

ERCOT Generation Interconnection Process and Requirements

University of Texas at Austin
2013 Renewable Energy Institute
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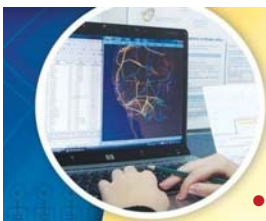
Hala N. Ballouz, P.E.

President

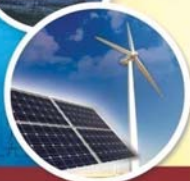
Hugo E. Mena, P.E.

Chief Engineer

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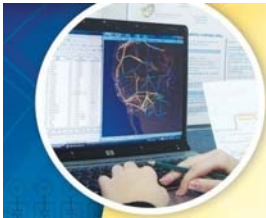
- In business since 1968
- Offers consulting services to electric utilities and private generators, in particular renewable energy generators
- Specialize in:
 - **Transmission grid deliverability analysis**
 - **Management of grid interconnection**
 - **Congestion and curtailment analysis**
 - **Market pricing and nodal analysis**
 - **Design & Equipment grid compliance**
 - **Project design/engineering/procurement**
 - **Project testing and inspection**



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Outline of Presentation

The Interconnection Process

Resource Asset Registration Forms (RARF)

Technical Grid Compliance Requirements

Demands for Due Diligence

Design Compliance Case Study Examples

Conclusion

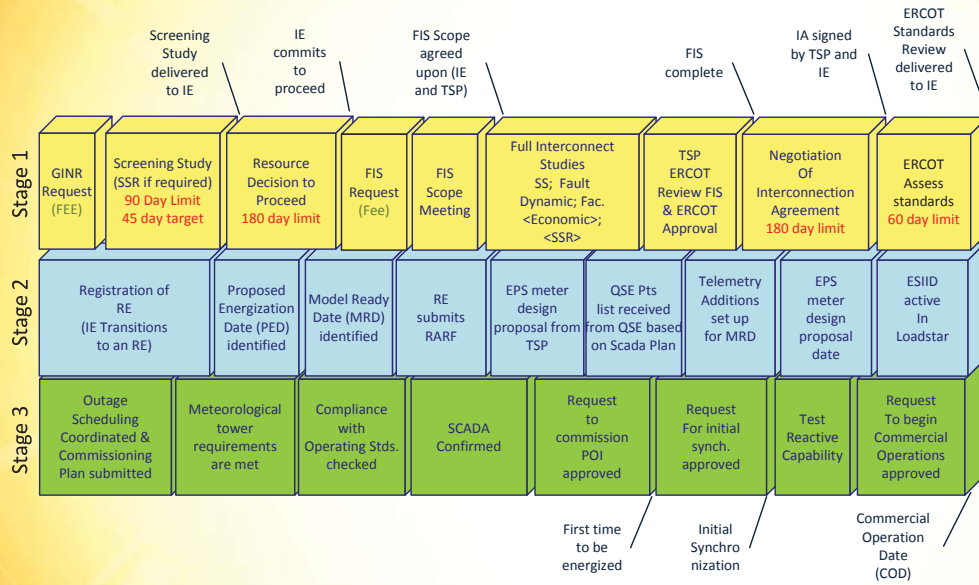


The Interconnection Process

Today's Interconnection Process is more **DEMANDING**

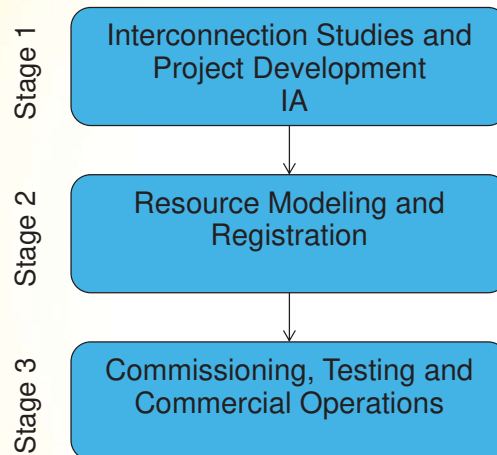
- More Technical Data Required
- Resource Data (wind and solar meteorological data)
- Commissioning Plans
- Testing (AVR, PFR, Reactive Test, Telemetry, & others)
- Stringent ERCOT review during registration

New Interconnection Process Milestones



Source: ERCOT Guide To The Interconnection Process Version 1.0

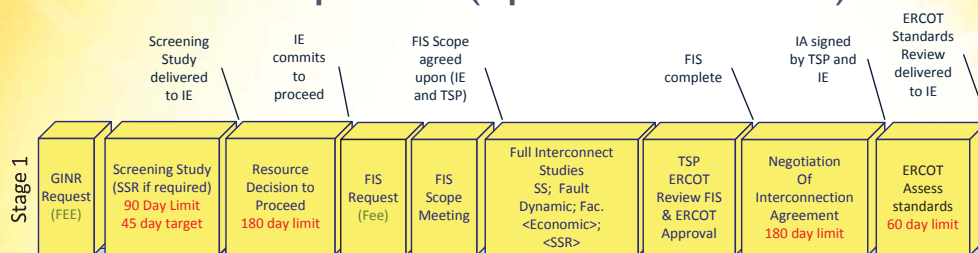
The Interconnection Process 3 Stages



Interconnection Process Milestones

- **Stage 1: Interconnection studies and project development**
 - ERCOT Screening Study (SS)
 - Full Interconnection Study (FIS)
 - Interconnection Agreement (IA)
- **Stage 2: Resource modeling and registration**
 - Resource entity registration
 - Metering and modeling data
 - RARF Submission
- **Stage 3: Commissioning, testing, and commercial operations**
 - Commissioning Plan
 - Approvals for Energization & Synchronization
 - AVR & PFR testing and approval
 - Reactive capability testing and approval
 - Approval to Begin Commercial Operations

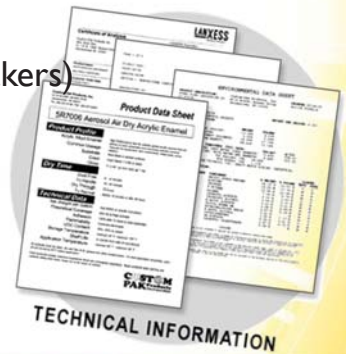
Stage 1: Interconnection studies and project development (up to 14 months)



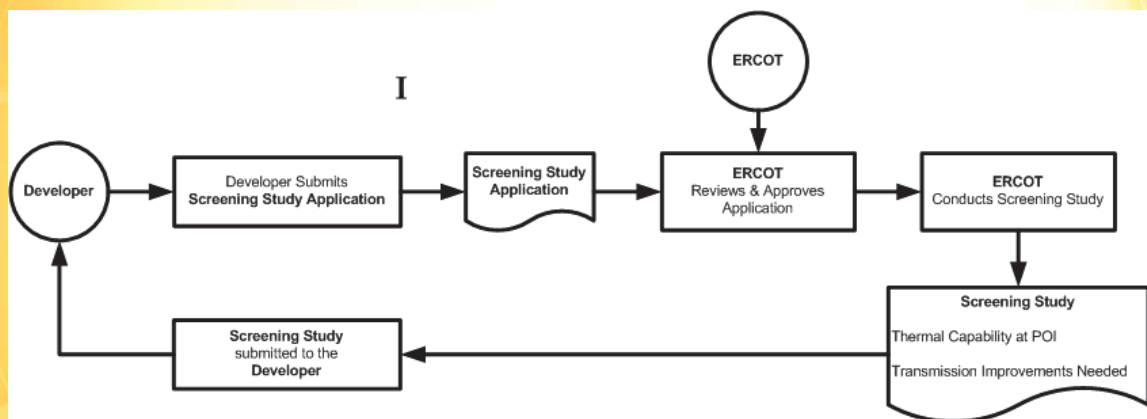
- Creation of GINR & Initial resource data submission
- ERCOT Screening Study (SS) – 3 Months
- **ERCOT SSR Study (if needed)**
- Full Interconnection Study (FIS) – 10 months
- Interconnection Agreement (IA) – 6 months
- **ERCOT Assessment - Protocol Compliance review – 3 months**

Technical Information Required in Interconnection Applications

- Plant Size in MW
- One-Line Diagram, including collector information
- Interconnection Point
- Plant/Equipment Technical Information
- Interconnection Facilities (tie line, breakers)
- Plant Model in (PSS/E or ASPEN)
- “Generator” Dynamic Models
 - PSS/E Model
 - PSCAD Model (if needed)



Stage I: Screening Study (up to 3 months)



Source: ERCOT Presentation – John Adams

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Title search: ERCOT Generation Interconnection Process and Requirements

Also available as part of the eCourse

[Texas Renewable Energy 2013: Update on ERCOT Interconnection Rules; plus Electric Regulatory Developments Involving Distributed Renewable Generation in Texas](#)

First appeared as part of the conference materials for the
2013 Renewable Energy Institute session
"Update on ERCOT Interconnection Rules"