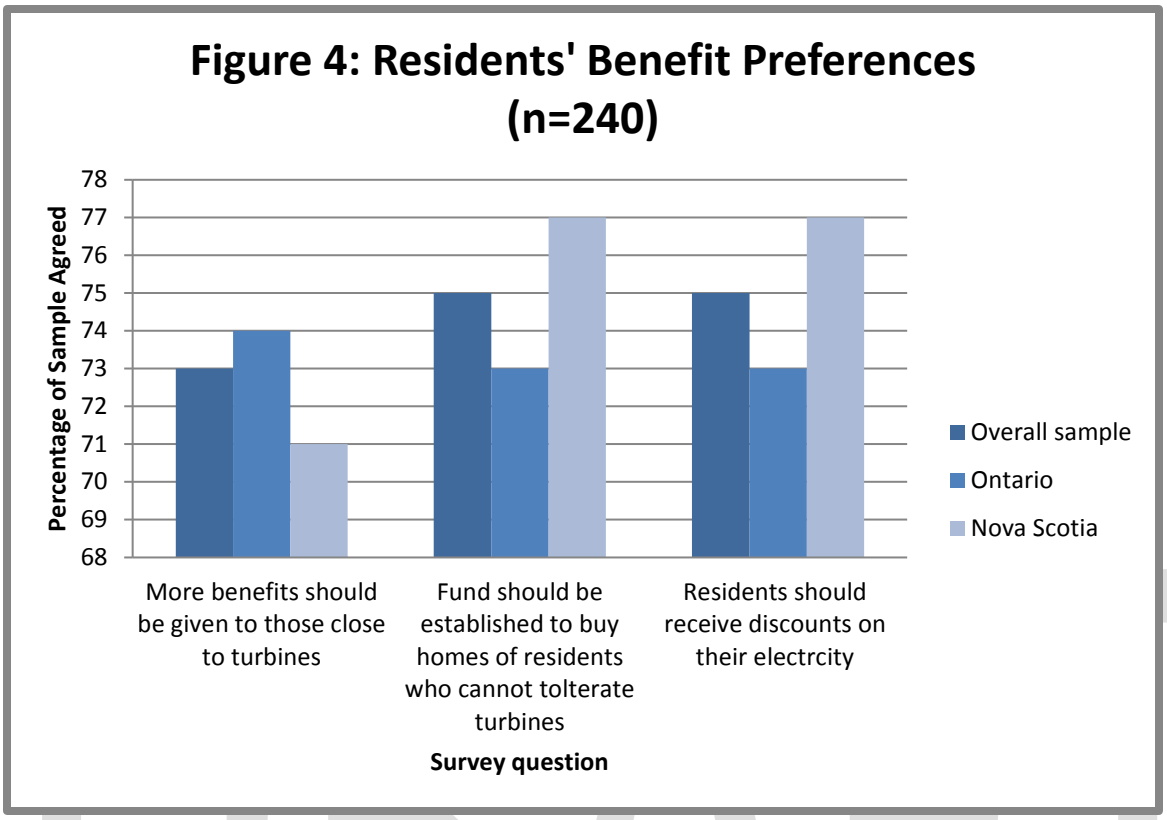
suggests these changes are not only wanted to by most residents but that these changes would likely be embraced by people across both jurisdictions.



Similarly, we asked what residents thought about investment opportunities and idea around leasing of private property to wind developers. Overall most residents surveyed (82%) believed that locals should be able to invest- yet despite high levels of support for this question, those from Nova Scotia were still statistically more likely to agree with the statement. There were also statistically significant differences between provinces on the of "The idea of investing in local wind energy development is offensive to me" and "landowners should be able to lease their land". Part of these differences though are no doubt due to the differences in: i) investment opportunities and ii) leasing of private land for the purpose of wind energy in both provinces.



The survey also included items asking residents for their preferences regarding the method of financial compensation or benefit with reference to local wind energy development. Both conventional and somewhat novel methods of payments were introduced including discounts of electricity for those living close to wind energy developments.



Somewhat similar to Tables 2-6 which examined procedural justice, Figure 4 shows that nuanced questions about distributive justice has the power to reveal much more than general questions do. The chart shows that there is higher slightly stronger agreement among residents when they are presented with examples of financial benefits such as electricity discounts compared to general questions about "more benefits".

Principles moving forward

There are a number of principles for policy change – practical implications - suggested by these findings with a focus on increasing community buy-in to local turbine projects. The value-added of addressing these changes is largely social, to discourage deep local community conflict over new wind turbine development. Yet there may be overall benefits to governments and industry, with less time spent on time consuming appeals against new turbine developments.

Principle 1: There is no 'magic bullet' when it comes to local support.

As opposed to what some in the literature have suggested, procedural and distributive justice- each on their own- appear to be necessary but not sufficient conditions for maximizing local support for wind turbines and wind energy. This may help explain the relatively low levels of

support in Ontario in particular where neither condition is being met through top-down, developer-led approaches. In Nova Scotia, improvement can too be made where 'community-owned' development is not always truly so and thus has seemed to lead to some disapproval of some elements of both procedural and distributive justice.

Principle 2: Community-based development does not automatically quell discontent

Though the residents in Nova Scotia were generally more supportive and less concerned than those in Ontario, on may measures the majority of residents in Nova Scotia remained concerned about wind energy, and particularly the siting process (e.g., information about investment opportunities, transparency).

Principle 3: Majority support may be accompanied by majority discontent on a number of siting measures.

This principle mainly applies to Nova Scotia where there is an expected high level of support for turbines (66-80% depending on the measure), yet there is somewhat of a paradox of discontent on a number of siting measures (e.g., information sharing, benefits sharing). Discontent/concern does not necessarily translate into lack of support, and this is likely highly context dependent.

Principle 4: General measures of perceived adequacy of planning processes – e.g., benefits may miss more specific favour/discontent.

Our findings regarding both procedural and distributive justice suggest that single measures of concern about benefits and justice, miss important details. For example, the overall amount of compensation paid to local residents may not be as important as the distribution of that compensation (i.e., to the residents living closest).

Principle 5: Residents desire third-party "unbiased" information and knowledge translation

Given that most information comes from government, developers, CANWEA, and opposition groups, and each is presumed to have their own unique perspective on turbines; residents expressed concern that it was difficult to sift through and make sense of the overall costs and benefits of local turbines: e.g., a common question we as researcher get from other academics and acquaintances is, "Do turbines *really* cause health effects?" Given the information from a range of sources, the answer is not a simple one.

Principle 6: Majority vote from local community favoured by residents

There is relatively strong support for allowing communities to decide their own fate regarding turbines through a referendum/community vote.

Principle 7: Support for a range of financial benefits mechanisms including opportunities for locals to invest and profit directly

There is majority support for a range of financial benefits mechanisms including: money to residents living closest to turbines, a fund for buying out negatively impacted residents living close, and discounts for locals on their electricity bill. There was particularly high support for the idea of providing opportunities for locals to invest, with a much smaller but notable group in Ontario who feel this idea is offensive.

Principle X…

[*More may be added following the workshop, public review and comment period – email us if you have comments].*

About the authors

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