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COMMUNITY SOLAR IN ALBERTA:

Risk Management & Insurance Considerations

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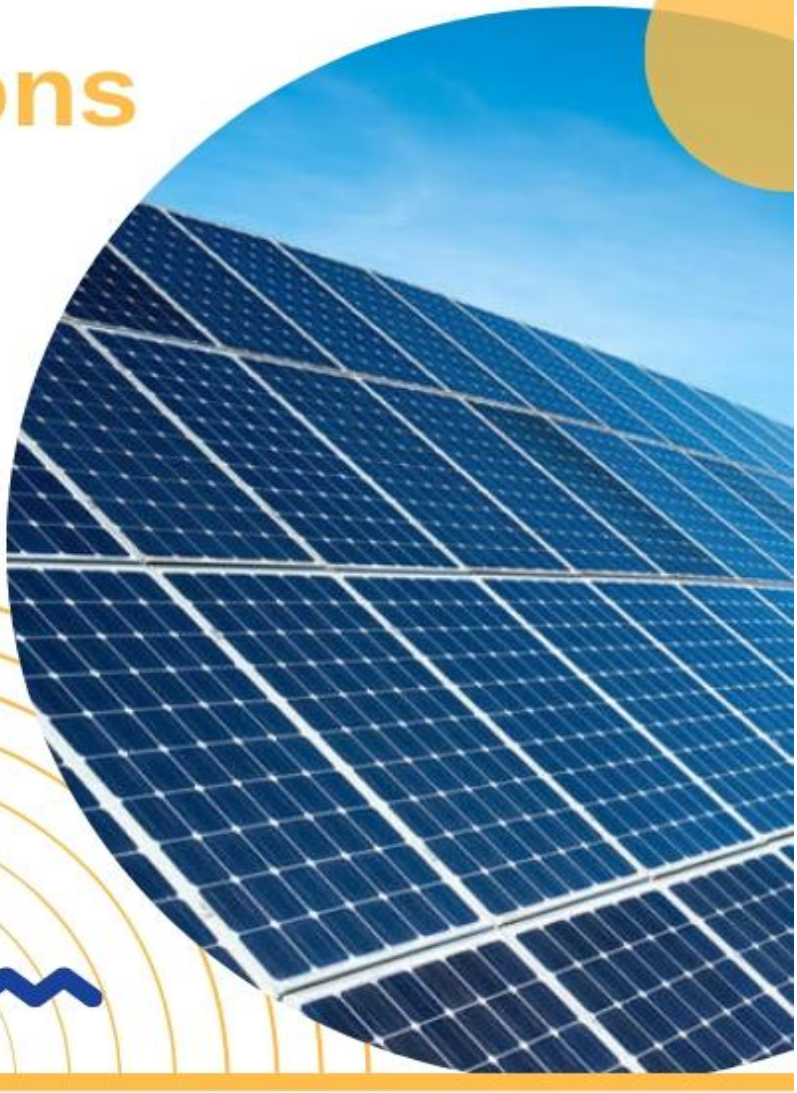

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Energy Efficiency Alberta

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ABOUT THE AUTHOR

This report was authored by Jen Aitchison, Senior Vice-President, Hugh Wood Canada Ltd. for Wesley Johnston President and CEO, Canadian Solar Industries Association (CanSIA) with support from the Energy Efficiency Alberta (EEA) Community Energy Capacity Building Program (CECBP).

Jen has been acknowledged for fundamentally changing the insurance landscape for renewable energy and combining risk management with market-based solutions for win-win results. With over 18 years in the insurance industry and the last 11 focused on renewable energy, she provides strategic insight to her clients that allow for best in class risk assessment, management and insurance placements at a fair cost often commenting on contracts, warranties and lending agreements for the best results for her clients. Jen is a founding member of Women in Renewable Energy (WiRE), won the 2015 Canadian Solar Industry Association's President's Award for chairing the PV Fire Safety committee including release of the Fire Safety Manual. She currently serves on the Board of Energy Storage Canada, and TREC SolarShare's governance committee and was previous President and board chair of Touchstone Youth Shelter. She was also featured by Women's Post as Woman of the week as one of the leading environmentalists supporting risk management and mentoring women entering the field.

1. Introduction

Alberta's legislated target of 30% of electricity production from renewable resources by 2030 will to the development of a significant number of new electricity generation facilities that harness the province's solar, wind, hydro, biomass and geothermal resources throughout the next decade. These facilities will include those generating solar electricity on the roofs of homes, schools and community centres ("Micro-Generation") and those generating electricity at a larger scales ("Utility-Generation").

In 2018, the Government of Alberta announced the $200 million "Community Generation" program to launch in Q3, 2019 and a new "Small-Scale Regulation" to enable municipalities, co-operatives, agricultural societies, First Nations, Metis Settlements, non-profit organizations, and post-secondary institutions to participate in the electricity market without the same level of burden that is placed on energy companies and larger facilities.

This document is intended to provide an overview of the risk management process including identifying assessing and treating the risks within a given Community Solar project that is assumed to be ground-mounted, approximately 1 – 25 MW_{AC} in size and connected to the distribution-system. There are risks to every project or operation, and every Community Solar project will have their own unique risks based on each project profile. Over the course of the document we will identify many of those risks and discuss assessment and treatment options, as well as provide links to other key documents and services that may need to be considered along the way as you evaluate the risks and returns of developing, financing, constructing and operating Community Solar Projects.

There is a level of risk in everything we do, from crossing a busy intersection to building bridges to living in an area that is prone to earthquakes, tornados or floods. Risk management is the process by which we identify, understand, assess and mitigate those risks to further limit the chance of a negative outcome. Business risks for example can be managed through contract negotiation, component selection, good overall business process or financial instruments such as bonds. Harder to predict risks such as flood and other extreme weather events are managed through engineering and construction considerations such as wastewater management and vegetation control, and, failing that, insurance policies. From a climate change perspective, business risk can also be managed and mitigated through environmental planning, adaptation, and sector specific risk and vulnerability assessments.

Over the course of the document we will identify, assess and provide examples of how to mitigate the common risks associated with Community Solar projects in Alberta and provide links to other key documents and services that may need to be considered along the way as you evaluate the risks and returns of developing, financing, constructing and operating your Community Solar project.

2. Project Planning

Location and Equipment Risks

When planning your project a number of considerations to quantify risks apply, such as, site evaluation and equipment risks. Site evaluation is the first consideration in the risk management process, and it is necessary to consider exposures surrounding the proposed site from an external exposure and third party liability perspective:

- High traffic areas such as residential housing, schools, shopping centres and arenas pose additional exposures of potential property damage, or injury of a third party (think windstorm damage/injury potential).
- If the array is highly visible, it may become an attractive nuisance for local kids which also provide increased exposures of similar nature.
- Access for First Responders falls a little into this category - the distance to first responders in the event of wildfire can greatly affect the success and longevity of the project.
- You will need to maintain access to roads and provide plans to your local fire department in case of an emergency. Your local bylaws should be able to provide information on access and road maintenance requirements, as will First Responders.
- Proximity to a river may lead to a flood exposure and affect insurance premiums.

For siting, berms, fencing, signage and appropriate setbacks from roads or rooftop edges as well as community engagement for safety and awareness education are all key elements. For equipment, evaluating the technology is crucial in the development of any project. For equipment, from the type and size of the panel to be used, to the bankability of the overall supplier in the event of a loss, there are a number of specific considerations.

The next two tables will review key risk management considerations in selecting the appropriate site and equipment for your project to ensure long term success, access to financing and insurability: location risks (Table 2.1); and equipment risks (Table 2.2).

Table 2.1. Location Risks.	
RISKS	**CONSIDERATIONS**
Earth Movement and Landslide	Certain engineering considerations will need to be made in order to reduce earthquake risks and ensuing damage caused by this and potential ensuing landslide. It is also important to engage your insurance broker to determine insurance capacity and deductible levels as well as overall insurability of your project. This may also impact ability to access financing for the project if adequate insurance for the area is not available at a reasonable cost. ○ Natural Resources Canada has an earthquake hazard tool accessible online: www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-en.php
Flood	Speaking to your local conservation authority and municipality will help to determine if there are any flood concerns in the area, types of mitigation already being used and any by laws that may apply to drainage or wastewater treatment plans you may have to include within your project budget. Your prospective insurer will also be able to give guidance as they have access to Swiss Re or Munich Re's natural catastrophe database for information that is not available through NRCAN as yet. ○ The Insurance Bureau of Canada also has online risk assessment tools: www.ibc.ca/on/disaster/water/municipal-risk-assessment-tool
Windstorm and Hail	Looking through historical data and speaking with your local conservation authority will also assist in this case as well as reviewing data sets available from Agriculture Alberta: www.agriculture.alberta.ca/acis/alberta-weather-data-viewer.jsp
Wildfire and Accessibility	Accessibility of the project to first responders such as fire, ambulance and police including access to firefighting tools such as full time firefighters within 8 km and a nearby hydrant vs volunteer brigade with only access to a pumper truck can make all the difference in the maximum probable loss in the event of a fire or other emergency such as a trespasser accessing the site and getting hurt. It is also important to engage the local first responders early in the siting process to allow for their input on disaster management or emergency access plans you may need to incorporate in design as well as training considerations. They need to be made aware of new potential hazards in their jurisdiction to prepare to be of service in the event a situation arises. Additional information to get your local first responders started is available from: **CanSIA**: www.cansia.ca/fire-safety-handbook.html **National Fire Protection Association**: www.nfpa.org/-/media/Files/News-and-research/proceedings/PhotoVoltaicBrooks.ashx?la=en&hash=050DF1EBC196AA4920D8A2ED350D77D368C2BDAC

Climate Change	Consider the changing climate and its influence on the frequency and intensity of extreme weather events like flooding, wildfire and wind- and hail storms. Reviewing climate projections and data on sources like www.climateatlas.ca/find-local-data or www.parc.ca/index.htm
Geotechnical	Engaging technical specialists is necessary when reviewing geo-technical concerns such as soil type, current or future contamination issues that may arise and overall engineering considerations for any ground mount systems.
Theft, Vandalism and Security Risks	Copper wiring, panels, inverters, cameras and computer equipment are all attractive to potential thieves. Having appropriate fencing, regularly scheduled security visits, cameras and highly visible signage to deter would be theft and vandals. Also, ensuring appropriate plans for equipment delivered to site and not storing things out in the open for long periods of time.
Wildlife and Native Plant Species	Checking with local authorities and engaging specialists to conduct habitat and migration patterns of a given site is a standard government requirement as part of an overall environmental impact assessment, as will understanding what you can and cannot do for revegetation and may also impact your wastewater management plan.
Cyber Risks	Hacking and cyber hostage situations are becoming more common. Although we have not seen any specific to solar, it is important to ensure back up data sources and appropriate cyber security considerations are a priority when choosing equipment and installing networks.

Reviewing the potential for a natural catastrophe when siting your facility is of utmost concern as this can not only affect your project, it can impact the insurability and/or cost of insurance for the project.

Table 2.2. Equipment Risks.	
RISKS	**CONSIDERATIONS**
Equipment Suitable for the Location	Many sites in Alberta have a very cold climate, wo you will need to ensure your equipment can withstand temperature changes within the range typical to the area as well as the extreme. Other environmental considerations such as racking appropriate for specific soil conditions or wind & snow load for example. These operating conditions are typically outlined within the equipment specifications as well as within the warranty provided. This will allow appropriate evaluation of equipment.
Equipment Matching	Utilizing appropriate photovoltaic modules with racking that has the ability to support the modules as well as adequately sized inverters and transformers will help avoid breakdown of equipment and potential denial of warranty claims. Installation manuals should outline torque ranges to be used that support the warranty of the racking and separately modules. Sometimes the torques don't match running the risk of over torqueing of the modules resulting in cracking or under torqueing resulting in exposure to breakage over time potentially voiding the warranty of one of the components. In the event of a mismatch, best practices are to contact both suppliers to get written confirmation on how to proceed with both technologies without voiding any warranties.
Software	When installing a facility, there are software considerations. Budgeting the future time and costs to update the computers that are contained in the E-Houses is important to avoid downtime. If these are not updated appropriately it can result in unscheduled, uninsured and unbudgeted downtimes. Securing your facilities to protect against potential cyber threats and having firewalls and back-ups in place are also important. Hackers are generally in your system over 180 days before they attack – make sure you're protected.
Warranties	Not all warranties are created equal. Each supplier will have standard warranties with their equipment. Most will exclude any ensuing loss of revenue and/or downtime and many are unassignable. It is important to look at long term implications of each warranty including; o Assignability – if your EPC orders the equipment, ensure the warranty is assignable to the end user and doesn't stop at the original purchaser. o Bankability – will the supplier likely be around for the duration of the warranty period? Do they have a parent company that is diverse in the event one arm of equipment is discontinued? o Level of warranty – if the warranty is with a global company, ensuring that the warranty is written in the name of the parent company as opposed to the local entity is key in the event the local company disappears. o Insurance – in the event there is an offering of an insurance backed warranty, having a certificate reflecting limits carried is not enough. Asking whether the insurance is project specific or for their entire global operations is also key in deciding if the extra cost to include this type of warranty is worth the spend. Like warranties, not all insurance backing of warranties is created equal. A $6M limit across a $1BN global sales, with a $1M deductible, does not provide much coverage compared to a project dedicated limit, especially considering the timeline of these warranties out to 25 years.

Replacement Availability and Timeline	Replacement parts should also be considered in the event of a breakdown from whatever the cause. Knowing how long it may take to get a replacement part and if the type of parts you use originally can be replaced not only by the original supplier, but also if you are able to use alternate parts from alternate suppliers. There may be long lead times for things such as transformers that are not easily matched with alternate suppliers or off the shelf parts typically housed in spare parts warehousing. Considering these items when choosing components can ultimately save time and money at the backend; however may cost a little more on the front end such as including replacement parts timeline guarantees or choosing parts that happen to be more interchangeable with other suppliers' equipment. This will also help you budget for potential uninsured downtime in the event a loss is not covered by your insurance or you have to sustain waiting period deductibles within your insurance that may impact operating cash flow or debt service commitments.

Evaluating the technology is crucial in the development in any project. From the type and size of modules to be used to the bankability of the overall supplier in the event of a loss there are a number of specific considerations.

3. Contract Considerations

Breadth and details within contracts from engineering to procurement and construction through to land leases and financing agreements may seem cumbersome, but certain clauses make a huge difference in the long run, should something go wrong. We will review the important role contracts play in the development, construction and operation of a Community Solar project.

First and foremost, prudent advice from legal counsel with experience in drafting construction contracts is an essential plank in risk management. A well drafted contract can protect an innocent party from the financial consequences of the negligent actions of another party. The reverse is also true. An overly broad indemnification clause can prevent recovery of financial losses or damages from the very party that caused on contributed to the loss. The key is to transfer risk that is appropriate, reasonable and importantly, supported by insurance contracts via additional insured language, indemnity provisions and waivers of subrogation.

Liability of other parties assumed under contract should be limited to vicarious liability only. One should not assume liability to the extent of the negligence of that party, only to the extent of your own negligence or for those you are responsible, such as sub-contractors working under your direction.

Indemnification clauses within contracts outline what each party to a contract will be responsible for and provide assurance that certain liabilities will be carried by the appropriate parties. An example of appropriate indemnification is that of a contractor providing environmental services such as geotechnical or site grading for waste water run off or a contractor responsible for thermal oil transfer at site where an environmental or pollution event may arise leading to an event requiring cleanup and potentially Alberta Environment & Parks involvement. In an EPC and O&M agreement the contractor providing these services would indemnify and hold harmless the project owner, site owner, lenders and if a sub of the GC, the GC from any losses costs or expenses that may arise out of their operations. If an event did arise, this would ensure the appropriate party would have to respond to the claim defending the indemnified parties.

Waivers of subrogation are commonly requested. A common feature of the modern CGL accepts this obligation, provided the waiver preceded the loss in question.

Remembering that fines and penalties are not insured in a traditional definition for “damages”, you must be careful to avoid such obligations. Further, the concept of liquidated damages has become more common. This can range from a reasonable pre-estimate of damages designed to reduce the time and money spent to determine quantum of a loss to a disguised penalty clause where the liquidated damage amount is all but unconscionable. To the extent that liquidated damages are equivalent to a realistic estimate of property damage caused, a policy may respond. I use the term “may” because some definitions of “damages” specifically exclude “liquidated damages” along with fines and penalties. Best advice is to resist any request for liquidated

damages, but if not possible confer with your insurance advisor to understand the extent of insurance coverage available.

Specific to power purchase agreements, evaluating risks surrounding curtailment provisions and any potential failure to supply clauses is also important, especially considering the availability of solar energy. Considering opportunities to incorporating energy storage into the projects would be a potential option in the event these items cannot be removed and are or may become more of a threat on the economics of the projects in future.

Overall, the key consideration is that the indemnification obligations are fully supported by the insurance program in place or insurance carried by other parties to the contract that provide appropriate indemnities to the project owner and lenders as applicable. Any gaps need to be addressed, either by expanding the scope of insurance, where possible, or negotiating the offending terms out of the contract. A discussion with an appropriately skilled insurance advisor and your legal counsel is recommended.

3.1. The Role of Insurance & Insurance Backed Financial Instruments:

We have spoken about various financial risks that may arise such as bankability of suppliers, managing downtime of uninsured breakdown or losses. There are many financial risks that can be insured such as losses from fire, theft, equipment breakdown due to lightning etc. but there are others that are not so easy to insure or are incredibly costly. Purchasing uptime warranty insurance, lack of sun coverage or hedging overall performance are all available, at a price. Consulting with your insurance broker to discuss the cost of these types of coverage is recommended. In addition, ensuring you choose bankable suppliers and EPC companies and making sure contractual obligations are clear, and in your favour, albeit potentially more costly, will all help to ensure smooth settling of project issues in the event something does go wrong. Engaging your insurance brokers and legal counsel to work together with regards to contractual obligations, indemnities and insurance requirements will also help to ensure the process following an issue is as smooth as possible.

4. Insurance Considerations

Insurance is not only a requirement of lending agreements, leases and various other contracts, it also the basis of the closest thing to financial return security as you can get. Although it is impossible to insure EVERYTHING, you can buy insurance for about 95% of the exposures to lack of financial return on an investment you may face in any project. It is important to ensure you get certificates of insurance for all parties to the project with each specific covenants provided under each specific coverage to ensure as seamless an insurance placement as possible and the lowest exposure to coverage gaps possible. Every project has insurable aspects as outlined in the following sections.

4.1. Engineering Coverage Including Design Defect

Professional Liability or E&O (Errors & Omissions) Coverage provides coverage for consultants, engineers and professionals to the project should they cause a financial loss arising out of their professional services to a third party (Project Owner or other third party). This typically however, excludes efficacy or guarantees. This coverage would come into play for example, in the event of a design defect such as wind/snow loading error, structural error causing a loss. There would be coverage for defence costs for the professional and if they are found liable and their coverage properly written, for losses, costs and expenses incurred to rectify the defect. Most property insurance policies exclude the costs to re-engineer the system or rebuild following, but will cover any ensuing damage following the defect should a covered loss such as fire occur. Ensuring the contracts in place require indemnification from the professional party to the project and sufficient limits are provided for is definitely something to consider at the front end of contract negotiations. Following a loss is the worst time to find out you've let the engineer off the hook for any losses or their liability is limited to the extent of their fees, which are typically nominal compared to the loss amounts that could occur. In large projects it is often recommended that an owner controlled project specific policy is placed to ensure sufficient limits are available and not shared amongst a number of projects on the engineer firms docket and the loss settlement is more controlled. There are also covenants available within a builders risk property policy that will broaden the defect exclusion to include replacement of the defect part and in some cases even the cost to redesign the system in the event of a loss. Speaking to your insurance advisor to pick the best course of action based on your project(s) profile is recommended.

4.2. Management Liability

No matter what business you are in, management teams and boards of directors charged with leading an organization for success has its own set of risks, responsibilities and liabilities. There are a number of insurance products available to mitigate these risks including;

Directors & Officers Liability – A D&O policy provides defense costs and indemnity coverage to the Named Insured arising out of an alleged "wrongful act" such as neglect,

breach of duty, misleading statements or management error/omission. These policies typically include coverage for the entity listed and any subsidiaries for which it maintains 51% or greater ownership and/or management control; individual directors, officers and employees; Reimbursement to the organization for a contractual obligation to indemnify directors and officers that serve on the board.

Indemnification provisions are typically included in the charter/bylaws of a corporation and also found for each individual within an employment agreement or contract outlining an organizations duty to indemnify the individual in their role within the organization. It is important to review the coverage inclusions and exclusions to ensure your overall exposure from a management perspective is adequately addressed.

4.3. Employment Practices Liability

Coverage for defense costs and potentially damages arising out of allegations stemming from situations such as wrongful dismissal, sexual harassment, discrimination etc. This coverage is typically included or available to be included with your Directors & Officers Liability as noted above.

4.4. Crime – Money and Securities

Coverage for loss of money & securities stemming from employee dishonesty, fraudulent credit cards, forged cheques etc. Most claims we see arise over a number of years and involve most trusted accounting personnel forging cheques or moving money to their own accounts under the vice of a false payable.

4.5. Cyber Liability

Cyber-attacks, like data breaches and hacks can result in devastating damage to businesses as they have to deal with business disruptions, lost revenue and litigation. As a result, cyber liability insurance has become an essential component to any risk management program.

Cyber Liability policies offer insurance coverage for the following:

- Claims expenses associated with third-party loss resulting from a security or data breach. In the event of a breach, organizations are required by law to notify affected parties and provide credit and ID monitoring of the affected parties. Coverage for this is included in cyber liability policies.
- Direct first-party costs of responding to a breach such as legal, forensic and PR services.
- Business interruption loss reimbursement covers lost income as a result of a breach during period of restoration.
- Coverage costs for network ransom associated with an attack or threat against the company when there is a demand for compensation to stop the attack.

- The cost to restore network and data to the point it was before the event occurred, this includes both hardware and software.
- Expenses for claims associated with online defamation and copyright and trademark infringement.

4.6. Workers Compensation

Workers compensation is not contemplated by Canadian Insurers. It is procured through the provincial body – Workers Compensation Board Alberta and is intended to cover employees that may become ill or injured while on the job.

4.7. Automobile Liability – Owned and Non-Owned

There are of course statutory liability limit requirements for automobile insurance as mandated by the province. Coverage for physical damage is generally only required to be purchased if your vehicle is leased or financed. When managing contractors ensuring they carry sufficient limits of liability as required by contractual obligation in addition to ensuring your own general liability provides coverage for non-owned autos in the event those limits are not sufficient following a law suit and your organization is named. Non- owned auto liability also provides coverage for rental vehicles while rented on business for no longer than 30 days generally within North America (Check your policy!).

4.8. Reps and Warranties Insurance

Mergers and acquisitions bring their own increased level of risk. Each transaction is different with each company making representations, warranties and providing indemnities for any discrepancies within a transaction that may arise post close. In order to make sure you aren't blindsided by any negative issues that may arise following a transaction Reps & Warranties insurance coverage should be investigated as an option to offset potential risks. Some of the coverage benefits include ability to insure potential unidentified risks such as not being able to collect on a sellers promised indemnification, extending the time to uncover any existing problems which in turn can speed up the sale process and covers liabilities of future reps and warranties claims on the business. On a side note, when looking at acquiring businesses it is also important to look at claims history and current insurance coverage including D&O that may need to be addressed at the point of close.

4.9. Manufacturers Liability

4.9.1. Liability

General liability covers bodily injury and property damage to a third party arising out of the operations of the Named Insured. The manufacturer is responsible for their products

operating in a safe non-destructive manner. Should the equipment malfunction and cause property damage or bodily injury to someone other than their own employees, general liability coverage would generally respond. There are of course caveats to this such as tampering with the equipment, defective design or installation of the equipment or intentional acts etc. that would negate coverage. There are also a number of specific clauses that should be reviewed and included in the contractual requirements that further protect the buyer from any vicarious liability that may arise as a result of the use of the product.

4.9.2. Errors and Omissions

This coverage acts as a professional liability policy for manufacturers that provides indemnity for losses, costs and/or expenses alleged to have caused a financial loss to a third party arising from an error or omission within the manufacturing process. An example of a covered loss would be solar panels under-performing due to an error in the manufacturing line such as the wrong soldering setting keyed into an automated module facility. This would most certainly cause a financial loss to the buyers as not only would they have suffered the financial loss of lack of performance, but also the downtime associated with the timeline to conduct due diligence and replace the modules.

In negotiating equipment purchase orders, it is important to request certificates of insurance from the manufacturer that reflects the appropriate coverage, currently in force with sufficient limits to cover not only an issue at your site, but multiple across the jurisdiction for which they sell their products.

5. Course of Construction

5.1. Bonding Considerations

There are three main types of bonds that are relevant in any construction project. In practice bonds are provided as a financial guarantee to the Owner that a project will be completed as per the contracts entered into with the General Contractor and or other Contractors. Should they be unable to meet their obligations the Surety will step in to complete the project up to the value of the bonds provided. In order to obtain bonding, a company must have good financials indicating a healthy working capital, project history and work-on-hand that shows the Contractor does not over extend themselves, which can lead to missing milestones that may result in breach of another contract. The three main bonds seen for construction projects are as follows;

5.1.1. Bid Bond and Agreement to Bond

Issued at the tender/bidding stage of a project. The Bid Bond provides financial security to the Owner that the Contractor bidding on the project will enter into a contract at their quoted terms or forfeit the amount of the Bid Bond if they do not. The Agreement to Bond provides a commitment to the Owner by the Surety that they will provide the final bond(s) should the Contractor be awarded the project.

5.1.2. Labour and Material Payment Bond

This bond is normally issued with a limit of 50% or 100% of the contract price. It provides a financial guarantee up to the limit of the bond, that the Contractor will pay all project labour and material supplied for the completion of the project as per the contractual obligations. This avoids a potential lien from a subcontractor or supplier that is not paid for their work. This bond can only be issued if a Performance Bond is issued.

5.1.3. Performance Bond

Not to be mistaken with performance or warranty insurance, this bond is a financial guarantee up to the limit of the bond, normally 50% or 100% of the contract price, that the Contractor will complete the project as per the contractual obligations. A Performance Bond will also include a 12 month warranty from substantial completion.

Final bonds (Labor and Material and Performance Bonds) can be replaced by Letters of Credit. However, this ties up the total amount of capital to satisfy the financial requirement instead of a percentage, that could otherwise be deployed elsewhere.

5.2. Property Considerations

In the course of construction there are 2 general ways to insure property under construction. The first in an installation floater which is typically used for smaller uncomplicated projects without the use of subcontractors; the second is a Builders Risk typically used for larger more complex construction projects. Both coverages generally provide coverage on an "all Risks" basis which includes fire, theft, lightning, windstorm, flood and earthquake, among other things. Under either policy forms, coverage ceases once the project is either substantially completed; accepted by the owner/operator; or left unattended for 30 days. Whichever occurs ***first.*** Some key differences to be aware of;

5.2.1. Installation Floater

Covers the contractors portion of the overall property values during the installation only, it provides no coverage for property while being worked on by subcontractors. This coverage also requires reliance on evidence of insurance from subcontractors for property coverage in the course of installation in the amount of the property they will be working on at any given time. It is settled on Actual Cash Value basis; meaning replacement cost less depreciation. It also generally doesn't include equipment breakdown coverage or losses arising out of the testing and commissioning process.

5.2.2. Builders Risk Coverage

Covers the property value of the entire installation and all contractors/sub-contractors until contractually accepted by Owner. It is settled on Replacement Cost Basis with no deductions for depreciation of equipment. It can include Delay in Start Up coverage for loss of revenue or profit due to delays in construction from a covered property loss during the construction period, if required by contract with the owner and/or the developer. It also includes Equipment Breakdown Coverage and losses arising out of the testing and commissioning process. Sometimes insurers will include specific broadening of defect exclusions to cover not only ensuing damage arising out of the defect, but also the cost to replace the defective parts and sometimes even the cost to re-design, however this could come at a significant cost.

5.3. Third Party Liability Considerations

Similarly to property in the course of construction, there are two general ways to cover liability. Commercial general liability covers a single entity while they in the course of their operations whereas a wrap up liability policy is typically project or portfolio specific and covers all parties to a project. There is also usually coverage inclusion for non-owned auto liability to cover any liability that may arise out of vehicle incident where the owner of the vehicle's insurance is not sufficient as well and sudden & accidental pollution covering and sudden & accidental pollution

events that may occur as a result of the construction operations. Key differences are outlined below;

5.3.1. Commercial General Liability

Third party coverage on entity's operations specifically relating to their occupancy / installation exposures. Usually put in place on an annual basis when no sub-contractors are being used where the contractor is involved in smaller projects or is consistently a subcontractor. If subcontractors are being used, the owner and main contractor must rely on evidence of insurance from all parties to the project and ensure the limits are sufficient with no erosion of limits from previous claims.

5.3.2. Wrap Up Liability

Covers a specific project and applies to the operations of all "sub" contractors involved in the construction portion of the specific project or portfolio of projects. No reliance on trades and sub-trades limits of liability. Generally used for large projects in which many trades & sub-trades are used; may also be required by contract. Contains a Completed Operations period that extends the coverage for liability arising out of the installation beyond the completion date of the project (usually up to 36 months maximum). This reduces claims settling complications and impact on corporate insurance placements.

5.4. Environmental Liability

Contractor Pollution Liability

Provides coverage for a pollution event that can arise from the construction of the project. New construction projects are exposed to a variety of environmental exposures, mostly due to the number of contractors on site, and the amount of equipment/vehicles used. Construction around water brings in another set of exposures including waste water management and potential issues with site grading that may lead to foreign soil contaminants being leached into nearby bodies of water. With environmental laws and requirements being an important part of any project, this policy provides coverage for sudden as well as gradual pollution conditions. It covers third party bodily injury and/or property damage caused by pollution conditions resulting from the project as well as the cost to clean up the site itself if necessary. A project or portfolio specific policy is recommended, which would be replaced by a Premises Pollution Liability policy when operational.

6. Operational Insurance Considerations

6.1. Property and Ensuing Business Interruption

Typically required by contract is All Risks property insurance including equipment breakdown and ensuing business interruption. This provides coverage for things well out of your control such as fire, flood, earthquake, hail, vandalism, theft of property, lightning and sudden & accidental breakdown of equipment. Typically written on a replacement cost basis with no deduction for depreciation, unless the facility is not replaced which would default the settlement to actual cash value and negate the business interruption coverage claim if any. There are also a number of extensions of coverage typically included such as contingent business interruption, expediting expenses, forest & fire-fighting expenses, bylaws and professional fees. With the exception of flood and earthquake, which carry much higher deductibles than other perils, deductibles typically range from $1,000. Property damage and 72 hours business interruption to $25,000. Property damage and 30 days business interruption. Rates will vary based on project profile and limits/deductibles carried as well as overall size and spread of the overall portfolio.

6.2. General Liability

This provides coverage for bodily injury or property damage to a third party arising out of the operations of the Named Insured within the normal course of business. Typical inclusions are tenants legal, personal and advertising injury, sudden & accidental pollution, employers liability (office employees only), non-owned auto. Limits are generally dictated by leases or finance contracts, however when reviewing the overall exposure looking at the maximum probable loss to a third party will assist in making appropriate limit selection. For example, if you were to place a solar farm on rural vacant land, you would likely require much less limits based on exposures than if you placed the solar array on a school or shopping mall. Deductibles and pricing will vary based on size, location, portfolio spread and overall exposures of each site.

6.3. Environmental Liability

Once a project is operational, owners continue to be subject to a range of pollution exposures such as thermal oil spills or the cost of cleanup following a massive windstorm that may include debris flying in to a third party site or a flood causing change of water flow that may result in contamination to nearby water bodies. In addition to site remediation and cleanup costs and/or damages to a third party, there can also be financial losses such as fines and penalties levied by the Ministry of Environment. An Environmental Impairment Liability policy would provide coverage for most of these costs. Ensuring there is no exclusion for pollution within your Directors' & Officers liability policy is also recommended, as fines and penalties can be levied against management depending on the specifics of the event subject to the claim. This policy is normally issued on a claims-made and reported basis which means the coverage is only valid during the

term for which it is in force. A claim must be made while the policy is in force in order for coverage to respond.

6.4. Insurance Backed Financial Instruments

This provides coverage for bodily injury or property damage to a third party arising out of the operations of the Named Insured within the normal course of business. Typical inclusions are tenants legal, personal and advertising injury, sudden & accidental pollution, employers liability (office employees only), non-owned auto. Limits are generally dictated by leases or finance contracts, however when reviewing the overall exposure looking at the maximum probable loss to a third party will assist in making appropriate limit selection. For example, if you were to place a solar farm on rural vacant land, you would likely require much less limits based on exposures than if you placed the solar array on a school or shopping mall. Deductibles and pricing will vary based on size, location, portfolio spread and overall exposures of each site.

6.4.1. Warranty Insurance

There are a number of available performance guarantees for resource driven energy projects such as wind, solar etc., that can be backed by a reinsurer. Effectively any warranty provided by a manufacturer can be reinsured; whether it's panel degradation and labor/material or that a full system will perform following completion. The overall cost and coverage however has to be reviewed carefully to ensure you are truly getting what you pay for. The most common warranty insurance is on the panels themselves and typically costs around 3-5c/W on average. The coverage however, is written across multi million dollars worth of panels and insures around 20% of those panels globally. There is system performance that covers the totality of the systems however, it generally runs closer to $0.10/W and is only economical when placed across a large global portfolio with diversification in equipment suppliers, epc and design.

6.4.2. Weather Hedging

This involves a great amount of engineering and weather data to be collected and underwritten to allow an insurance company to gauge the risk of certain agreed weather patterns causing a loss of output and ensuing loss of revenue to be insured. The overall cost varies greatly by location and exposures insured and are generally only economically viable when a large portfolio is considered.

6.4.3. The Great Swap

This is effectively providing assurance a certain band of return will be achieved. An insurance provider and owner/operator engage in a contract that allows any upside over the top of the agreed performance band to be paid to the insurer, and any downside outside

of the agreed performance band to be paid to the insured. Swapping profit and loss to allow for greater certainty without having to put more than a small amount of cash flow down.

6.4.4. Commercial Bonds

Similar to construction bonds, commercial bonds provide financial guarantees. However, unlike constructions bonds that are intended to cover more of the "bricks and mortar" exposures, commercial bonds are used for financial guarantees. Similar in scope to performance guarantees noted above, they tend to be a lower cost alternative to letters of credit or reserve account requirements imposed on entities generally by lenders to help securitize debt.

7. Operations and Maintenance Risks

O&M (Operations and maintenance) firms should also carry property and liability coverage to ensure the risks of loss are minimized and if they do occur, insurance is available to respond. Similar to construction coverage, there is risk of property damage, bodily injury and ensuing financial loss. As such it is important to ensure your chosen O&M firm carries general liability and some property damage coverage typically in the form of an installation floater to cover any damage in the course of their work such as cleaning panels, changing fuses or taking oil samples. Consulting with your insurance broker to establish appropriate coverage, limits and indemnity provisions based on your specific project(s) needs, to be included in the contract is recommended.

8. Conclusion

There are many things that can negatively impact your project such as natural catastrophes, poorly negotiated contracts, misaligned equipment or not insuring to value. However as long as you have carefully considered each risk exposure thoughtfully, and put in place mitigation techniques that are available and economically viable, your project will have a greater chance of longevity and achieving the expected output and ROI. Make sure to engage in experts early and plan ahead as much as possible. Spending that extra hour and dollar at the front end saves days and thousands at the back end if something goes wrong and the appropriate safeguards weren't put in place.

Appendix: Links and References

NRCAN Canadian Earthquake Hazard Resource:
www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-en.php

Agriculture Alberta Weather Data for Windstorm & Hail
www.agriculture.alberta.ca/acis/alberta-weather-data-viewer.jsp

Canadian Solar Industry Association & Ontario Association of Fire Chiefs PV Fire Safety Handbook
www.cansia.ca/fire-safety-handbook.html

National Fire Protection Association Photovoltaic Research Document:
www.nfpa.org/-/media/Files/News-and-research/proceedings/PhotoVoltaicBrooks.ashx?la=en&hash=050DF1EBC196AA4920D8A2ED350D77D368C2BDAC

Canadian Standards Association
www.csagroup.org/industry/energy-power/photovoltaic-pv/
Electrical Safety Authority
https://www.esasafe.com/business/alternative-generation-safety/renewable-generation

Workers Compensation Board Alberta
www.wcb.ab.ca/