A UTILITY PERSPECTIVE ON THE MASS. DG INTERCONNECTION TARIFF

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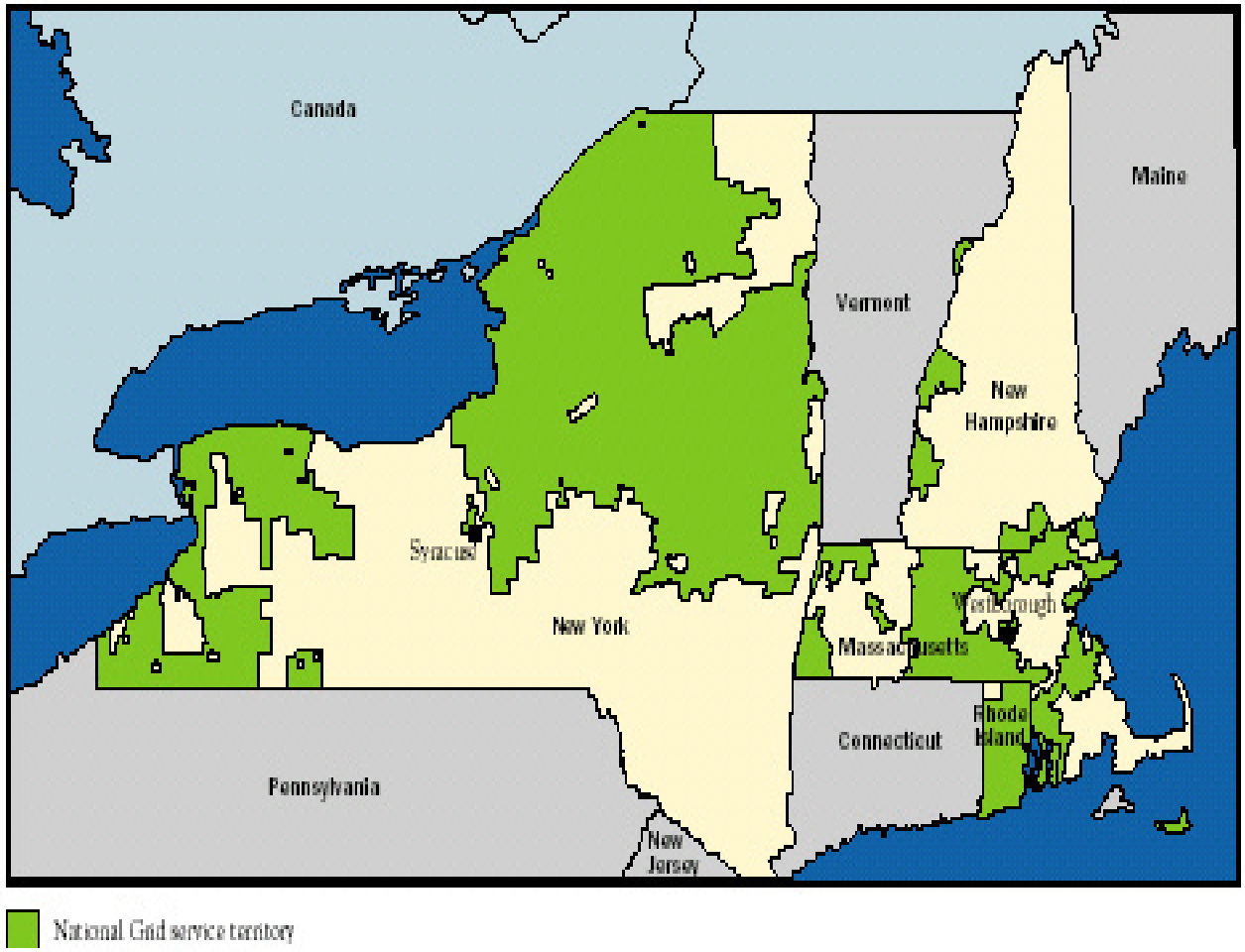
NATIONAL GRID'S *PRESENT* U.S. SERVICE TERRITORY



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Presentation Outline

1. OVERVIEW OF MASS. DISTRIBUTED GENERATION (DG) TARIFF

2. CONTRIBUTIONS OF OTHER ORGANIZATIONS

3. USE OF SCREENS FOR EXPEDITED APPLICATION PROCESSING

4. SIMPLIFIED CATEGORY – RELIANCE ON STANDARDS

5. EXPEDITED CATEGORY – TRUST IN OTHER STATES

6. CONCLUDING COMMENTS

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OVERVIEW COMMENTS ON ALL TYPES OF DG

- **PV** – growing very significantly in states with rebates
- **Wind Turbines –** more growth in the .2 – 1.5 MW range
- **Fuel Cells of All Types -** costs still prohibitive
- **Residential CHP -** high cost now, but sales could grow
- **Microturbines –** more sites now, but costs remain high

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Mass. Plan: Draw from the Best

- **IEEE P1547 – 3 years of DGI standards effort**
- **California Rule 21 – established DGI screens**
- **New York State PSC – began SIR process**
- **Texas – DGI process simplified and quicker**
- **NARUC – a model DGI plan with state options**
- **Existing Mass. IOU tariffs with DGI benefits**
- **FERC – some proposed screens & documents**

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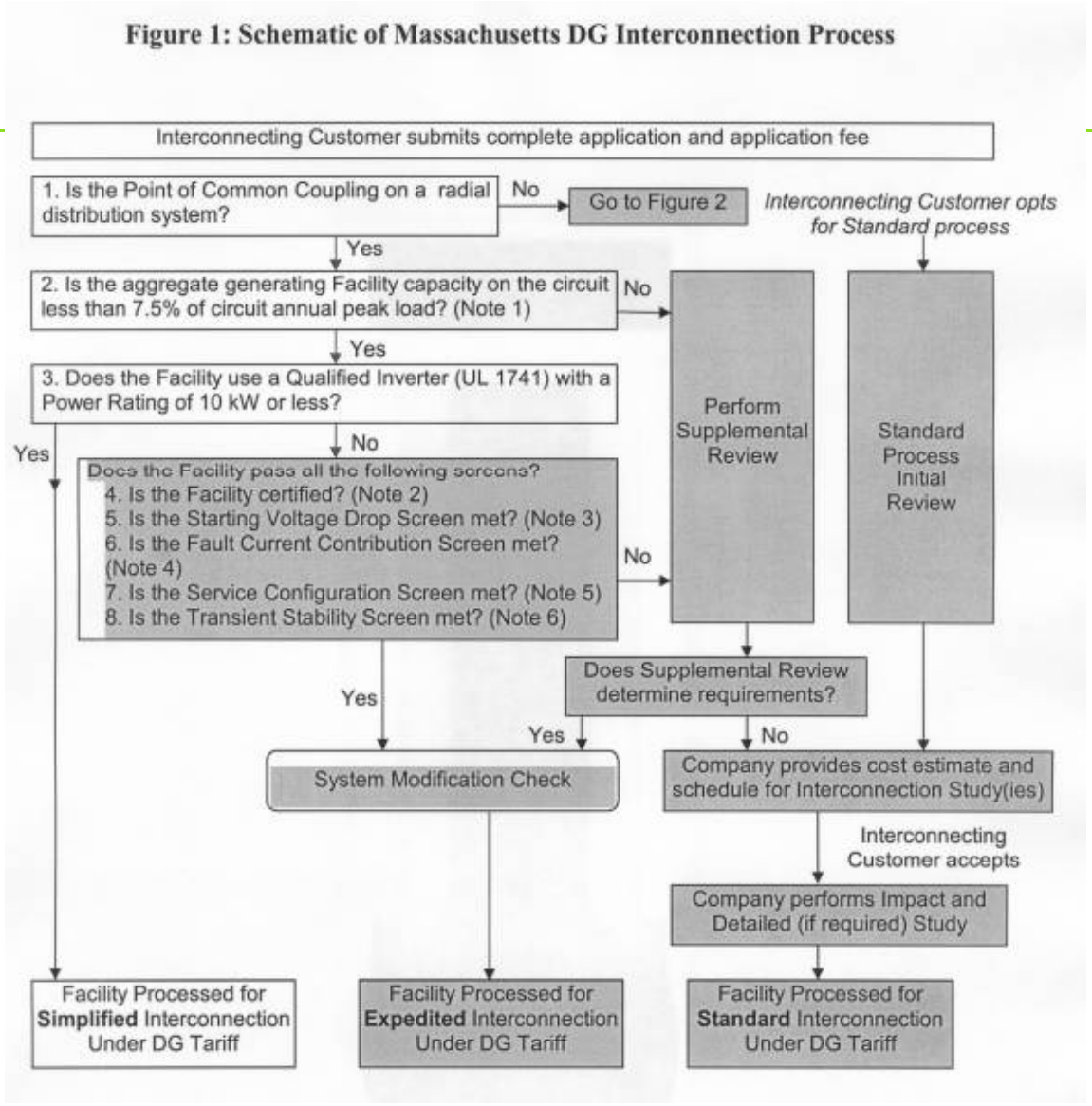
Figure 1: Schematic of Massachusetts DG Interconnection Process



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SIMPLIFIED APPLICATION – 4 BASIC CRITERIA

1. Is the Point of Common Coupling on a radial distribution system?

No → Go to Network Process

Yes ↓

2. Is the ***aggregate*** DG capacity on the circuit less than 7.5% of the circuit annual peak load? (See note 1)

Yes ↓

3. Does the facility use a Qualified Inverter (UL 1741) with a power rating of 10 kW or less (1Ø) or 25 kW or less (3Ø)?

Yes ↓

4. (***Almost always the case***) Is the DG connection such that the service transformer loading is balanced? (See note 5)

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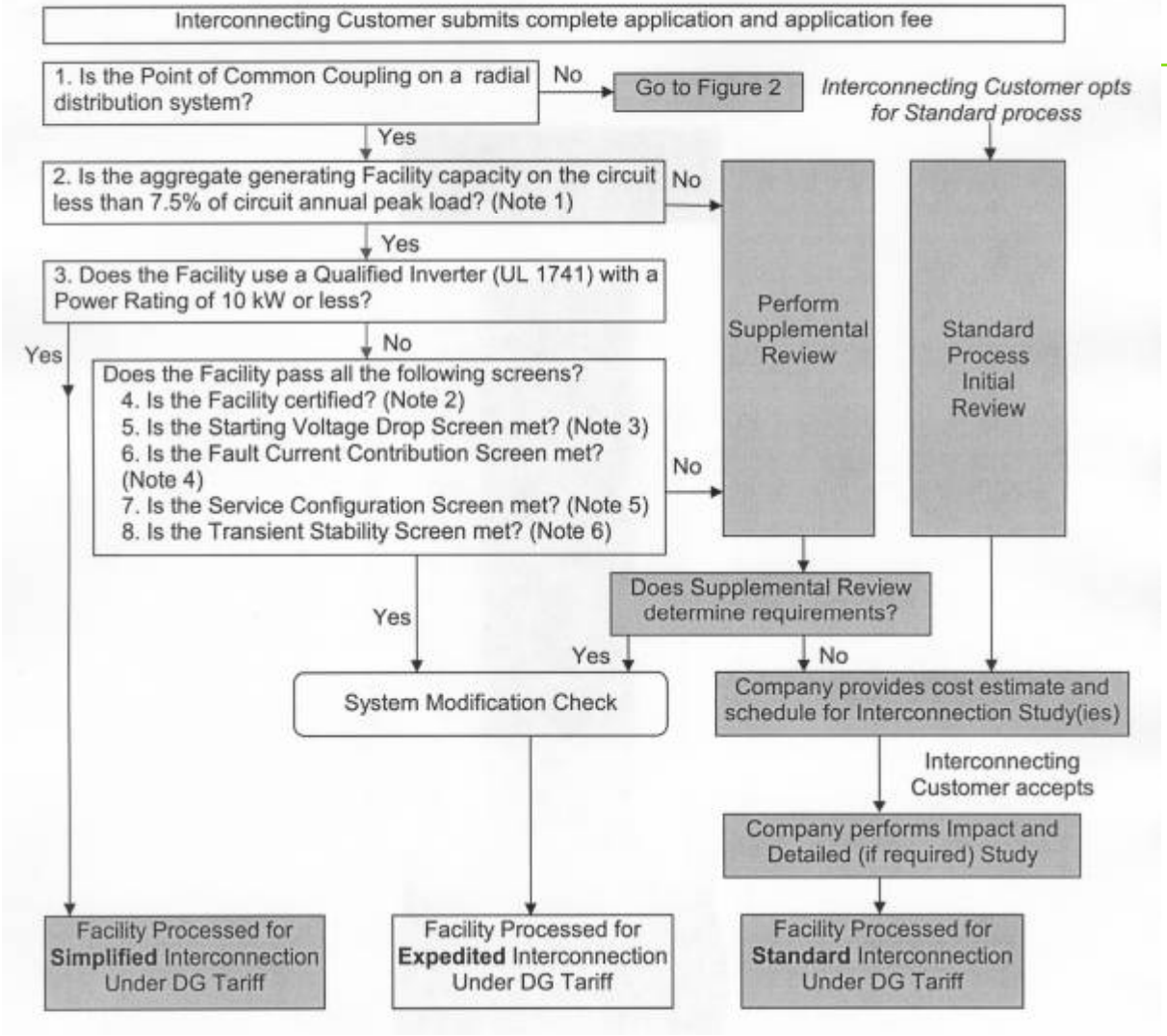
Figure 1: Schematic of Massachusetts DG Interconnection Process



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EXPEDITED APPLICATION – 4 CRITERIA

5. Is the DG unit certified by a NRTL or other states? (note 2)

6. Is the starting voltage drop screen (criterion) met? (note 3)

7. Is the fault current contribution screen met? (note 4)

8. Is the transient stability screen met? (note 6)

Yes

Check for minor system modifications

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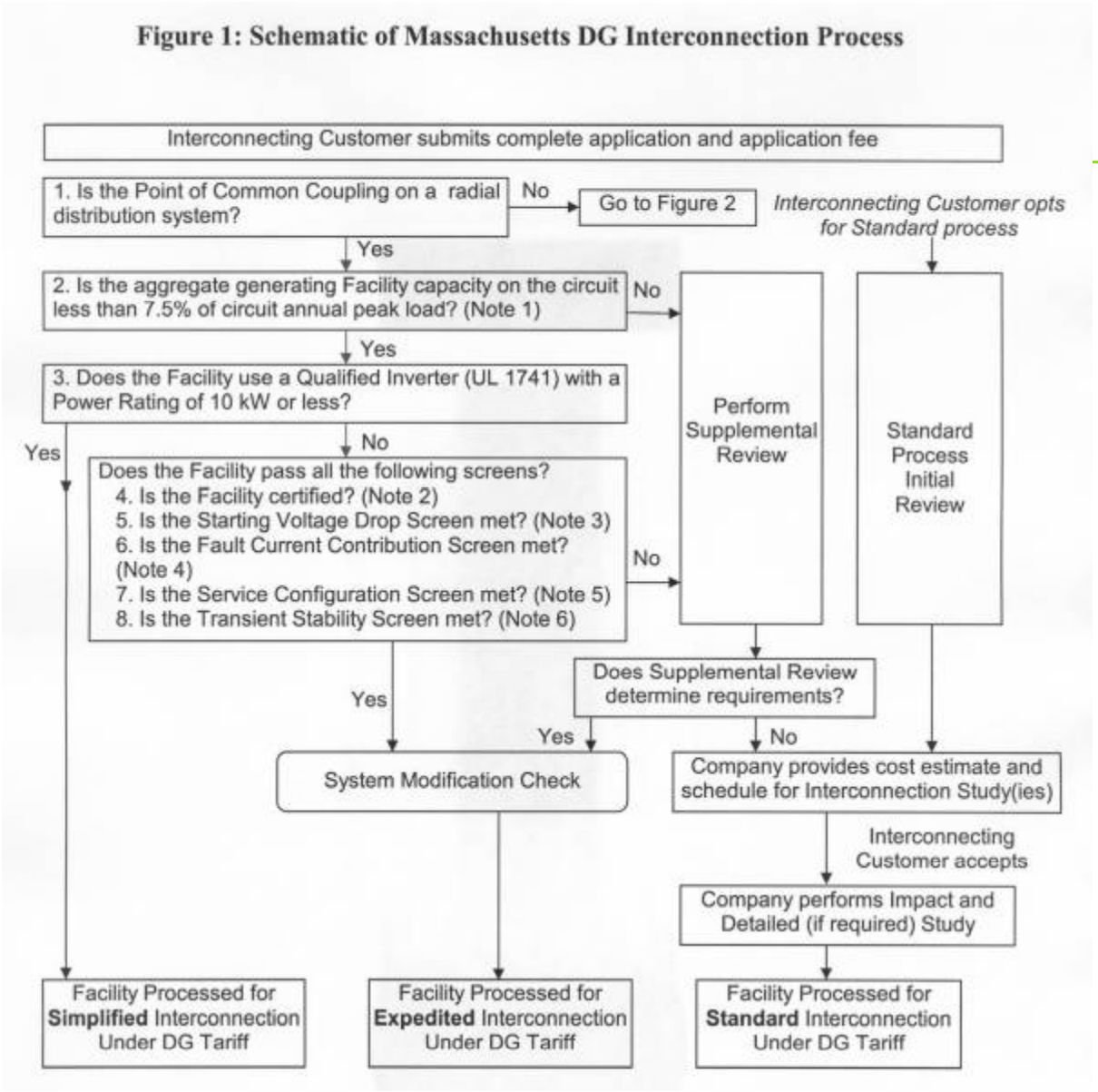
Figure 1: Schematic of Massachusetts DG Interconnection Process



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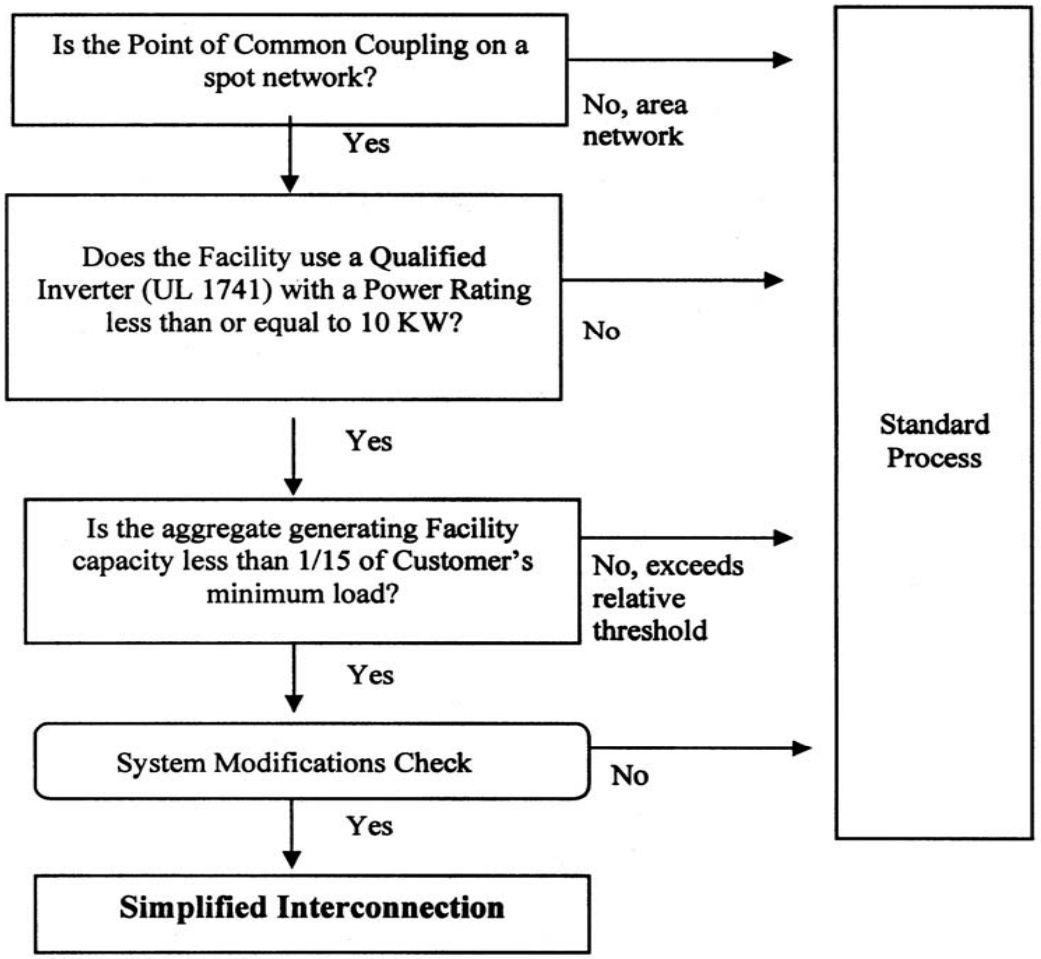
SPOT NETWORK APPLICATION PROCESS



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SPOT NETWORK CRITERIA

Is the point of common coupling on a spot network?

Does the facility use a Qualified Inverter (UL 1741) with a power rating of 10 kW or less (1Ø or 3Ø)?

Is the aggregate DG capacity less than 1/15th of the customer's minimum [daytime] load?

Check for minor system modifications

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PLANS FOR P1547.6 – DG ON NETWORKS

- **Over 30 WG members so far; utility people with protection and network knowledge, network device manufacturers, DG manufacturers, consultants & others**
- **Multiple options to be explored, e.g., more communication links, two-step protection against reverse power flow, advanced solid-state devices, and new concepts**
- **Good base of relevant publications has been assembled**
- **Meeting every six months or so; next in Las Vegas 8/3-4**

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Conclusions

- **After two years of use, DG contractors have said that the Simplified process is easy to understand and simple to carry out.**
- **For inverter-based technology, the Expedited process is almost as simple and prompt as the Simplified process.**
- **Manufacturers are aware of inverter advantages, and at least two DG companies plan to shift output from induction generators to inverters.**
- **Good experience to date has led us to include 3-phase inverters up to 25 kW in the Simplified process.**
- **Progress is being made on spot and area network distribution system interconnections through the IEEE P1457.6 Standards Working Group.**

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