2.1 Model Interconnection Procedures

Prior to 2003, few states had comprehensive procedures for interconnecting distributed generation. For the most part, utilities had broad discretion to study the impact of an interconnection at a customer's expense. In addition, because few small generator interconnections were proposed, a lack of utility experience with these interconnections meant that the cost of the review process could overwhelm the cost of a system, particularly for modest residential-scale systems.

Six years later, the policy landscape is much different. Much of the content embodied in current state standards can be traced to the work done in developing four interconnection standards that later formed the foundation for many state efforts. These four model procedures are California's Rule 21 interconnection standard (CA Rule 21), FERC's Small Generator Interconnection Procedures (SGIP), the Mid-Atlantic Demand Resource Initiative Procedures (MADRI Procedures), and IREC's Model Interconnection Procedures (IREC Procedures). The remainder of this section discusses how these procedures came into existence and why they have since become templates for developing state interconnection procedures.

A lack of utility experience with interconnections meant that the cost of the review process could overwhelm the cost of a system, particularly for modest residential-scale systems.

California was among the first states to attempt a comprehensive rule for interconnecting distributed generation when it developed CA Rule 21 in 2000. In 2003, three critical events laid additional foundation for many of the interconnection procedures for distributed generation that exist today. First, IEEE finalized standard 1547 – the *Standard for Interconnecting Distributed Resources with Electric Power Systems*. This provided the basic technical requirements for interconnection. Second, FERC issued *Large Generator Interconnection Procedures* (LGIP) for interconnecting systems over 20 MW. The LGIP became the model for FERC's SGIP, which was adopted in 2005. And third, NARUC finalized its *Small Generation Resource Interconnection Procedures* (NARUC Procedures). NARUC submitted its new procedures to FERC in the early stages of the docket that led to FERC Order 2006.

Despite being referenced in EPAct 2005, the NARUC Procedures are rarely reviewed by state regulators developing procedures. Instead, for various reasons the SGIP/SGIA, MADRI Procedures, CA Rule 21 and IREC Procedures are more commonly used, along with various state interconnection procedures. Nevertheless, the NARUC Procedures (and, to an extent, CA Rule 21) established a baseline of features that are now ubiquitous in state interconnection procedures. These include:

- Much of the application process
- Many of the technical screens used in current rules
- A fast-track process for generators that pass the technical screens
- A 20MW threshold
- A standard three-step structure for utility study of more complex generators (feasibility, impact, and facilities studies)
- Use of a standard form agreement between a utility and customer
- Reliance on IEEE 1547

FERC began to develop the SGIP in 2002. With extensive participation by utilities, regulators, renewable energy advocates, industry and government experts, FERC issued Order No. 2006 on May 12, 2005. Accompanying the SGIP in Order 2006 was the Small Generator Interconnection Agreement (SGIA), a standard form

agreement. Through subsequent orders, FERC developed its final version of the SGIP and SGIA on August 28, 2006, in Order 2006-B. The SGIP's significance rests in its application for large distributed generators, its widespread adoption and its function as a model for state procedures. For interconnection of distributed generators under a few megawatts, which is the vast majority of such interconnections, SGIP is rarely applicable since states typically have jurisdiction to oversee interconnections of such systems.

In November 2005, the utility commissions of Delaware, New Jersey, Maryland, Pennsylvania, the District of Columbia, the PJM Interconnection (the regional transmission organization for the states just listed) and various federal agencies (FERC, the Department of Energy and the Environmental Protection Agency) concluded work on the MADRI Procedures. These stakeholders developed their procedures as an alternative to the SGIP which came out six months earlier. It was not intended to be applied in its model form. Rather, the drafters intended that utilities and state regulators in the PJM Interconnection states would modify the new procedures and make them specific to peculiarities of local markets. Among the states in the PJM Interconnection, Pennsylvania adopted the MADRI Procedures in significant part; Maryland completed a rulemaking in June 2008 by adopting rules that improve upon the MADRI Procedures; and the District of Columbia initiated a rulemaking to consider similar rules. Delaware developed interconnection procedures with very low system capacity. New Jersey elected not to adopt the MADRI Procedures and instead developed what DG proponents consider to be one of the best state procedures in the U.S. Outside the PJM Interconnection region, the MADRI Procedures have been used in Illinois and Oregon. Utah and South Dakota are considering Oregon's improved version.

The IREC Procedures were initially developed in 2005, and were most recently revised in September 2009. The original intent of the procedures was to respond to EPAct 2005's call for states to consider adopting best practices by creating its own version of those best practices, as of late 2006. Coming at a later date than the other procedures discussed above, the IREC Procedures drew on SGIP/SGIA, the MADRI Procedures, the NARUC Procedures and the progressive rules developed in New Jersey. The IREC Procedures drew directly from the SGIP for its basic format, technical standards, application forms and the simplified agreement for interconnection of inverter-based systems no larger than 10 kW. The 2009 update of the IREC Procedures applies the simplified process for small inverter-based systems to systems no larger than 25 kW, and includes other stylistic and substantive revisions.

Although significant differences exist between the SGIP/SGIA, CA Rule 21, the MADRI Procedures, and IREC Procedures, their many commonalities establish a relative baseline of interconnection procedure essentials. Among the common elements of all four procedures are:

- Coverage of all technologies, rather than just renewable technologies
- Interconnection of systems up to at least 10 MW
- Pro forma interconnection agreements
- A simplified procedure for small solar arrays covering most residential installations
- A fast track procedure for systems up to 2 MW that allows interconnection without additional cost or delay if certain screens are met
- A scoping meeting if screens are not met to review expected costs and duration of studies
- A three-part study (feasibility, impact and facilities) process for interconnection of more complex and larger systems (CA Rule 21 has supplemental review process as a first step for systems that do not meet all the screens and, failing that, a single study process that essentially includes the three study areas listed)

- Comprehensive coverage of issues such that utility discretion to create substantive additional rules is largely foreclosed

In October 2008, the Solar America Board for Codes and Standards issued a report titled, *Comparison of the Four Leading Small Generator Interconnection Procedures,* which provides a detailed look at the advantages and disadvantages of the four leading interconnection standards discussed above. Additionally, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy and Office of Electricity Delivery and Energy Reliability issued a brief, two-page document in March 2007 listing best practices for DG interconnection.

2.2 Legal and Procedural Issues

Many of the barriers to interconnection have little to do with technical functionality or safety. Since the adoption of the national technical standards discussed in Section 3 of this document, states and utilities have been addressing technical issues in a satisfactory, uniform manner. At the very least, in many jurisdictions, the technical rules are clear to all parties involved. A substantial portion of the difficulties associated with interconnection now lie in the legal and procedural arenas.

> If legal advice is necessary to interpret the paperwork required by a utility, then project costs rise, and plans are more likely to be abandoned.

This section describes some of the significant legal issues related to interconnection, including liability insurance and agreements between system owners and utilities. Procedural issues are then addressed, including:

- Utility practices and timelines
- Interconnection applications
- Expedited vs. study track procedures
- Fees and charges

State regulatory authorities develop procedural regulations, usually with input from interested stakeholders. In several states, including California and New Jersey, clear legal and procedural rules have greatly facilitated the interconnection process.

Insurance

The impact of liability insurance requirements depends on the size of a DG system. Additional liability insurance to cover systems greater than 100 kW installed at commercial or industrial facilities is generally not an issue because owners of such facilities likely already have sufficient liability insurance coverage (i.e., at least $300,000 in coverage), or because the marginal cost of additional insurance is not prohibitive relative to a DG project's cost. Significantly, liability claims related to the malfunction of interconnected, customer-sited renewable energy systems are an extremely rare occurrence.

However, liability insurance has been a major battleground in developing of rules applicable to DG systems sited at homes or small businesses. Some states with interconnection standards require liability insurance for small systems as a means of protecting the utility and its employees from any accidents attributable to the operation of a customer's system. Because most homeowners already have liability insurance through a standard homeowner's insurance policy, a requirement to provide a reasonable amount of liability coverage usually does not

impact these system owners.[25] Many states with DG interconnection standards have prohibited utilities from imposing insurance requirements on customers beyond reasonable limits established by state regulatory commissions.

In several states, including California and New Jersey, clear legal and procedural rules have greatly facilitated the interconnection process.

Indemnity, another salient insurance issue relevant to DG interconnection, refers to security against or compensation for damage, loss or injury. In contracts between utilities and system owners, a utility frequently requires the system owner or other customer-generator to indemnify the utility for any potential damages as a result of operation of the installation. Indemnification requirements are somewhat redundant in states with liability insurance requirements. States that have specifically addressed indemnification in DG interconnection procedures usually require mutual indemnification (as opposed to requiring indemnification of the utility by the system owner but not of the system owner by the utility).

Beyond the issues of limits of liability and indemnity, some utilities have sought to impose a requirement that the utility be listed as an additional insured on the customer's liability policy. In essence, this means a utility would be protected under the system owner's policy if the utility is sued in relation to the operation of the system. However, in most areas of the country, insurance companies have indicated that listing a utility as an additional insured is not even a possibility for residential insurance policies. As a result, some utilities have dropped this requirement. Where state regulatory authorities have examined the issue, the attempted requirement has been rejected.

Standard Agreements

In the process of developing interconnection procedures, most states choose to adopt a standard interconnection agreement in order to assure equal legal treatment of DG system owners across different utility service territories in the same state.[26] Standard agreements essentially make the interconnection process easier both for utilities and system owners. Even if a state adopts uniform interconnection rules with a clearly defined interconnection process, unreasonable contract terms that find their way into utility agreements can be fatal to DG projects when a standard agreement has not been developed or recommended.

The difference between larger DG installations (for commercial or industrial applications) and smaller systems (for residential or small commercial applications) is worth highlighting once again. Given the differences in scale and project application, two different model agreements are included in IREC's 2009 model interconnection rules.[27] For certified, inverter-based systems up to 25 kW in capacity, the agreement is included in the application as two pages of terms and conditions for interconnection. The second model agreement, which appears in IREC's model as Attachment 3, applies to all other systems.

Turning first to the smaller-scale installations, the two-page agreement serves as a first step to removing legal and financial barriers to the installation of grid-tied renewables. If a residential customer is forced to navigate and comprehend a pile

[25] Several states have specified that homeowners should carry at least $100,000 in liability insurance (what is provided by most homeowner's insurance policies).
[26] One notable exception is New Jersey. Although New Jersey is widely considered to have excellent interconnection standards, it has not adopted a standard interconnection agreement (as of July 2009).
[27] IREC's 2009 model interconnection standards are available at www.irecusa.org/index.php?id=87.