Synchro Secure Energy Management System

- Investor Outline

This Power Point Presentation was created at the request of Mr. Arun Savkur for by:

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Website: http://ascenttrust.com

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This Power Point Presentation consists of the following Sections:

Synchro Secure Energy Management System

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  - Preamble-One

There are two interrelated events which occurred in the 2020-2021 time frame which have created an urgent need for this project. These events are:

- The cold weather shutdown of the ERCOT GRID in the winter of 2021 which caused significant stress to the Grid.
- The ransomware event of the Colonial pipeline.

The single and most important reason that a project of this **SCOPE** can be realized in the State of Texas is because the **GRID** in Texas is not under the control of any of the Federal Regulators at FERC and NERC:

- **ERCOT** is an ISO and is not interconnected to any of the other portions of the Eastern or Western Grids.

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❖ Preamble-Two

This Power Point Presentation is meant to serve as a preliminary introduction to the Synchronization and Power Factor Correction Project being proposed by the Senior Engineer of **AscenTrust, LLC.**

- ❖ The project will include the development and deployment of a Synchronous Optical Network (SONET). The basic synchronization pulses which will be used to synch the components of our Energy Delivery System will be the SONET synch pulses.
- ❖ The project will include the development and deployment of proprietary software and hardware components to the Existing SCADA Systems which are installed and Manage the ERCOT Energy Supply System
- ❖ The Project will also involve the creation of a Data Warehouse to store the massive amount of Data which will be collected by the **PHASOR MEASUREMENT UNITS (**PMU).
- ❖ The project will include the development and deployment of an Energy Management System. With the inclusion of Wind and Solar on the GRID, the need for a Global Operational View of the system has become apparent. Using PMU'S and the high speed network made possible by the use of the Synchronous Optical Network (SONET) we will be able to analyze and control the frequency and voltage of the power generating facilities.

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The primary purpose in using a Fiber optic Network as the fundamental network medium are:

- ❖ SONET/SDH in fiber optic networks is a very mature and stable technology and can easily be integrated into the SCADA Systems which control the ERCOT Grid.
- ❖ Optical fiber is immune to Electromagnetic Interference and is therefore a premier communication technology for interactions with the Electrical Grid.
- ❖ Fiber Optic cabling is now cheaper than copper and has orders of magnitude more bandwidth.
- ❖ The SONET synchronization pulses are steady to one part in 10^8
- ❖ The Senior Engineer has access to one of the SONET systems in the City of Houston.

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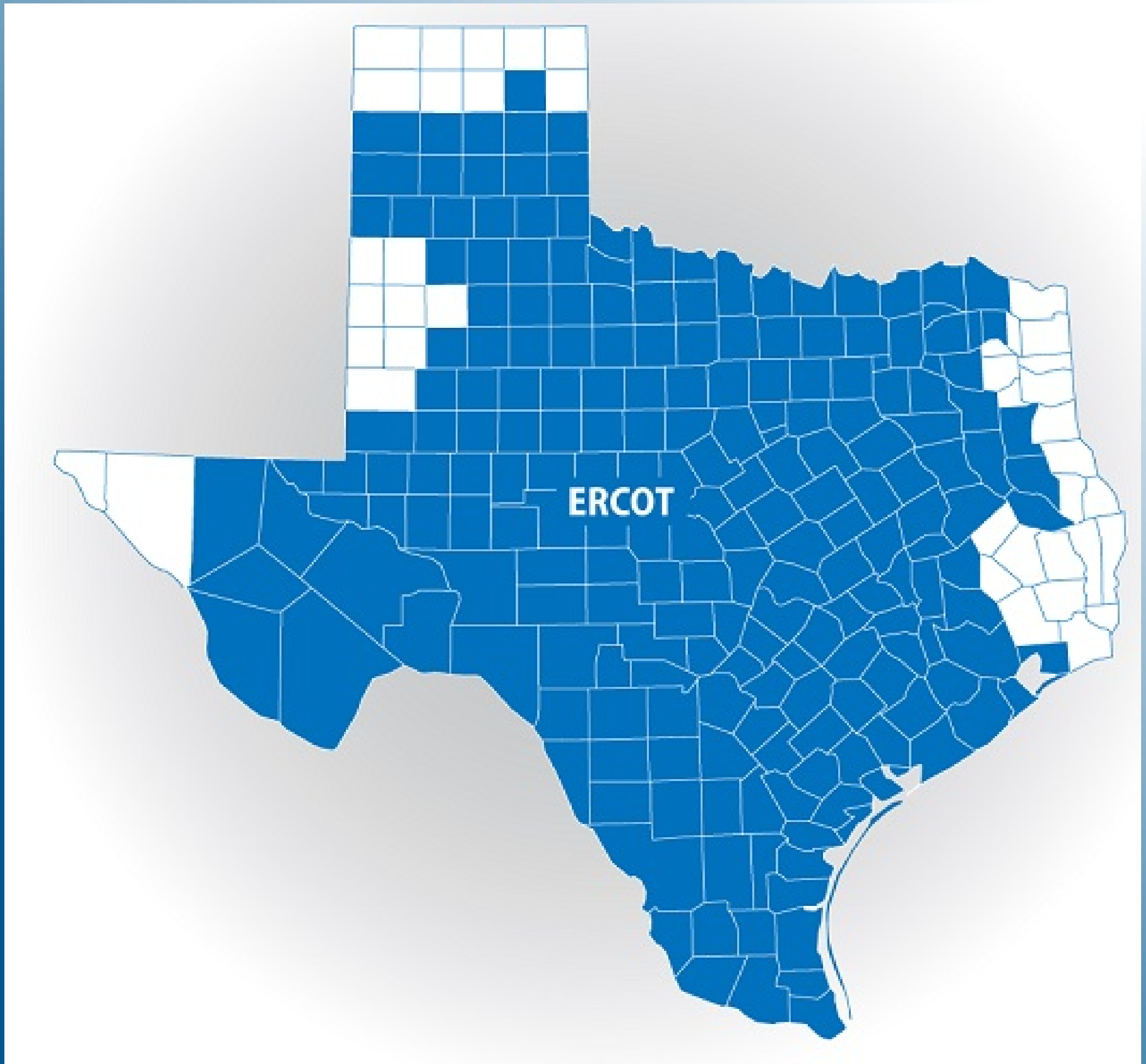
  - ❖ Part Two-ERCOT-One

The highlighted areas of the State of Texas are Counties which are in the ERCOT controlled area of Texas.



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- Investor Outline
  - Part Two-ERCOT-Two

- The **Electric Reliability Council of Texas, Inc.** (**ERCOT**) is an American organization that operates Texas's electrical grid, the Texas Interconnection, which supplies power to more than 25 million Texas customers and represents 90 percent of the state's electric load.
- ERCOT is the first independent system operator (ISO) in the United States and one of nine ISOs in North America.
- ERCOT works with the Texas Reliability Entity (TRE), one of eight regional entities within the North American Electric Reliability Corporation (NERC) that coordinate to improve reliability of the bulk power grid.
- The ERCOT area of the GRID IN Texas is completely independent of FERC (Federal Energy Regulatory Commission(FERC)and operates under the authority of the State of Texas through the Public Utility Commission (PUC).

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  - Part Two-ERCOT-Three

The United States Energy Information Administration Electric Power Monthly published the following detailed report regarding Texas' Net Generation by Energy Source: Total (All Sectors), 2010-December 2020, (Thousand Megawatthours), for the Month of December 2020:

- Coal: 78,700 MWh;
- Petroleum Liquids: 909 MWh;
- Petroleum Coke: 742 MWh;
- Natural Gas: 125,704 MWh;
- Other Gas: 972 MWh;
- Nuclear: 69,871 MWh;
- Hydroelectric Conventional: 23,086 MWh;
- Solar: 5,381 MWh;
- Renewable Sources Excluding Hydroelectric and Solar: 38,812 MWh;

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  - ❖ Part Two-ERCOT-Four

ERCOT is a membership-based 501(c)(4) nonprofit corporation, and its members include consumers, electric cooperatives, generators, power marketers, retail electric providers, investor-owned electric utilities (transmission and distribution providers), and municipally owned electric utilities.[16]

- ERCOT ISO manages the flow of electric power to 23 million Texas customers - representing 85 percent of the state's electric load.
- Performs financial settlement for the competitive wholesale bulk-power market
- Enables retail electric choice for Texas customers

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  - Part Two-ERCOT-Five

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Competitive Renewable Energy Zone (CREZ) – a geographic area in the state of Texas initially identified by AWS Truewind (as ERCOT's consultant) as an area suitable for multiple 100 MW wind development projects. Of the original 25 zones the Public Utility Commission (PUC) chose a small set based on input from potential windfarm developers.

- New CREZ 345kV lines built both inside ERCOT load-serving areas and far into areas where load is served by SPP.
- CREZ will not add any new connections between ERCOT and SPP.
- CREZ areas are Panhandle A, Panhandle B, Central, West, and McCamey.

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  - ❖ Part Two-ERCOT-Six

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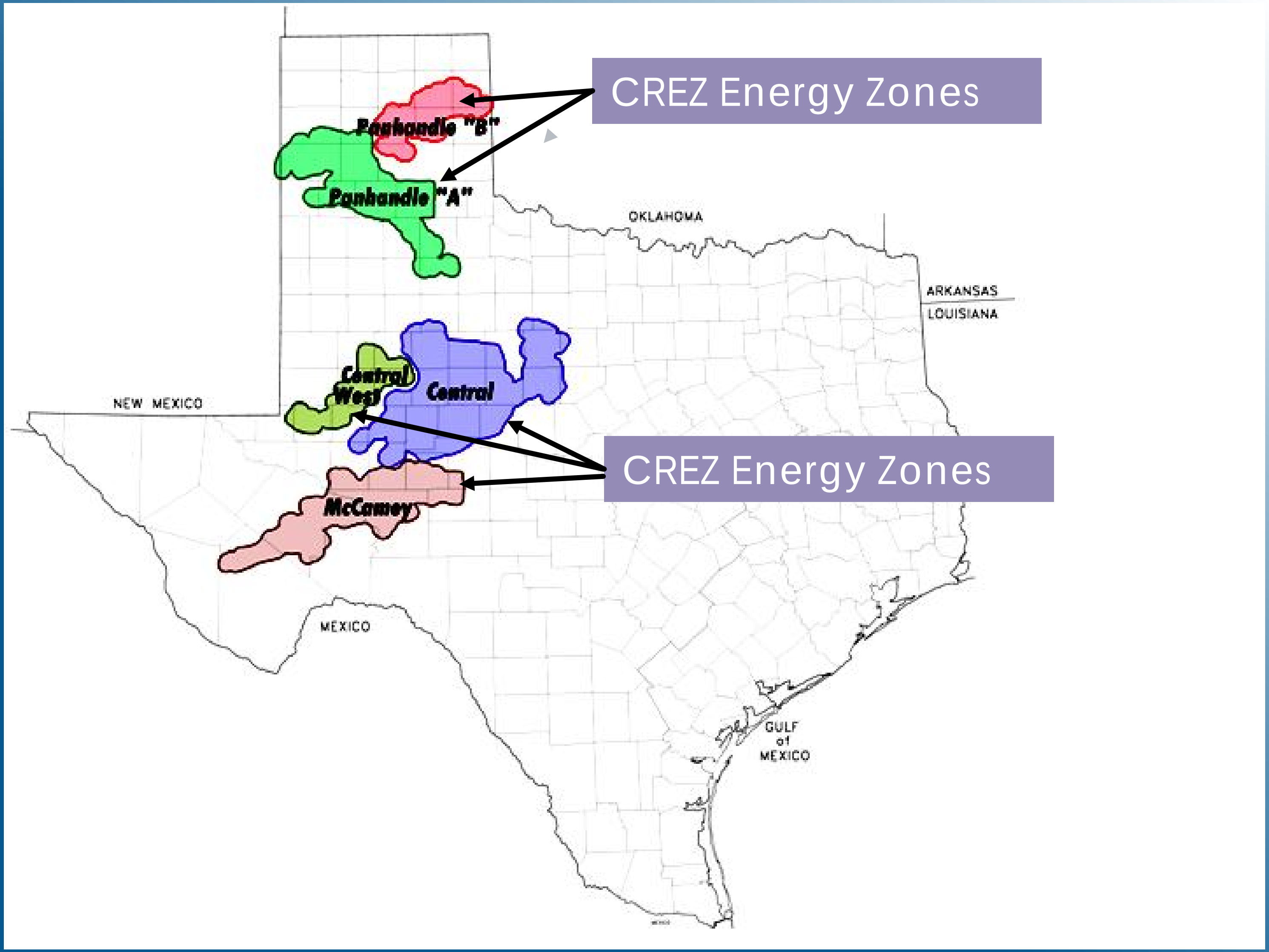

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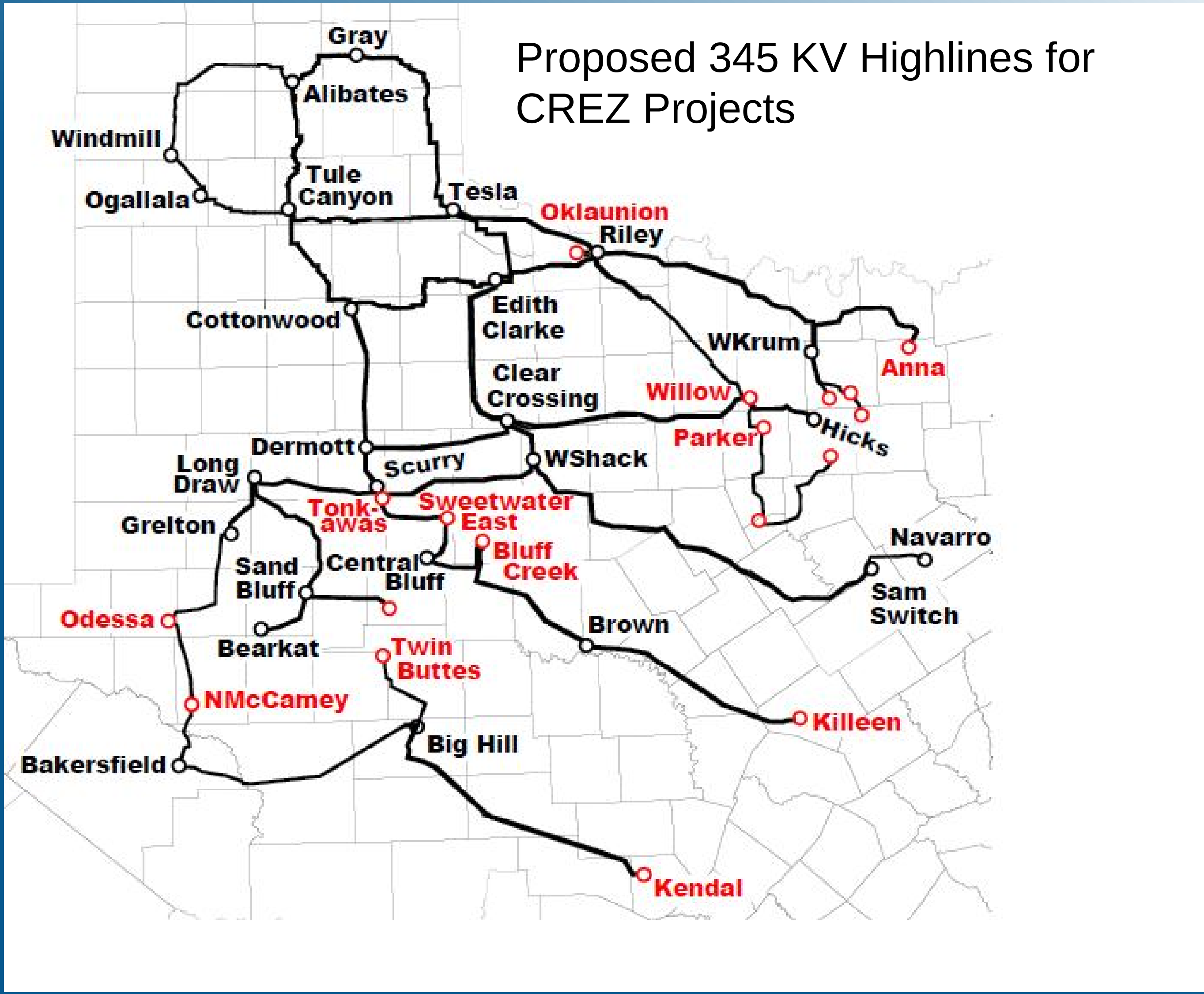
  - Part Two-ERCOT-Seven



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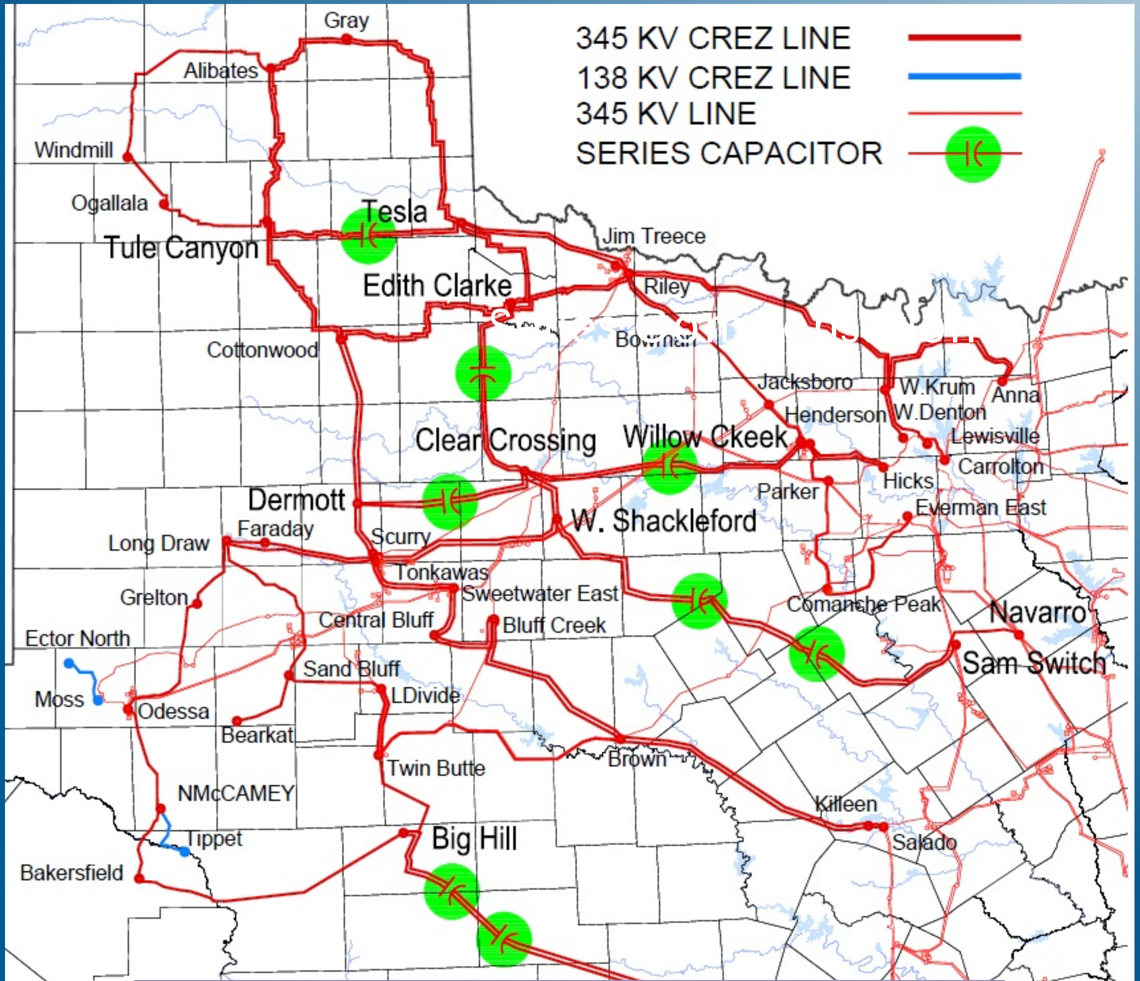
❖ Part Two-ERCOT-Eight



Series Compensation in ERCOT

- CREZ
  - Tule Canyon – Tesla
  - Edith Clarke – Clear Crossing
  - Dermott – Clear Crossing
  - West Shackleford – Sam Switch/Navarro
  - Big Hill – Kendall
  - Clear Crossing – Willow Creek (2016)
- Rio Grande Valley
  - Lon Hill – Rio Hondo
  - Lon Hill – Edinburg
  - Lobo – Edinburg (2016)
- HorseHollow GenTie

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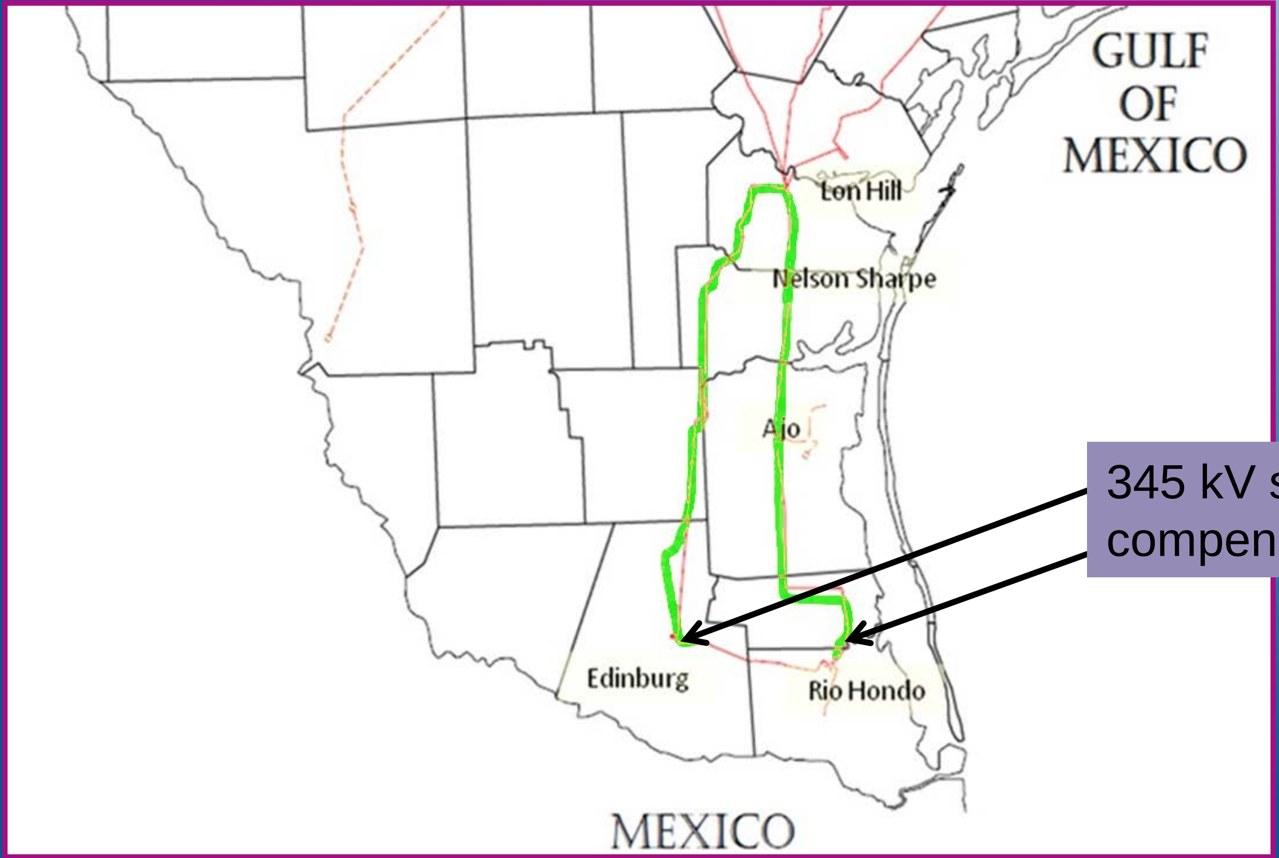
❖ Part Two-ERCOT-Nine

- Series capacitors installed on long 345 kV lines to adjust the power factor and allow full loading.
- 1,000 MW of wind farms connected to Ajo.



345 kV series compensated lines

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  - ❖ Part Two-ERCOT-Ten

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This simple test is performed by inspection: Does it take ten or fewer outages to make a generator radial to a series cap? This test will clear many projects, especially those far from the series capacitors and those connecting to the lower voltage network.

This tests whether the network electrical characteristics are conducive to resonance. ERCOT performs this test as part of the transmission planning and GINR process.

This tests the affected outage combinations to see whether they solve in a min load case. If the case doesn't solve or has many overloads, the outage isn't credible.

If credible SSR risk exists, then a study should be performed. In lieu of a study, generator resources may obtain a letter from their manufacturer or they may also rework their proposed interconnection to reduce risk exposure.

TOPOLOGY TEST
TEN or less
contingencies to radial?

↓

ERCOT SSO Screening
Grid-side frequency scan shows risk?
At 6 or fewer concurrent outages?

↓

POWER-FLOW TEST
Outage combination solves in
steady-state w/ few overloads?

↓

DETAILED STUDY REQUIRED
Or rework the proposed interconnection.
Or obtain letter from gen. manufacturer.

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❖ Part Three-Key Players in Energy Market

There are several groups or organizations that are involved in monitoring, maintaining, regulating and selling energy in Texas. These key players include:

- **Public Utility Commission of Texas:** The PUC of Texas is responsible for maintaining and enforcing regulations surrounding the generation, transmission and supply of electricity. It also offers customer service related to its services in order to resolve disputes between consumers, utilities or REPs.
- **Electric Reliability Council of Texas (ERCOT):** This council manages and maintains the flow of electricity from the Texas Interconnection and handles 85% of Texas' electric load. **ERCOT** also helps to supply 24 million Texans with stable electricity and is managed by the Public Utility Commission of Texas, in response to Texas Legislature. Major cities within **ERCOT**'s service areas include, Houston, Fort Worth, Dallas, San Antonio, Corpus Christi, Midland and more.
- **Utilities:** **A** utility is primarily responsible for the generation and distribution of electricity within all spaces: residential, commercial, industrial, etc. There are several major utilities in Texas. A few examples of these utilities include, Oncor Energy, NRG, TXU Energy, and Texas New Mexico Power. Not all utilities provide electricity services to all cities within the state.
- **Electric Cooperatives (Co-ops):** Co-ops provide electricity to residential customers via low-voltage power lines. In Texas, co-ops are a part of the Texas Electric Cooperatives (TEC). It includes, 11 generation and transmission and 64 distribution cooperatives. Established in 1941, TEC continues to operate today, with a focus on 7 principles including, voluntary and open membership, democratic member control, members' economic participation, autonomy and independence, education, training and information, cooperation amongst cooperatives, and concern for community.

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❖ Part Four-Synchronization-One

❖ Introduction to Synchronization-One

In an alternating current electric power system, **synchronization** is the process of matching the frequency of a generator or other source to a running network. An AC generator cannot deliver power to an electrical grid unless it is running at the same frequency as the network. If two unconnected segments of a grid are to be connected to each other, they cannot exchange AC power until they are brought back into exact synchronization.

There are five conditions that must be met before the synchronization process takes place. The source (generator or sub-network) must have equal line voltage, frequency, phase sequence, phase angle, and waveform to that of the system to which it is being synchronized.

Waveform and phase sequence are fixed by the construction of the generator and its connections to the system. During installation of a generator, careful checks are made to ensure the generator terminals and all control wiring is correct so that the order of phases (phase sequence) matches the system. Connecting a generator with the wrong phase sequence will result in a short circuit as the system voltages are opposite to those of the generator terminal voltages.[2]

The voltage, frequency and phase angle must be controlled each time a generator is to be connected to a grid.

Generating units for connection to a power grid have an inherent droop speed control that allows them to share load proportional to their rating.

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- ❖ Investor Outline
  - ❖ Part Four-Synchronization-Two
    - ❖ Synchronous Machines-Two

Electric power transmission is the bulk movement of electrical energy from a generating site (power plant), to an electrical substation. The interconnected lines which facilitate this movement are known as a *transmission network*. This is distinct from the local wiring between high-voltage substations and customers, which is typically referred to as electric power distribution. The combined transmission and distribution network is part of electricity delivery, known as the electrical grid.

Efficient long-distance transmission of electric power requires high voltages. This reduces the losses produced by heavy current. Transmission lines use high-voltage alternating current. The voltage level is changed with transformers, stepping up the voltage for transmission, then reducing voltage for local distribution and then use by customer

The wide area synchronous grid of Texas, also known as an "interconnection" directly connects many generators delivering AC power with the same relative *frequency* to many consumers. This GRID falls under the jurisdiction of the PUC of Texas and the Electric Reliability Council of Texas (ERCOT) grid).

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  - ❖ Part Four-Synchronization-Three
    - ❖ Synchronous Machines-Three

A synchronous generator is an electrical generator that converts mechanical energy to electrical energy in the form of alternating current. Due to the need for frequency stability in the production of three phase electrical power, most alternators use a rotating magnetic field with a stationary armature. Occasionally, a linear alternator or a rotating armature with a stationary magnetic field is used.

In principle, any AC electrical generator can be called an alternator, but usually the term refers to small rotating machines driven by automotive and other internal combustion engines.

Alternators in power stations driven by steam turbins are called synchronous generators. Large 50 or 60 Hz three-phase alternators in power plants generate most of the world's electric power, which is distributed by electric power grids.

On large generators, brushless exciters are used.

- A brushless exciter is a small AC generator whose field circuits are mounted on the stator and armature circuits are mounted on the rotor shaft.
- The exciter generator's 3-phase output is rectified to DC by a 3-phase rectifier (mounted on the shaft) and fed into the main DC field circuit.
- It is possible to adjust the field current on the main machine by controlling the small DC field current of the exciter generator (located on the stator).

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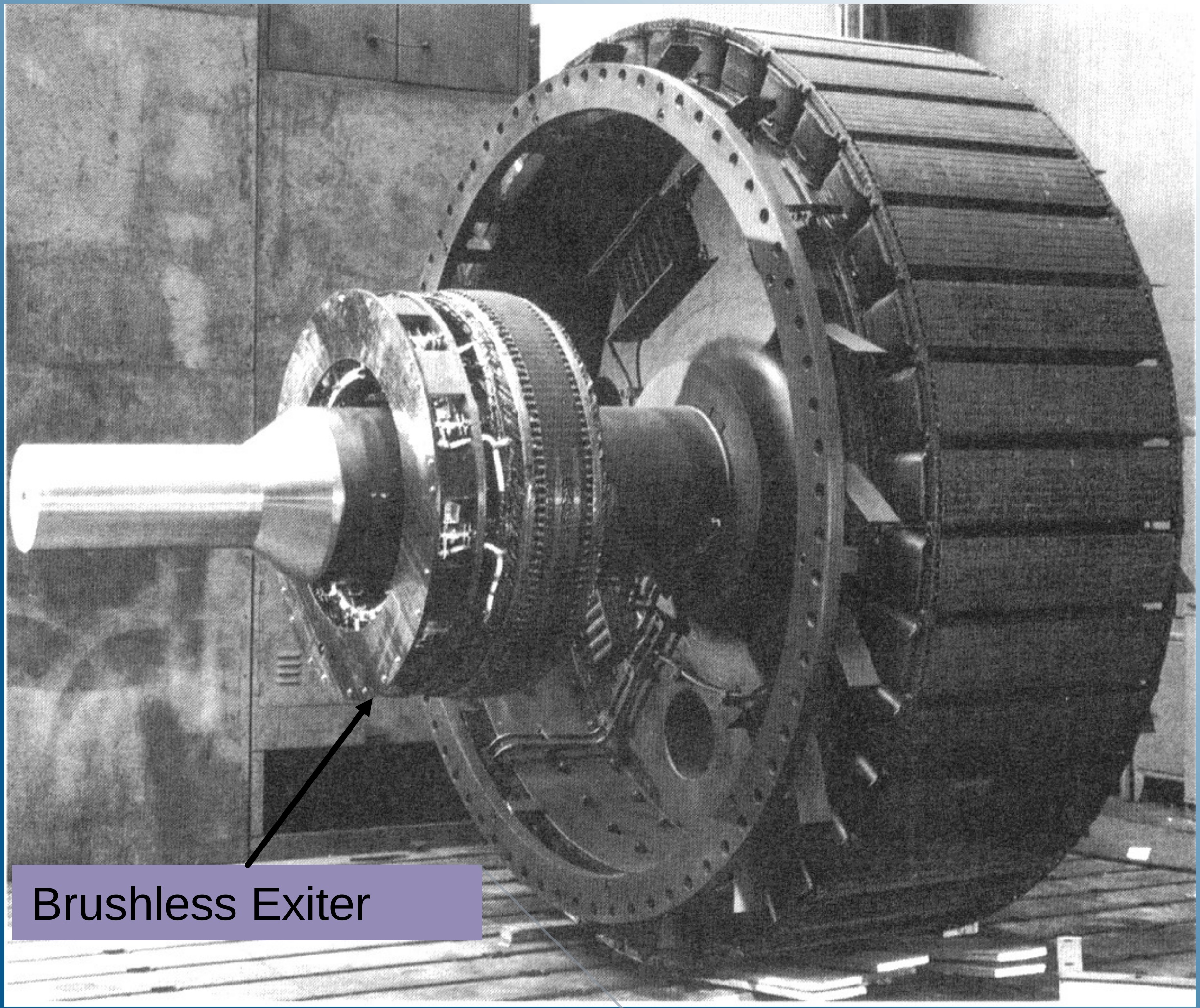
  - Part Four-Synchronization-Five
    - Synchronous Machines-Five

A rotor of a large synchronous machine with a brushless exciter mounted on the same shaft.

The rotor has a high inertial mass by which it can easily neutralize the impact of faults on the fundamental frequency.



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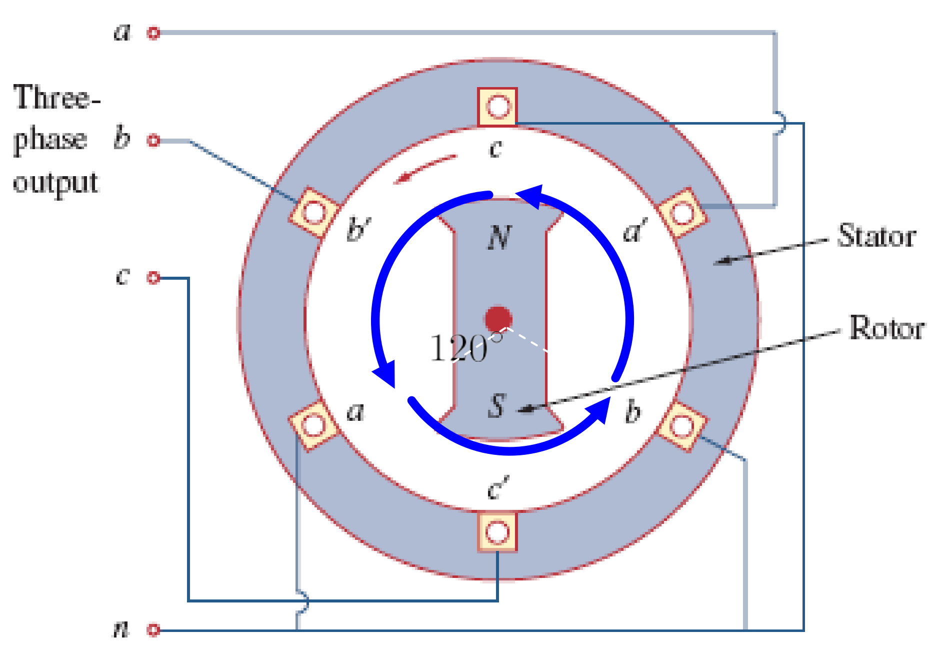
  - Part Four-Synchronization-Six
    - Synchronous Machines-Six

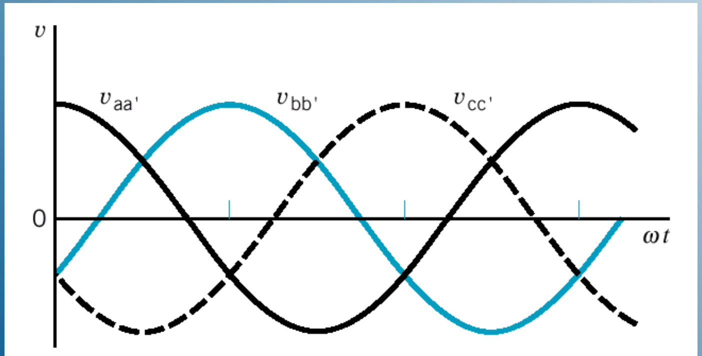
Three-phase voltage ia generated by Flux Linkage from the spinning rotor to the coils in the stator.

$$V_{aa'} = \sqrt{2}V \cos \omega t$$

$$V_{bb'} = \sqrt{2}V \cos(\omega t - 120°)$$

$$V_{cc'} = \sqrt{2}V \cos(\omega t - 240°)$$





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  - Part Four-Synchronization-Seven
    - Synchronous Machines-Seven

- A synchronous generator operating at a lagging power factor has a fairly large positive voltage regulation.
- A synchronous generator operating at a unity power factor has a small positive voltage regulation.
- A synchronous generator operating at a leading power factor often has a negative voltage regulation.

Normally, a constant terminal voltage supplied by a generator is desired. Since the armature reactance cannot be controlled, an obvious approach to adjust the terminal voltage is by controlling the internal generated voltage $E_A = K\phi\omega$. This may be done by changing flux in the machine while varying the value of the field resistance R_F, which is summarized:

1. Decreasing the field resistance increases the field current in the generator.
2. An increase in the field current increases the flux in the machine.
3. An increased flux leads to the increase in the internal generated voltage.
4. An increase in the internal generated voltage increases the terminal voltage of the generator.

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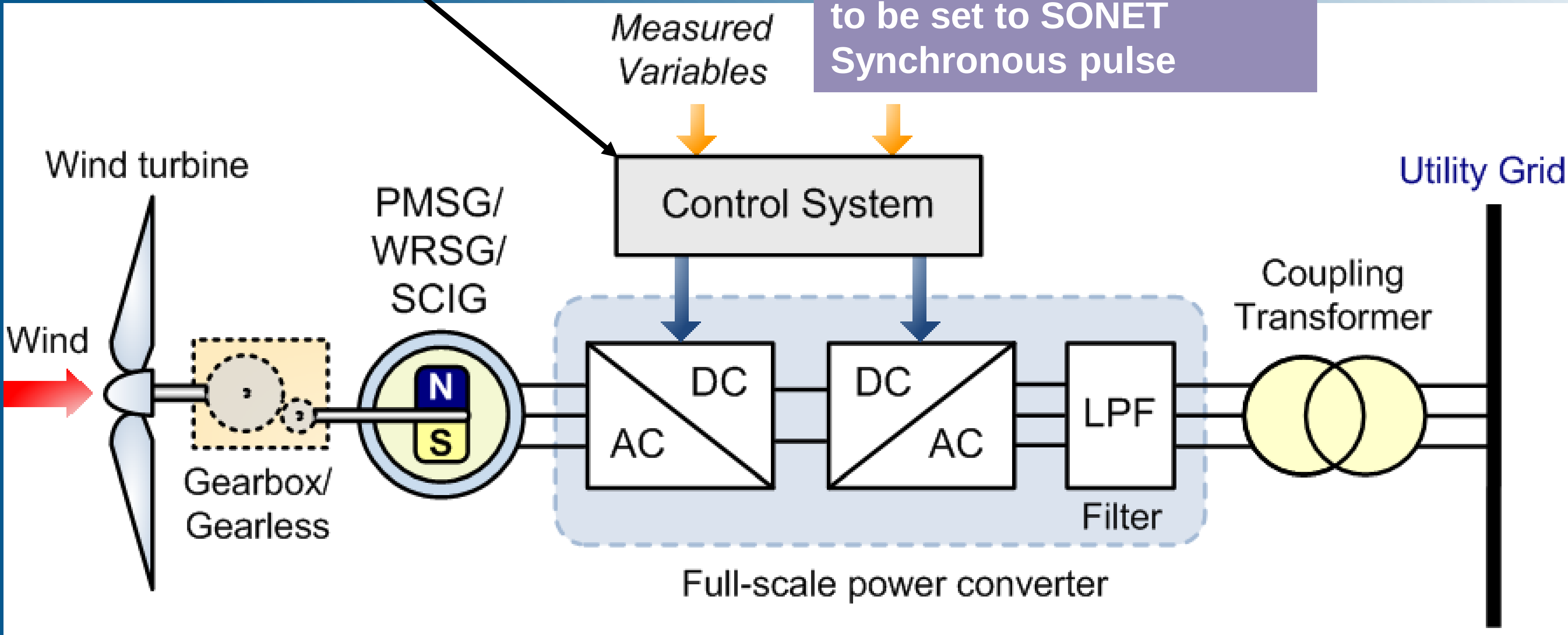
  - Part Four-Synchronization-Eight
    - Wind Turbine

For the Wind Turbine Three-phase voltage Synchronization will occur within the Control System in the nacelle.

Note: Reference frequency in Synchronization Project to be set to SONET Synchronous pulse



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  - Part Four-Synchronization-Nine
    - SONET-One

Synchronous optical networking (**SONET**) and **synchronous digital hierarchy** (**SDH**) are standardized protocols that transfer multiple digital bit streams synchronously over optical fiber using lasers or highly coherent light from light-emitting diodes (LEDs). At low transmission rates data can also be transferred via an electrical interface. The method was developed to replace the digital hierarchy (PDH) system for transporting large amounts of telephone calls and data traffic over the same fiber without the problems of synchronization.

Clock sources used for synchronization in telecommunications networks are rated by quality, commonly called a *stratum*. Typically, a network element uses the highest quality stratum available to it, which can be determined by monitoring the synchronization status messages (SSM) of selected clock sources.

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Part Four-Synchronization-Ten

SONET-Two

- SONET was designed with definite layering concepts
- Physical layer – optical fiber (linear or ring)
  - when exceed fiber reach – regenerators
  - regenerators are not mere amplifiers,
  - regenerators use their own overhead
  - fiber between regenerators called section (regenerator section)
- Line layer – link between SONET muxes (**A**dd/**D**rop **M**ultiplexers)
  - input and output at this level are **V**irtual **T**ributaries (**VC**s)
  - actually 2 layers
    - lower order VC (for low bitrate payloads)
    - higher order VC (for high bitrate payloads)
- Path layer – end-to-end path of client data (tributaries)
  - client data (payload) may be
    - PDH
    - ATM
    - packet data

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  - Part Four-Synchronization-Eleven
    - SCADA-One

SCADA is an acronym for Supervisory Control and Data Acquisition.

- SCADA systems are very important in the monitoring and controlling of the Electrical Infrastructure commonly referred as the GRID.
- SCADA systems are also used to monitor and control a plant or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining and transportation.
- These systems encompass the transfer of data between a SCADA central host computer and a number of **Remote Terminal Units** (RTUs), **Programmable Logic Controllers** (PLCs), **Intelligent Electronic Devices** (IEDs) **Phasor Measuring Unit** (PMUs), and the central host and the operator terminals.
- SCADA system are used to monitor and control all aspects of the production facilities, substations, transmission lines and distribution facilities.

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  - Part Four-Synchronization-Twelve
    - SCADA-Two

- Originally electrical power units used electro-mechanical automation
- Dial-up modems used for remote access
- In 1970s computer-based SCADA commenced
- Suppliers (e.g. IBM, Siemens, GE) supplied complete proprietary systems
- More advanced with client-server computers
- Advanced functions became common (e.g. EMS. DMS, load forecasting, dispatch, protection engineering, regulatory reporting, etc)
- Communication link evolved from noisy narrow bandwidth telephone lines to sonet, Microwave, radio, power line carrier, cellular networks

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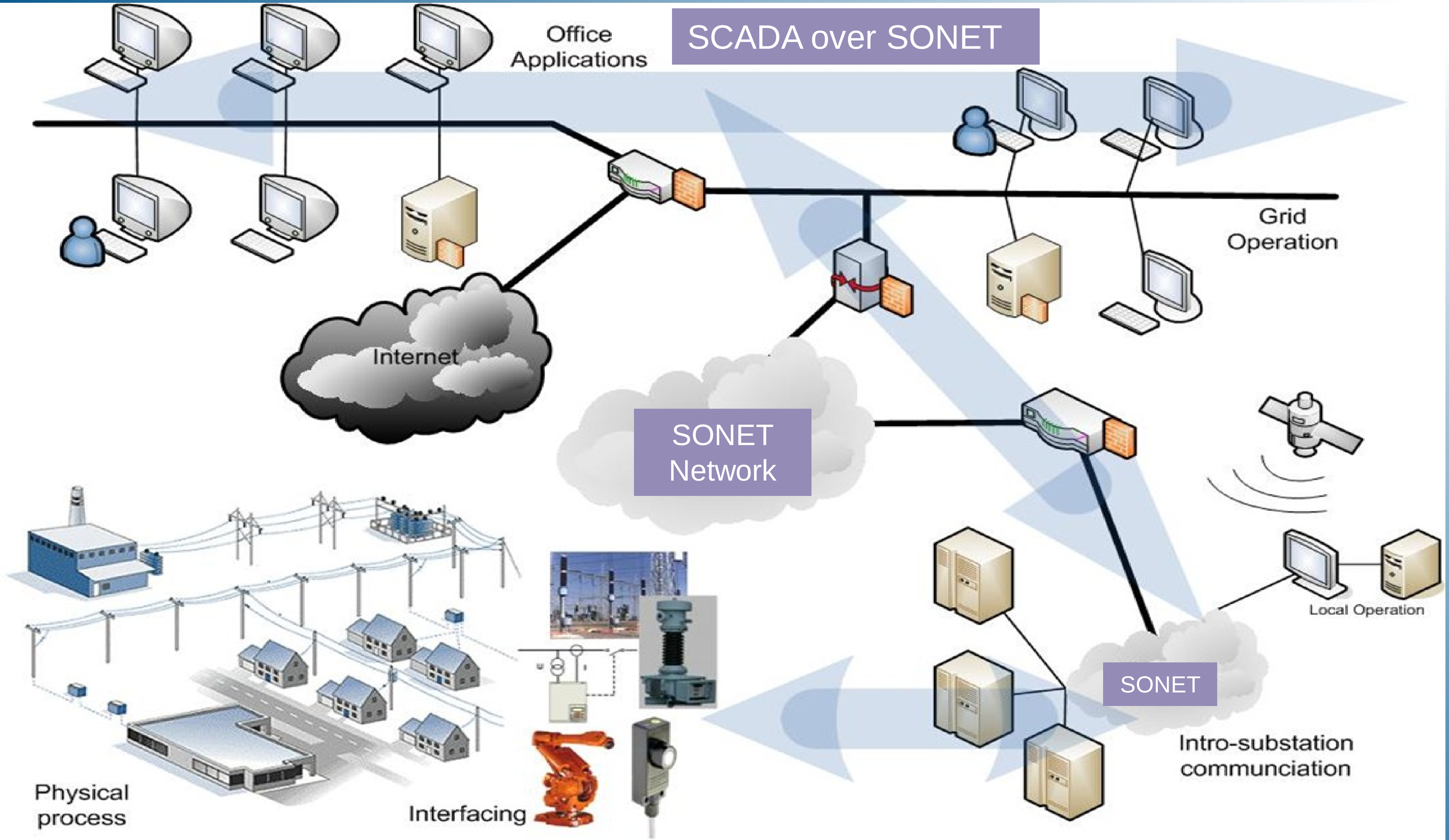
- ❖ Investor Outline
  - ❖ Part Four-Synchronization-Thirteen
    - ❖ SCADA-Three



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  - ❖ Part Four-Synchronization-Fourteen
    - ❖ SCADA-Four

Complex SCADA Systems such as those used in controlling the Electrical Generation and distribution systems contain the following Subsystems:

- ❖ Remote Terminal Units (RTUs)
- ❖ Programmable Logic Controllers (PLCs)
- ❖ Intelligent Electronic Devices (IEDs)
- ❖ Phasor Measurement Units (PMUs)
- ❖ Communication Systems: Modern SCADA uses mostly the TCP/IP (Internet) Protocol
- ❖ Master Station AND Human Machine Interface (HMI)

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  - ❖ Part Four-Synchronization-Fifteen
    - ❖ SCADA-Five-Remote Terminal Units

REMOTE TERMINAL UNITS

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  - Part Four-Synchronization-Sixteen
    - SCADA-Six-Programmable Logic Controler

A **programmable logic controller** (**PLC**) or **programmable controller** is an industrial computer that has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, machines, robotic devices, or any activity that requires high reliability, ease of programming, and process fault diagnosis. The PLC provided several advantages over earlier automation systems. It tolerated the industrial environment better than computers and was more reliable, compact and required less maintenance than relay systems. It was easily extensible with additional I/O modules, while relay systems required complicated hardware changes in case of reconfiguration. This allowed for easier iteration over manufacturing process design.

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  - Part Four-Synchronization-Seventeen
    - SCADA-Seven-Programmable Logic Controller

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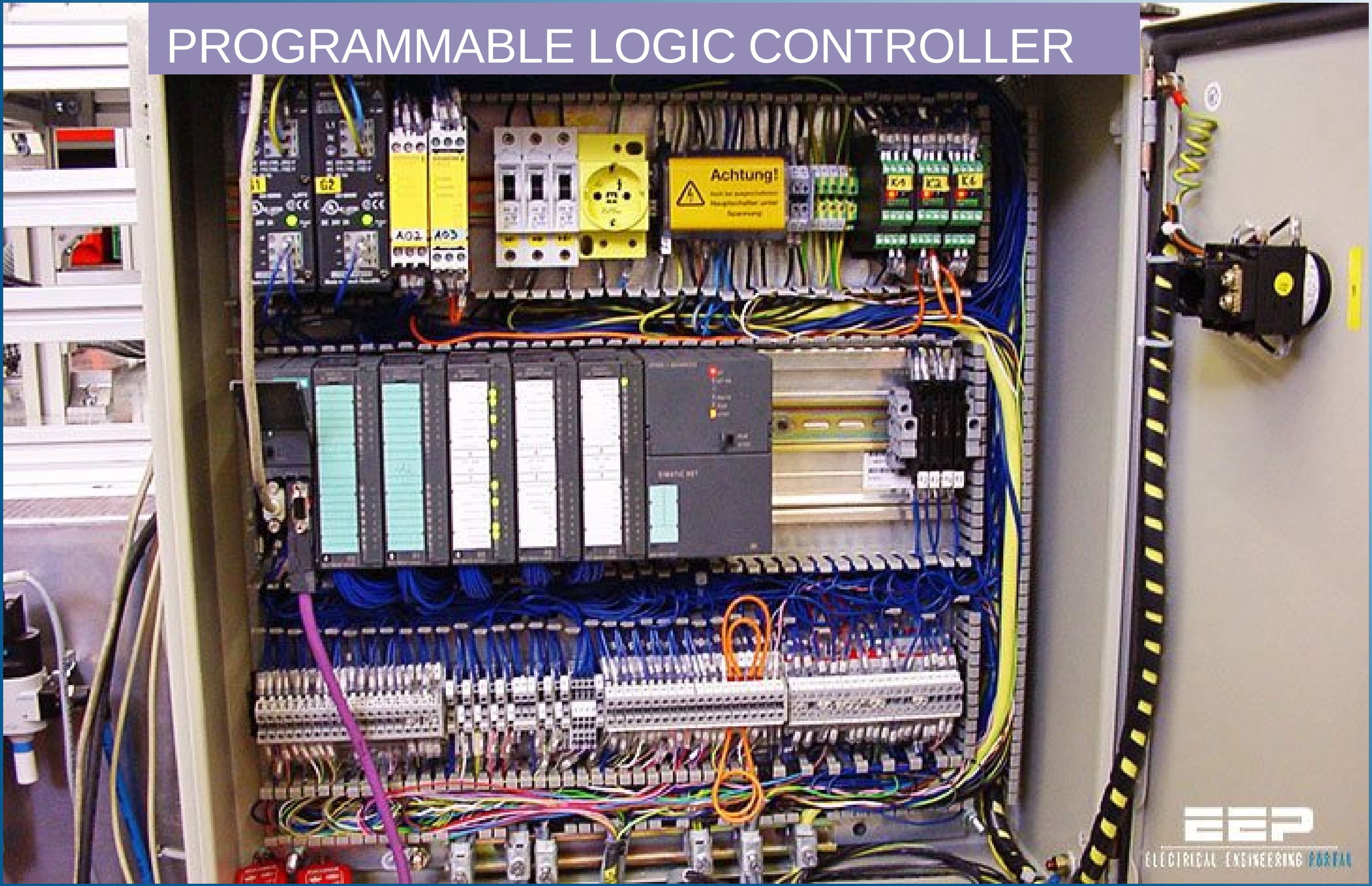
PROGRAMMABLE LOGIC CONTROLLER



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  - Part Four-Synchronization-Eighteen
    - SCADA-Eight-Intelligent Electronic Device-One

IEDs receive data from sensors and power equipment and can issue control commands, such as tripping circuit breakers if they sense voltage, current, or frequency anomalies, or raise/lower tap positions in order to maintain the desired voltage level. Common types of IEDs include protective relaying devices, tap changer controllers, circuit breaker controllers, capacitor bank switches, recloser controllers, voltage regulators etc. This is generally controlled by a setting file. The testing of setting files is typically one of the most time-consuming roles of a protection tester.

IEDs are used as a more modern alternative to, or a complement of, setup with traditional remote terminal units (RTUs). Unlike the RTUs, IEDs are integrated with the devices they control and offer a standardized set of measuring and control points that is easier to configure and require less wiring. Most IEDs have a communication port and built-in support for standard communication protocols (DNP3, IEC104 or IEC61850), so they can communicate directly with the SCADA system or a substation programmable logic controller. Alternatively, they can be connected to a substation RTU that acts as a gateway towards the SCADA server.

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  - Part Four-Synchronization-Nineteen
    - SCADA-Nine-Intelligent Electronic Device-Two

Intelligent Electronic Device

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  - Part Four-Synchronization-Twenty
    - SCADA-Ten-Central Host Computer

The supervisory computer is the core of the SCADA system, gathering data on the process and sending control commands to the field connected devices. It refers to the computer and software responsible for communicating with the field connection controllers, which are RTUs and PLCs, and includes the HMI software running on operator workstations. In smaller SCADA systems, the supervisory computer may be composed of a single PC, in which case the HMI is a part of this computer. In larger SCADA systems, the master station may include several HMIs hosted on client computers, multiple servers for data acquisition, distributed software applications, and disaster recovery sites. To increase the integrity of the system the multiple servers will often be configured in a dual-redundant or hot-standby formation providing continuous control and monitoring in the event of a server malfunction or breakdown.

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  - Part Four-Synchronization-Twenty-One
    - SCADA-Eleven-Application Server-One

Application servers provide the computing platform for the SCADA System, included servers are:

- Real-time database
- Historical database
- Energy Management applications
  - State Estimation
  - Optimal/Dispatcher Powerflow
  - Voltage Stability Assessment
  - Etc....
- Geographic Information Systems
  - Distribution Management

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  - Part Four-Synchronization-Twenty-Two
    - SCADA-Twelve-Application Server-Two

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  - Part Four-Synchronization-Twenty-Three
    - SCADA-Thirteen-Application Server-Three

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  - Part Four-Synchronization-Twenty-Four
    - SCADA-Fourteen-Human Machine Interface-One

The human-machine interface (HMI) is the operator window of the supervisory system. It presents grid status information to the operating personnel graphically in the form of mimic diagrams, which are a schematic representation of those subsystems of the GRID being controlled. The HMI is linked to the SCADA supervisory computer to provide live data to drive the mimic diagrams, alarm displays and trending graphs. In many installations the HMI is the graphical user interface for the operator, collects all data from external devices, creates reports, performs alarming, sends notifications, etc. Mimic diagrams consist of line graphics and schematic symbols to represent process elements, or may consist of digital photographs of the process equipment overlain with animated symbols.

Supervisory operation of the SYSTEM is by means of the HMI, with operators issuing commands using mouse pointers, keyboards and touch screens. For example, a symbol of a pump can show the operator that the pump is running, and a flow meter symbol can show how much fluid it is pumping through the pipe. The operator can switch the pump off from the mimic by a mouse click or screen touch. The HMI will show the flow rate of the fluid in the pipe decrease in real time.

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  - Part Four-Synchronization-Twenty-Five
    - SCADA-Fifteen-Human Machine Interface-Two

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  - Part Four-Synchronization-Twenty-Six
    - Phasor Measurement Unit-One

A **phasor measurement unit** (PMU) is a device used to estimate the magnitude and phase angle of an electrical phasor quantity (such as voltage or current) in the electricity grid using a common time source for synchronization. Time synchronization is usually provided by GPS or IEEE 1588 Precision Time Protocol, which allows synchronized real-time measurements of multiple remote points on the grid. PMUs are capable of capturing samples from a waveform in quick succession and reconstructing the phasor quantity, made up of an angle measurement and a magnitude measurement. The resulting measurement is known as a **synchrophasor**

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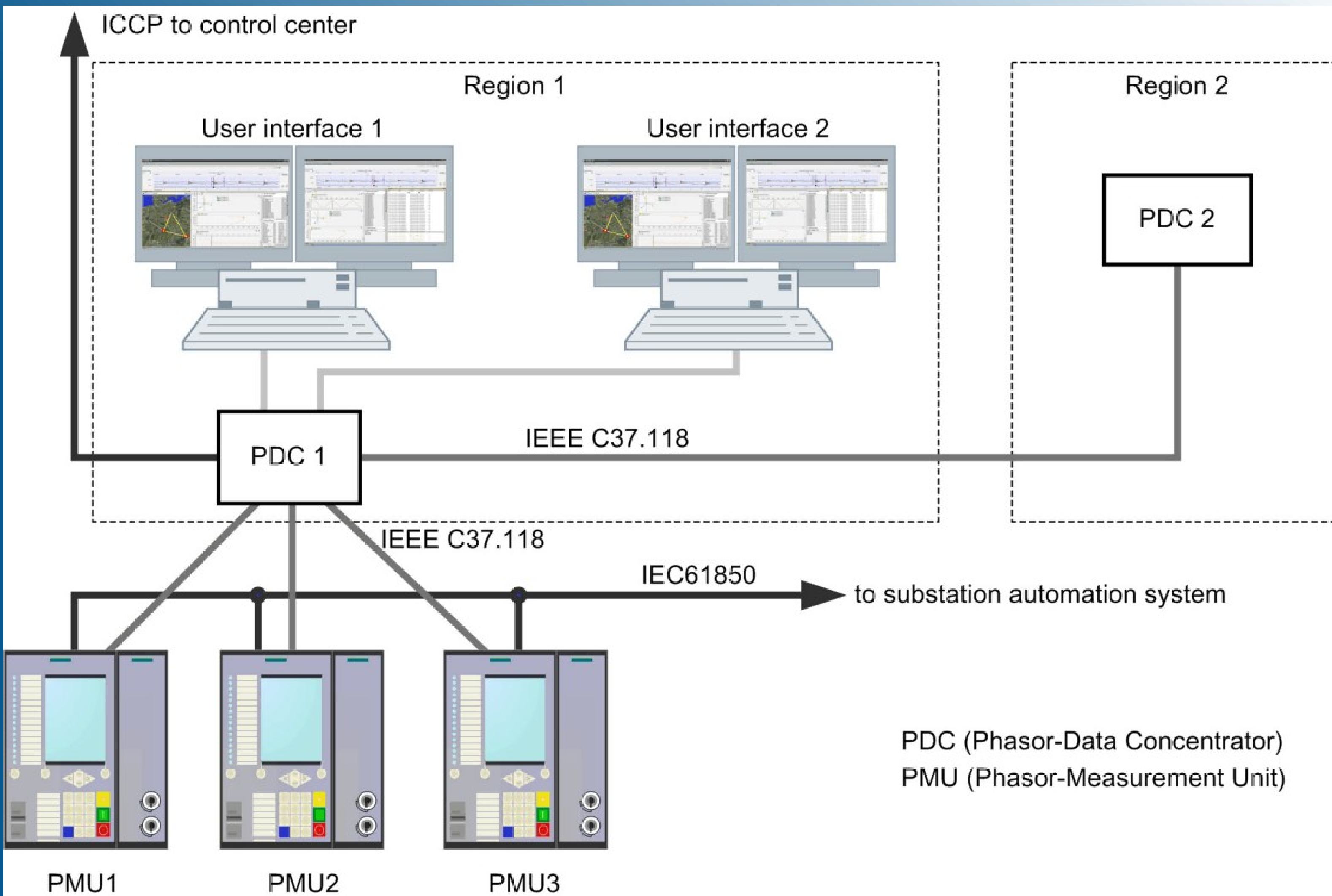
  - Part Four-Synchronization-Twenty-Seven
    - Phasor Measurement Unit-Two



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  - Part Four-Synchronization-Twenty-Eight
    - Phasor Measurement Unit-Three

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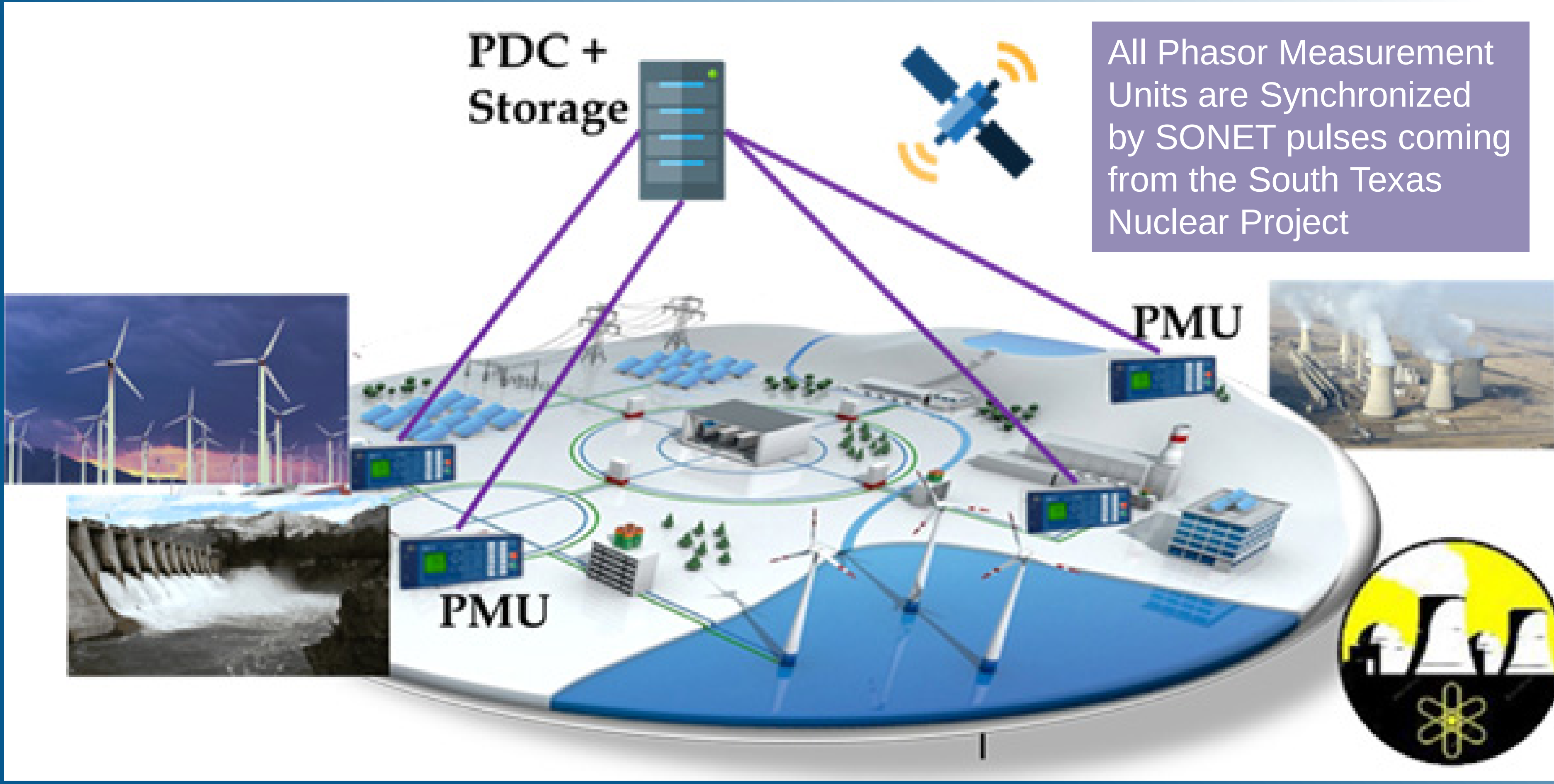

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  - ❖ Part Four-Synchronization-Twenty-Nine
    - ❖ Phasor Measurement Unit-Four

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- Investor Outline
  - Part Five-Power Factor Adjustment-One

The **power factor** of an AC transmission system is defined as the ratio of the *real power* to the *apparent power* flowing in the transmission line. A power factor of less than one indicates the voltage and current are not in phase.

Real power is the instantaneous product of voltage and current and represents the capacity of the electricity for performing work. Apparent power is the product of RMS (Root Mean Square) current and voltage. Due to energy stored in the load and system and returned to the source, or due to a non-linear load that distorts the wave shape of the current drawn from the source, the apparent power may be greater than the real power. A negative power factor occurs when the device (which is normally the load) generates power, which then flows back towards the source.

Power factor correction brings the power factor of an AC power circuit closer to 1 by supplying or absorbing reactive power, adding capacitors or inductors that act to cancel the inductive or capacitive effects of the load, respectively. In the case of offsetting the inductive effect of motor loads, capacitors can be locally connected. These capacitors help to generate reactive power to meet the demand of the inductive loads. This will keep the reactive power from having to flow all the way from the utility generator to the load. In the electricity industry, inductors are said to consume reactive power and capacitors are said to supply it, even though reactive power is just energy moving back and forth on each AC cycle.

Synchro Secure Energy Management System

- Investor Outline
  - Part Five-Power Factor Adjustment-Two

An **automatic power factor correction unit** consists of a number of capacitors that are switched by means of contactors. These contactors are controlled by a regulator that measures power factor in an electrical network. Depending on the load and power factor of the network, the power factor controller will switch the necessary blocks of capacitors in steps to make sure the power factor stays above a selected value.

In place of a set of switched capacitors, an unloaded synchronous motor can supply reactive power. The reactive power drawn by the synchronous motor is a function of its field excitation. It is referred to as a **synchronous condenser**. It is started and connected to the electrical network. It operates at a leading power factor and puts vars onto the network as required to support a system's voltage or to maintain the system power factor at a specified level.

The synchronous condenser's installation and operation are identical to those of large electric motors. Its principal advantage is the ease with which the amount of correction can be adjusted; it behaves like a variable capacitor. Unlike with capacitors, the amount of reactive power supplied is proportional to voltage, not the square of voltage; this improves voltage stability on large networks. Synchronous condensers are often used in connection with high-voltage direct-current transmission projects.

Synchro Secure Energy Management System

- ❖ Investor Outline
  - ❖ Part Six-Energy Management Systems-One

Energy Management System

An **Energy Management System** (**EMS**) is a system of computer-aided tools used by operators of electric utility grids to monitor, control, and optimize the performance of the generation or transmission system.

Up to the early 1990s it was common to find EMS systems being delivered based on proprietary hardware and operating systems. Back then EMS suppliers such as Harris Controls (now GE), Hitachi, Cebyc, Control Data Corporation, Siemens and Toshiba manufactured their own proprietary hardware. EMS suppliers that did not manufacture their own hardware often relied on products developed by Digital Equipment, Gould Electronics and MODCOMP. The VAX 11/780 from Digital Equipment was a popular choice amongst some EMS suppliers.

EMS systems now rely on a model based approach. Traditional planning models and EMS models were always independently maintained and seldom in synchronism with each other. Using EMS software allows planners and operators to share a common model reducing the mismatch between the two and cutting model maintenance by half.

Synchro Secure Energy Management System

- Investor Outline
  - Part Six-Energy Management Systems-Two

ENERGY MANAGEMENT FRAMEWORK

The EMS framework to be developed includes transmission operations management in coordination with generation operational management with the necessary simulation tools and energy services, assisted by the Data acquisition and SCADA systems. Every Major Energy Control Center will have a dispatcher training simulator where the operators get to analyze the results of real disturbances and create real-life scenarios for study purposes.

The functionality included in each of the subsystems shall include at a minimum:

Generation Operation Management:

- Load Forecasting
- Unit Commitment
- Hydrothermal Coordination (For thermal plants only)
- Real-time Economic Dispatch
- Real-time generator Control (Generator control will eventually be fully automated by the use of the synchronization systems which will be installed.

Synchro Secure Energy Management System

- Investor Outline
  - Part Six-Energy Management Systems-Three

Transmission Operation Management: Real time

- Network Configuration/Topology Processors
- State Estimator
- Contingency Analysis
- Optimal Power Flow
- Islanding of Power System

Study Mode Simulation

- Power Flow
- Short-circuit Analysis
- Network Modeling

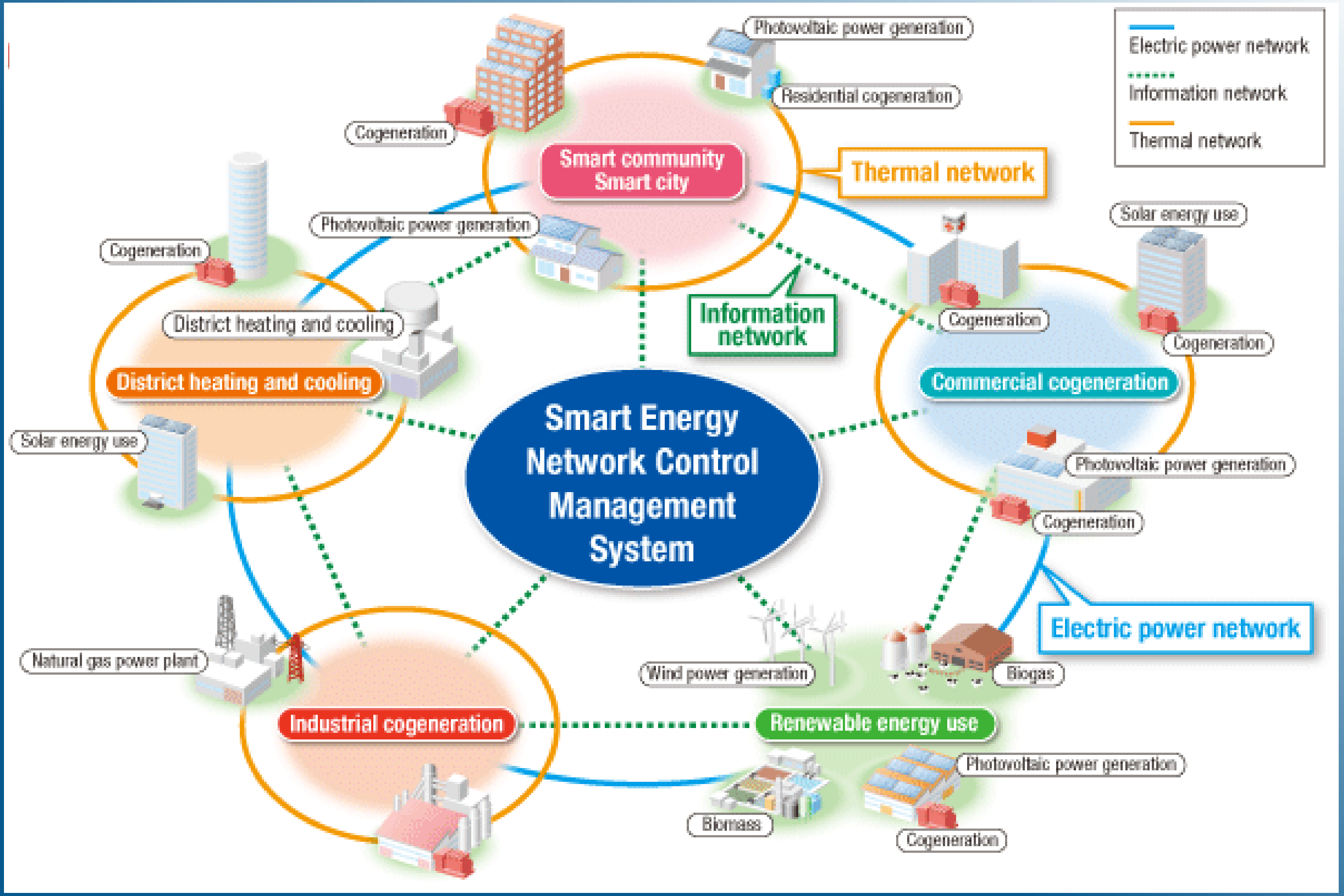
Energy Services and Event Analysis

- Event Analysis
- Energy Scheduling and accounting
- Energy Service Providers

Dispatch Training Simulator

Synchro Secure Energy Management System

- Investor Outline
  - Part Six-Energy Management Systems-Four



Synchro Secure Energy Management System

❖ Investor Outline

❖ Part Seven-SCADA and Network Security-One

SCADA systems that tie together decentralized facilities such as power, oil, gas pipelines, water distribution and wastewater collection systems were designed to be open, robust, and easily operated and repaired, but not necessarily secure.

The move from proprietary technologies to more standardized and open solutions together with the increased number of connections between SCADA systems, office networks and the Internet has made them more vulnerable to types of network attacks that are very common in Windows based System which are standard in the modern Office Environment. Both vendors made updates available prior to public vulnerability release. Mitigation recommendations were standard patching practices and requiring VPN access for secure connectivity. Consequently, the security of some SCADA-based systems has come into question as they are seen as potentially vulnerable to cyber attacks.

In particular, security researchers are concerned about

- the lack of concern about security and authentication in the design, deployment and operation of some existing SCADA network
- the belief that SCADA systems have the benefit of security through obscurity through the use of specialized protocols and proprietary interfaces
- the belief that SCADA networks are secure because they are physically secured
- the belief that SCADA networks are secure because they are disconnected from the Internet.

Synchro Secure Energy Management System

- Investor Outline
  - Part Seven-SCADA and Network Security-Two

In 2020, a major cyberattack suspected to have been committed by a group backed by the Russian government penetrated thousands of organizations globally including multiple parts of the United States federal government, leading to a series of data breaches. The cyberattack and data breach were reported to be among the worst cyber-espionage incidents ever suffered by the U.S., due to the sensitivity and high profile of the targets and the long duration (eight to nine months) in which the hackers had access.

Within days of its discovery, at least 200 organizations around the world had been reported to be affected by the attack, and some of these may also have suffered data breaches. Affected organizations worldwide included NATO, the U.K. government, the European Parliament, Microsoft, VMware, SolarWinds and others.

The attack, which had gone undetected for months, was first publicly reported on December 13, 2020, and was initially only known to have affected the U.S. Treasury Department and the National Telecommunications and Information Administration (NTIA), part of the U.S. Department of Commerce

The cyberattack that led to the breaches began no later than March 2020. The attackers exploited software or credentials from at least three U.S. firms: Microsoft, SolarWinds, and VMware. A supply chain attack on Microsoft cloud services provided one way for the attackers to breach their victims, depending upon whether the victims had bought those services through a reseller. A supply chain attack on SolarWinds's Orion software, widely used in government and industry, provided another avenue, if the victim used that software. Flaws in Microsoft and VMware products allowed the attackers to access emails and other documents, and to perform federated authentication across victim resources via single sign-on infrastructure.

Synchro Secure Energy Management System

- Investor Outline
  - Part Eight-Development and Deployment Plan-One

NOTE:

- The vulnerabilities which have been identified in the two slides on SCADA and Network Security provide us with a strong incentive to develop a comprehensive network technology which does not have dependencies on Microsoft, VMware, SolarWinds and any other third-party Software which has access to the hardware and software system of our servers.
- The Synchronization and communication System which we will be developing will be based on the IBM Mainframe Architecture for the Data Crunching, UNIX and Linux (Red Hat and CentOS 8) for the SCADA and PMU data gathering and monitoring and control functions.
- The transport protocol will be SONET over fiber-optical cable.
- SCADA and EMS suppliers will including Alstom, ABB and OSI and the choices of Operating systems will be restricted to UNIX and Linux. Other suppliers including ETAP, NARI, PSI-CNI and Siemens continue to offer UNIX-based solutions and will also be used as Vendors.

Synchro Secure Energy Management System

- Investor Outline
  - Part Eight-Development and Deployment Plan-Two

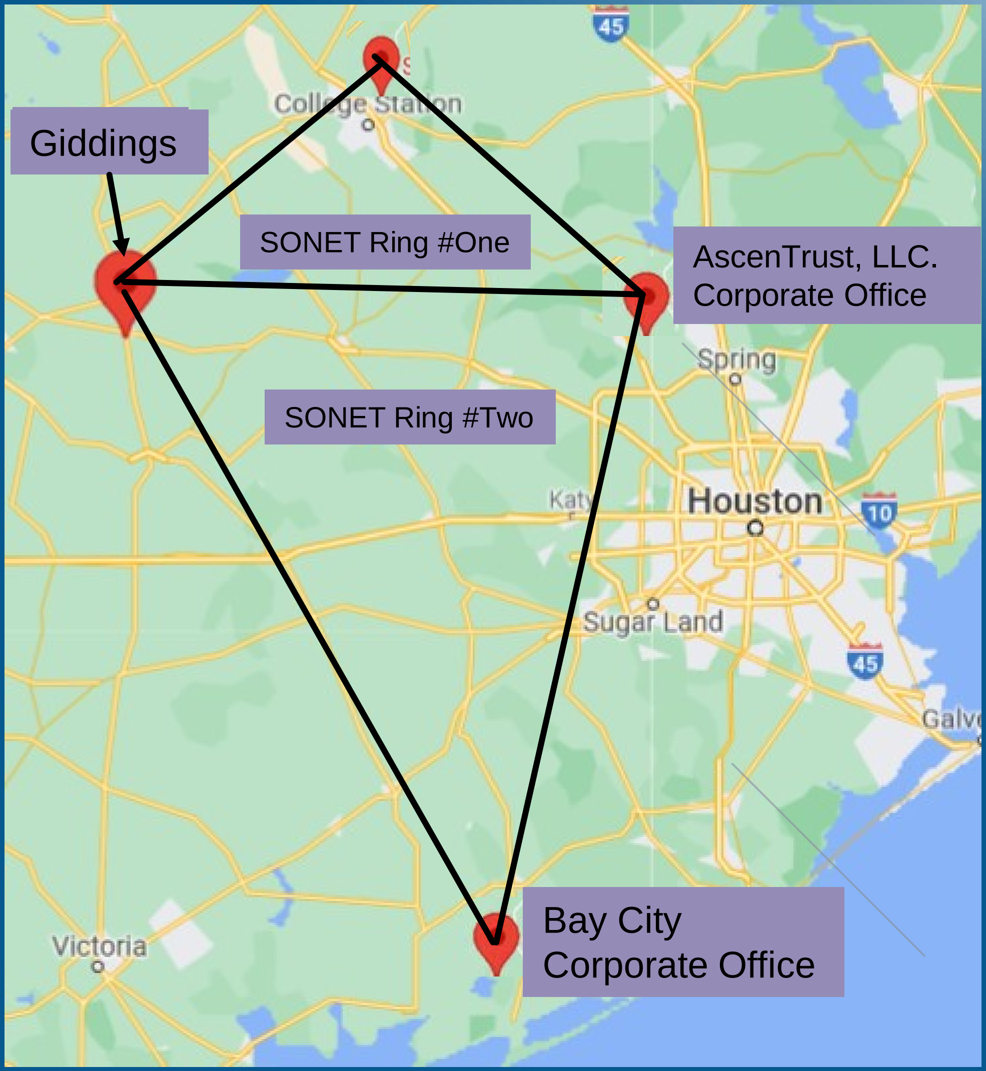
The first task of the Development Phase will be the creation of an Internal SONET network. By internal I mean that it will be a private network for and through the acquisition and development phase of our first power plant project in Matagorda.

Development: The following is a preliminary list of items which the Senior Engineer has been developing for a number of years. This list does not include many of the items which we will eventually develop and deploy.

Synchro Secure Energy Management System

❖ Investor Outline

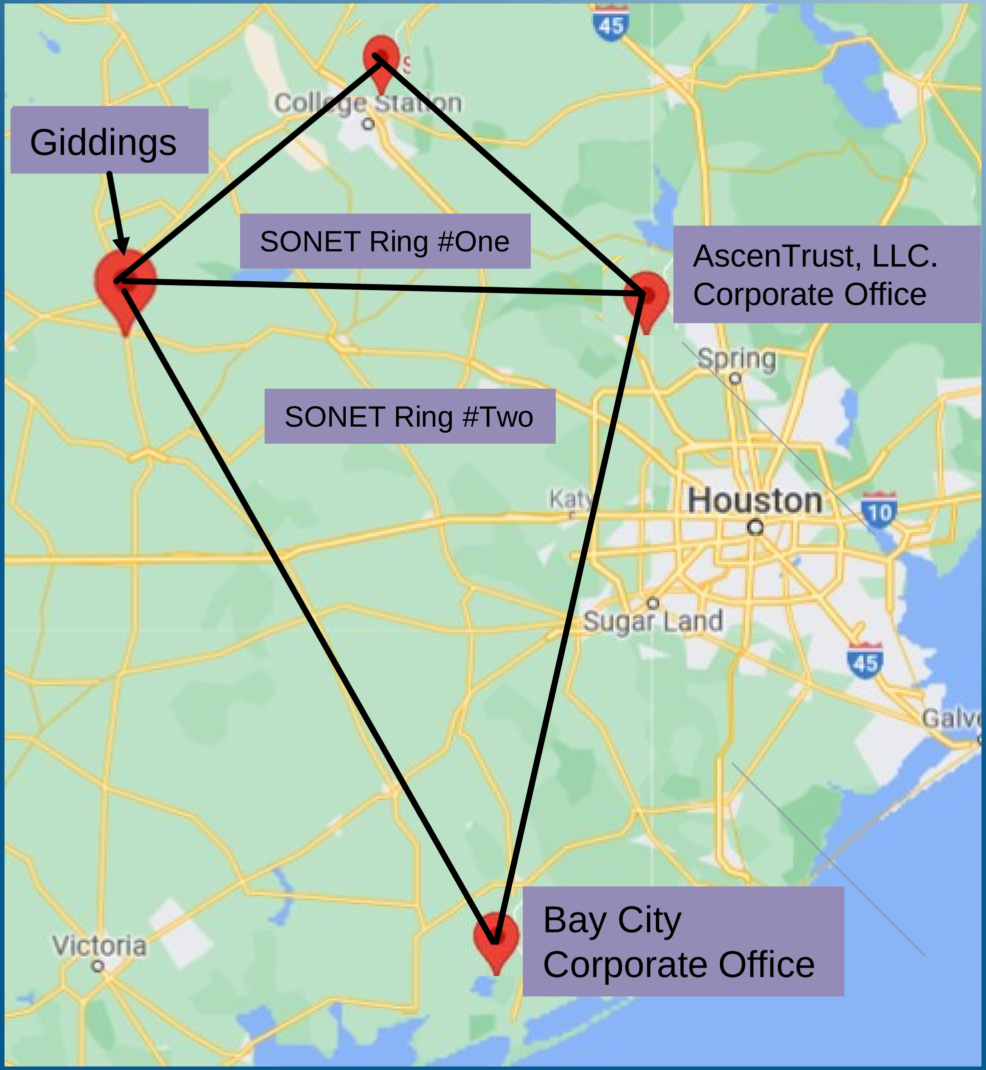
❖ Part Eight-Development and Deployment Plan-Three



The straight lines drawn on the map on the left are merely to indicate the destination points of our fiber. The real route will be along public R.O.W. so that we will not have any right of way acquisition problems.
The Senior Engineer of AscenTrust, LLc. has an ongoing business relationship with an **ISP** who's server Farm is located in Giddings, Texas. We are already in the process of developing a high speed connection to Giddings because we will be using the server farm in Giddings as our failover for the https://chkdit.com (This is our COVID-19 monitoring software).
The two SONET rings shown will be connected to the Server Farm in Giddings and a Primary Server Farm created in our Building @ 16920 Kuykendahl in Spring, Texas.

Synchro Secure Energy Management System

- ❖ Investor Outline
  - ❖ Part Eight-Development and Deployment Plan-Four



PART TWO

The whole area bounded by these two rings is Medically Underserved and therefore Qualifies for Medical Service Funding from both the State and Federal to provide services for COVID monitoring and prevention

The whole area bounded by these two rings will be integrated into our high speed Internet Solution.

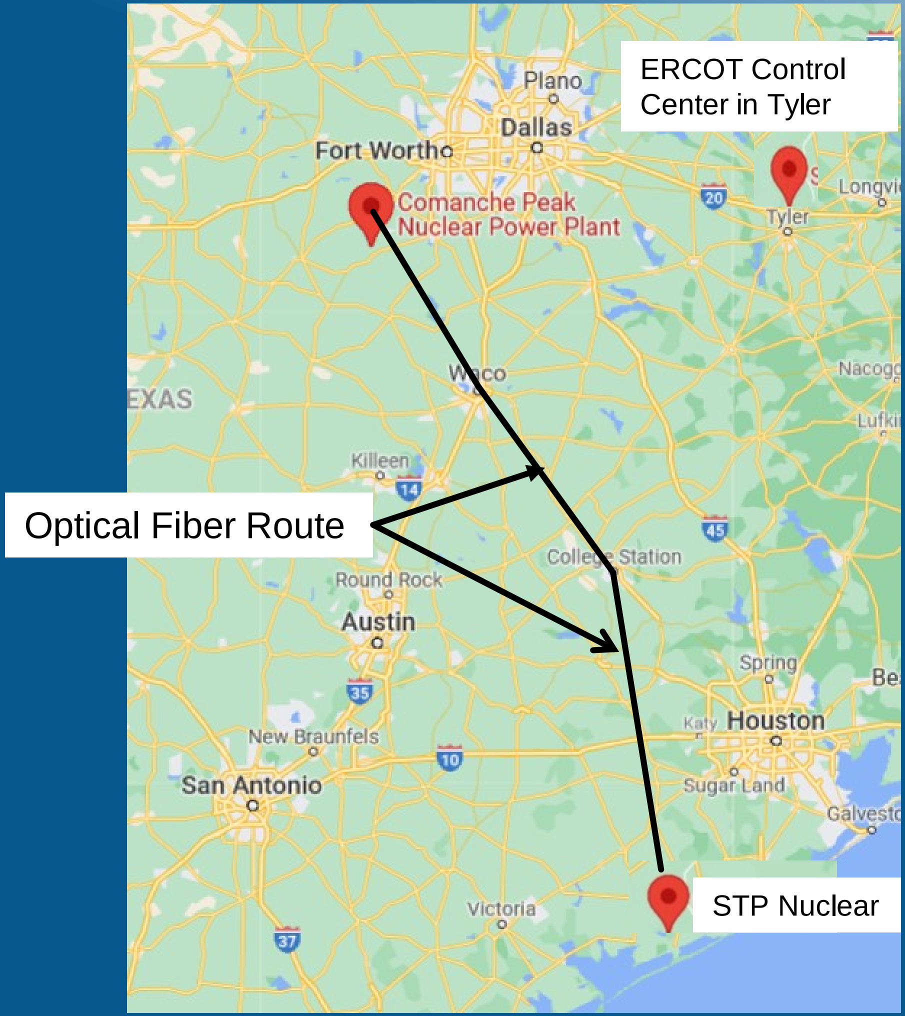
All of the Cities and Towns in the Bounded areas will be lobbied to join our Co-op System (Now generally called Micrograds)

In the ERCOT area of the State these Co-ops receive preferential treatment with respect to the production and sale of Electricity.

Synchro Secure Energy Management System

❖ Investor Outline

❖ Part Eight-Development and Deployment Plan-Five



We expect the first layout of the optical fiber connection between the two Nuclear Power Plants in Texas to have an intermediate location at the Texas A&M campus in College Station.

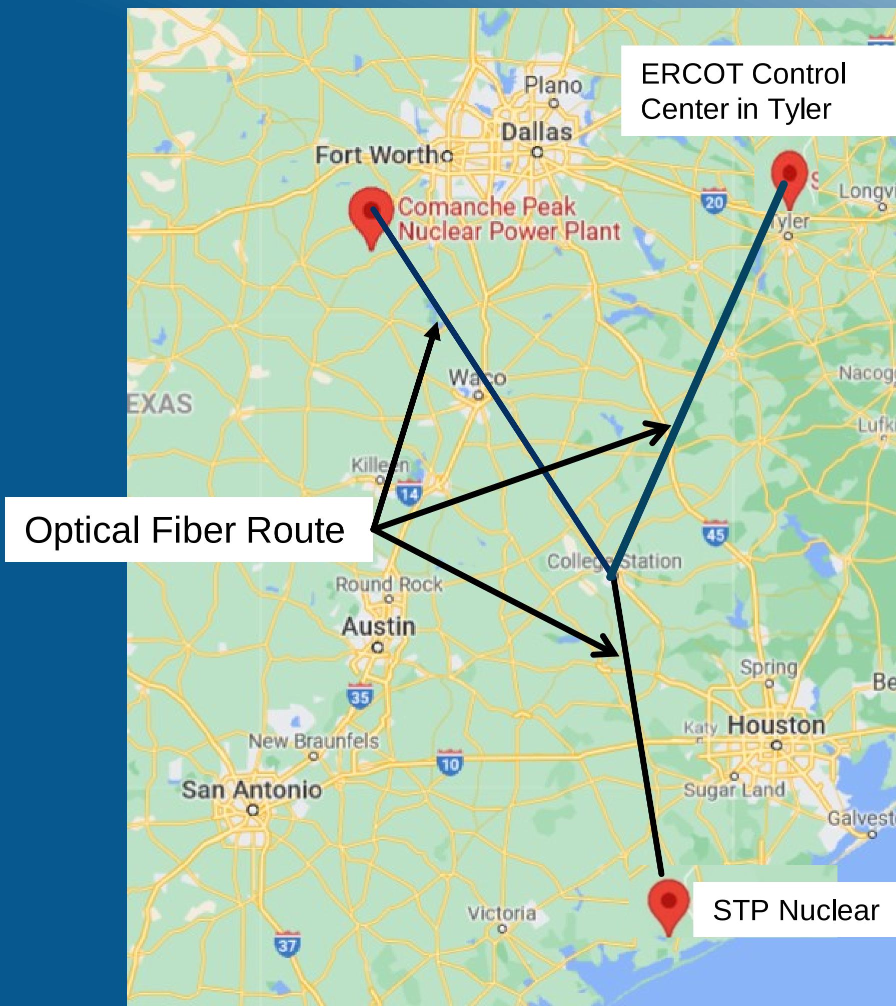
ERCOT uses a software application called PowerWorld. One of the creators of this software, Dr. Thomas J. Overbye has a teaching position in the Electrical Engineering Department of College Station.

One of our Board Members, Dr. Gary Sorenson was a Professor of Civil and Environmental Engineering so we have very good contacts at Texas A&M

We intend to use the R&D Park at Texas A&M as the central hub for our Data Processing for the Synchronization Project.

Synchro Secure Energy Management System

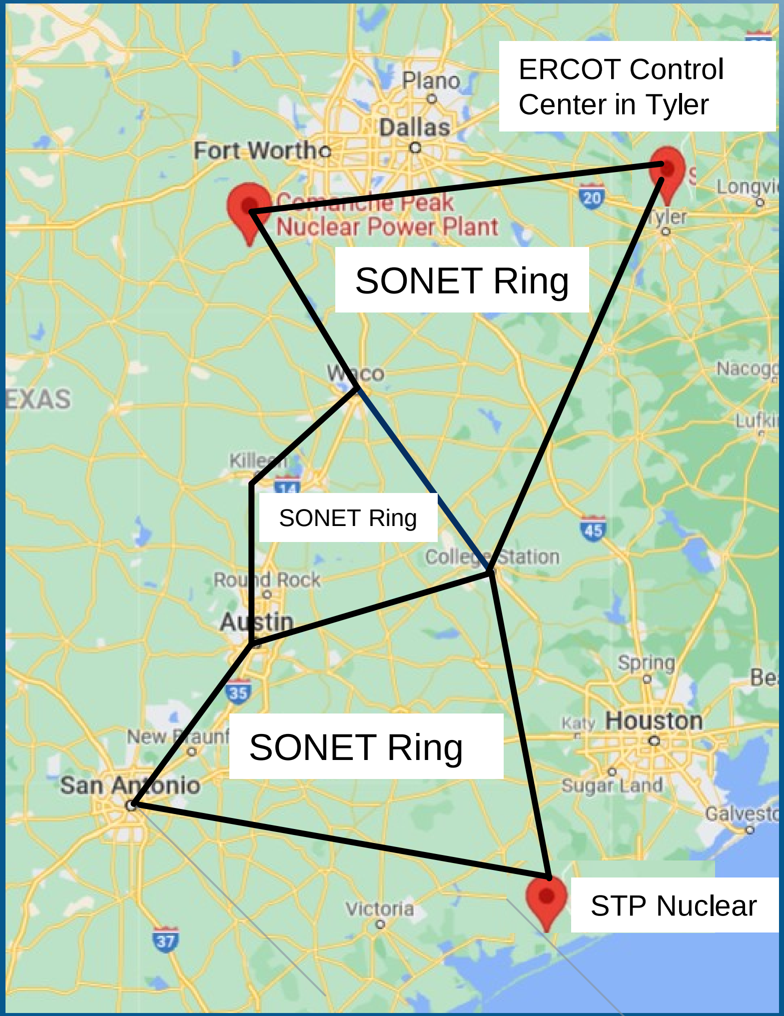
- Investor Outline
  - Part Eight-Development and Deployment Plan-Six



The straight lines drawn on the map on the left are merely to indicate the destination points of our fiber. The real route will be along public R.O.W. so that we will not have any right of way acquisition problems. The tie-line at the South Texas Nuclear Project appears to be going to the Nuclear Power Plant but in fact it will to the Wharton Community College which will be the Bay City Office for the Project.
The next fiber tie-line will be to the ERCOT Control Center in Tyler. This link-up will bring the grid ISO on board of our Project.

Synchro Secure Energy Management System

- Investor Outline
  - Part Eight-Development and Deployment Plan-Seven



The City of San Antonio is very important to our Power Project in Matagorda County. The City is an Independent Utility in the State and is willing to give us a Power Purchase Agreement for any amount of Green Energy which we can produce on our site close to the South Texas Nuclear Project.

The City of Austin is also an Independent Utility which we can approach for PPA's

The City of San Antonio and the City of Austin are the majority owners of the STP Nuclear Power Plant.

We want a node in Killeen and in Waco because of the major distribution Hub for CREZ Wind Farm from the West Texas Wind Farms.

Synchro Secure Energy Management System

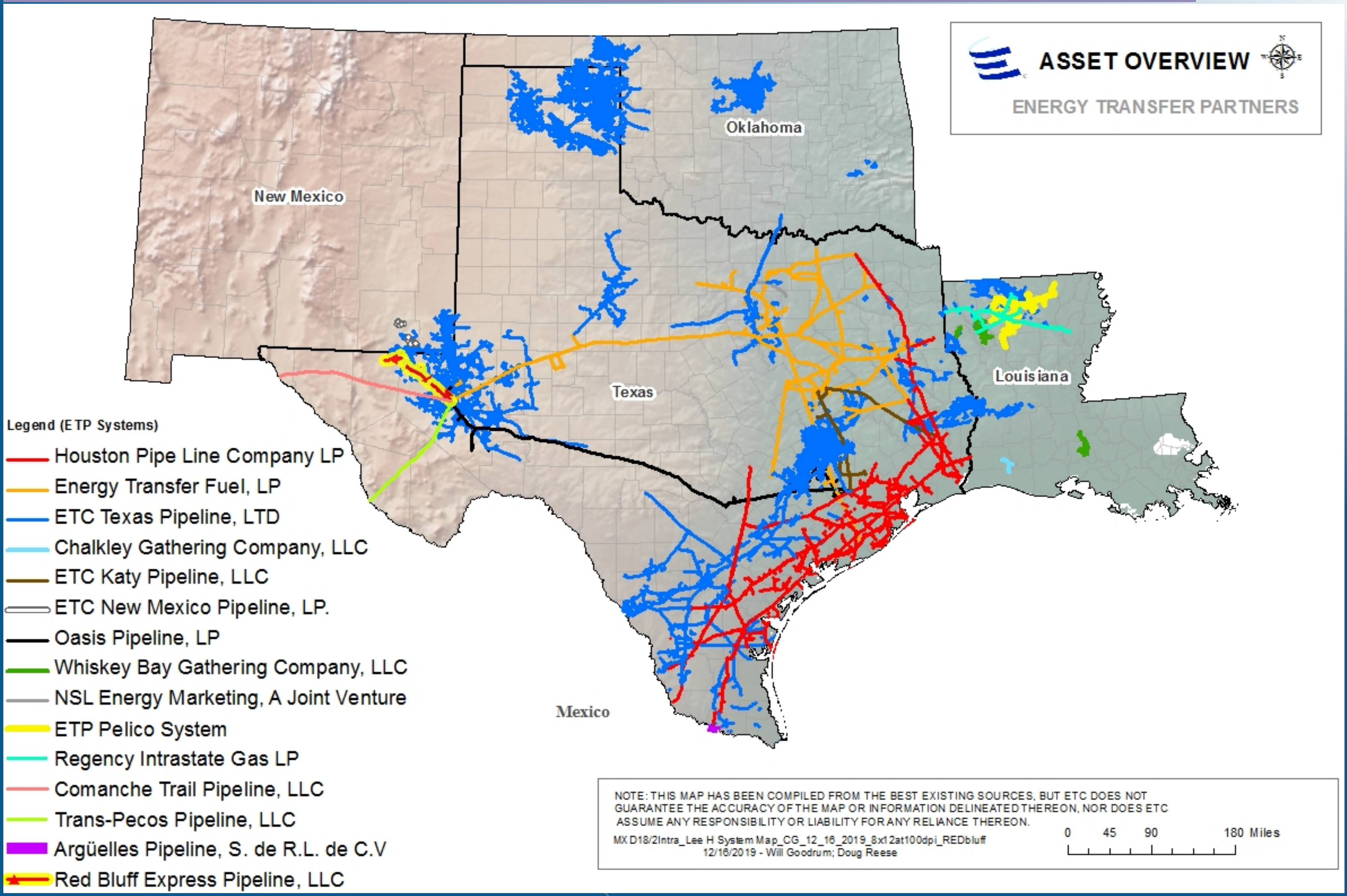
- Investor Outline
  - Part Eight-Development and Deployment Plan-Eight
    - Energy Pipeline Transfer-One

Energy Pipeline Transfer

- Energy Pipeline Transfer is the largest Natural Gas Supplier in the State of Texas.
- Energy Pipeline Transfer is our Natural Gas Supplier for our Combined-Cycle Power Plant in Matagorda County.
- We have been having ongoing discussions with this Company to provide Single Cycle Production Facilities at the Texas sites, in the ERCOT area, where they have major compressors running.
- These small Single Cycle Turbines would be able to provide the Energy to keep the Pipeline Compressors running.
- Additionally we would be able to provide Power Factor Correction on the High Voltage Transmission Lines without having to install in-line Capacitors.

Synchro Secure Energy Management System

- Investor Outline
  - Part Eight-Development and Deployment Plan-Eight
    - Energy Pipeline Transfer-Two



Synchro Secure Energy Management System

- Investor Outline
  - Exit Strategy for Investors-One

ASCENTRUST LLC

There are three distinct Exit Strategies for our Investors:

1. Sale of Mature Company to an Industrial Conglomerate
2. IPO (Initial Public Offering)
3. Bond sale in Europe to buy-back investor equity

Synchro Secure Energy Management System

- ❖ Investor Outline
  - ❖ Exit Strategy for Investors-Two
    - ❖ Outright Sale of Company

Sale of Mature Company to an Industrial Conglomerate

Example:

Open Systems International, Inc. (OSI) is an ISO 9001-certified automation software company headquartered in Medina, Minnesota. The Company was Founded in 1992, is privately held and employee owned. The company's systems are used for the real-time management and optimization of production, transport, and delivery networks for utilities in the electric, oil & gas, transportation, and water industries.

In 2020, Emerson Electric Company announced an arrangement to purchase Open Systems International for $1.6 billion.

Synchro Secure Energy Management System

- Investor Outline
  - Exit Strategy for Investors-Three
    - IPO

An **initial public offering** (**IPO**) or **stock launch** is a public offering in which shares of a company are sold to institutional investors and usually also retail (individual) investors. An IPO is typically underwritten by one or more investment banks, who also arrange for the shares to be listed on one or more stock exchanges.

Through this process, colloquially known as *floating*, or *going public*, a privately held company is transformed into a public company. Initial public offerings can be used to raise new equity capital for companies, to monetize the investments of private shareholders such as company founders or private equity investors, and to enable easy trading of existing holdings or future capital raising by becoming publicly traded.

Synchro Secure Energy Management System

- Investor Outline
  - Exit Strategy for Investors-Four
    - Bond Sale

- A **corporate bond** is a bond issued by a corporation in order to raise financing for a variety of reasons such as to buyout an initial Investor, ongoing operations, M&A, or to expand its business.
- The term is usually applied to longer-term debt instruments, in our case we would probably go for a maturity of ten years.
- The risk depends on the particular corporation issuing the bond, the current market conditions and governments to which the bond issuer is being compared and the rating of the company.
- Corporate bond holders are compensated for this risk by receiving a higher yield than government bonds. The difference in yield (called credit spread) reflects the higher probability of default, the expected loss in the event of default, and may also reflect liquidity.