

# **Community Partnership for Energy Planning**

## **Utility Search Conference**

### **Executive Summary**

**Plantation Inn  
Crystal River, Florida  
October 29-30, 2007**

**Process Design and Facilitation  
by  
STAR Group, LLC  
[www.stargroupconsulting.com](http://www.stargroupconsulting.com)**

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## **Preface**

Progress Energy Florida (PEF) hired STAR Group, LLC (STAR Group) to design and facilitate local community public involvement process in connection with the potential transmission investment in a ten-county region in Florida. This local community process is part of a statewide outreach effort by Progress Energy to inform the public and obtain input on the need for new transmission infrastructure to support the growth in Florida.

Working with PEF, STAR Group identified and convened a Leadership Team made up of local leaders in the counties of Citrus, Hernando and Levy to direct the planning for a Utility Search Conference<sup>SM</sup> – a two-day conference to discuss transmission. The Leadership Team determined the Focus Statement for the conference, key stakeholder groups, and the criteria for participant selection. In addition, members of the Leadership Team participated in the Background Report Committee, overseeing the development of a Background Report on the Community Partnership for Energy Planning.

UtiliPoint International (UtiliPoint), an independent utility consultancy firm, was hired to prepare the Background Report. UtiliPoint prepared the Background Report by compiling and analyzing information supplied to it by Progress Energy and reviewed by members of the Background Report Committee. The Background Report was mailed to the Utility Search Conference participants for their review prior to the conference.

The Community Partnership for Energy Planning Utility Search Conference was held at the Plantation Inn in Crystal River, Florida on October 29-30, 2007. Forty-eight community leaders committed to attend the two-day conference. They were selected from a list of 135 individuals who had been nominated to participate by their peers. Conference attendees represented government officials, local businesses, large commercial power users, environmental and alternative energy advocates, community organizations, emergency services and utilities. Several individuals attended as observers but did not participate in the conference.

This Executive Summary contains the key information and recommendations developed by the conference participants.

## **Focus Question**

The focus statement and question below were developed by the Leadership Team as a reference point to guide the discussion held during the two-day conference.

***"Progress Energy Florida is considering construction of new, and expansion of existing, transmission facilities in several counties. The goal is to ensure the continued reliable delivery of needed electricity. Transmission facilities are planned from a proposed power plant in Levy County to the Tarpon Springs area, from Tarpon Springs to Kathleen in Polk County and from Levy County to Leesburg. These proposed transmission facilities could affect the counties of Citrus, Lake, Levy, Marion, Hernando, Hillsboro, Pasco, Pinellas, Polk, and Sumter.***

***What would be the most cost-effective, most efficient routes with minimal impacts for these new transmission facilities?"***

## **Most Desirable Future Statement**

Participants were asked to create a vision of their Most Desirable Future relative to the Focus Question.

***In seven years, our communities will have the cost-effective energy supply needed for the population growth, through reliable transmission lines that are constructed in multi-purpose corridors which are visually and environmentally appealing. We envision greater public awareness of energy use, conservation and alternative technologies, present and future.***

## **Barriers**

The participants were asked to list key barriers for achieving their Most Desirable Future. Their top four barriers are shown below.

1. "Not In My Back Yard" & legal challenges
2. Government regulations (federal, state, local)
3. Environmental impacts
4. Land acquisition/real estate costs

## **Most Probable Future Statement**

Participants were also asked to create a vision statement of their Most Probable Future relative to the Focus Question.

***If we chose not to provide quality recommendations to PEF, in the next 7 years our community will have insufficient capacity to meet demand, resulting in higher costs; there will be adverse economic, environmental and aesthetic impacts on our community we will lose any win-win situations with PEF, and there will be a loss of community acceptance for PEF's chosen solutions.***

## **Criteria for Siting New Infrastructure**

Participants developed a list of criteria they would utilize in the siting of utility infrastructure.

### **Community Criteria for Utility Infrastructure Siting:**

- Co-location (existing transportation, utility easements) – create a “Super corridor” of utility infrastructure
- Minimize impacts on environmentally sensitive areas and on communities
- Utilize best technology and underground where feasible

### **PEF’s Criteria for Transmission Infrastructure Siting:**

- Community/Public Input
- Land Use/Real Estate  
Examples: residences, major developments, schools, conservation lands and parks, existing linear facilities, Native American reservations, industrial and extractive land uses
- Environmental/Archaeological and Historical Considerations  
Examples: Protected species, eagle nests, wetland area, 100-year flood plain, archaeological resource sites, historical resource sites, visual impact
- Safety/Reliability  
Examples: Safety conditions under construction, maintenance and operation, adequate supply to meet various demand conditions
- Cost/Economics  
Examples: costs, constructability

## Participants' Recommendations

- A. Preliminary Route Corridors: Participants were given the opportunity to view a preliminary set of maps detailing potential transmission corridors and were asked to provide their recommendations regarding these potential corridors. These recommendations do not reflect consensus among participants; rather, the following is a list of ideas for PEF's consideration that were identified and brought forward by each of the small breakout groups:
- a. From the plant: the preferred corridor is the western corridor.
  - b. Co-locate with existing line (i.e., place new line(s) on existing power poles where feasible)
  - c. Add new lines to existing corridors
  - d. South of plant: do not follow the Suncoast Parkway unilaterally
  - e. South of 44 – neither western-most nor far-eastern route are desirable; continue down to the major departure at 491; stick to the primary tracking along Suncoast Parkway and the existing 500kV line
  - f. From Hernando Citrus line – follow central area to Brookridge substation; follow power corridor
  - g. South of substation – prefer along existing power line but there is a large community so may need to explore the alternate
  - h. Levy County – decided coming through center of Inglis not in best interest of city because of EMF and impact on future development. Felt eastern option the better of the 2 routes because generally undeveloped
  - i. On the eastern route, power lines would come to barge canal, then across U.S. 19 and then paralleling U.S. 19 to the transmission lines, then proceeding east along existing transmission corridor. Reason for “dog leg” is because of a major development in area. Then follow expressway, but take eastern route (491) because least community impact, easiest for construction. Could alternately look at joining main route to Brookridge substation and then south from there.
  - j. Follow present transmission lines because of collocation and follow all the way through. Caution, there is a property north of the canal that is a proposed water park.
  - k. East of Crystal River plant, chose route that follows existing lines (collocation). Other path would require land acquisition, environmental impact, etc.

- l. Proposed location of Crystal River high school near 1-mile corridor. There are three high-density areas near transmission line, better to use existing corridor. Through Citrus, use existing transmission path. Alternate route hits environmentally sensitive areas. Stay away from 491 because of schools.
- m. Highway 491 corridor feasible into Hernando. Known CAVEs (Citizens Against Virtually Everything); possible interchange with Suncoast Parkway; three schools “bookended”. Suncoast Parkway is a “scenic” highway; there also is an airport that is used often. Existing corridors seem viable but there is a YMCA to be aware of. No significant issues identified – proposed routes seem well thought out.
- n. Levy County south, follow existing corridor because alternate environmentally sensitive and some residential.
- o. Going south, collocate as much as possible with highways, new Suncoast Parkway extension; don’t like going east because of state forest. At southern end, felt that middle or eastern leg looked better (west had schools to be concerned about).
- p. East-West route – avoid northern leg, follow existing lines to avoid recreation, wetlands, and other sensitive areas.
- q. Come down through Levy County (caution about “island”); go through Crystal subdivision; as reach 488 crossing some historic lands and church, then there is ability to align with highway; stay along existing power line (rather than going east). Lecanto Sand Hill area, school, prison; rejected eastern path, going through endangered species (woodpecker area). Expand on east side of corridor if needed.
- r. Come along Suncoast, go along east side, open property, come to county landfill, work down to Centrillia, coming on eastern side of 500 kV. County interested in extending a road through there to get to Centrillia. Western way to Centrillia going through more existing homes. Gets you to substation; south of substation starting to get to higher population; western leg there is a DRI, existing line if you go east would take out mobile home; west would need to redo Sunshine Grove Road, or come along Suncoast Parkway. At southern end problems on all routes. Airport a major issue. Other routes go through heart of Spring Hill, golf courses, a lot of subdivisions. That’s when you will hit higher populated areas.
- s. PEF should develop a plan with short-term and long-term objectives
  - i. Short Term
    - Create a community outreach/focus group

- Require coordination with state and local programs
- Environmental protection – e.g., during construction phase

ii. Long Term

- Maintain this group of community advisors
- Maximize existing route corridors
- Require coordination with state and local programs
- Evaluate local co-generation facilities
- Maintain environment quality

B. Other Key Recommendations: Participants were asked to identify other key recommendations for PEF’s consideration that the group felt would (1) support the Most Desirable Future and (2) be consistent with the group’s articulated criteria for infrastructure siting. The recommendations developed by the participants were:

**a. Education and Public Outreach**

- 1) Town hall meetings and/or mailings to affected communities. Direct web site with maps.
- 2) As part of long-range plan continue to request public input at regular intervals
- 3) Education – proactive: Open and accurate communication: explain benefits to the community
- 4) PEF should establish a close connection with communities most impacted
- 5) Work on relationship with local communities.
- 6) Early childhood education and kid friendly “Save A Watt” program (partner with SWEWMD)
- 7) Ongoing, long term, comprehensive, multimedia campaign (TV Primary) – “Edu-Train”
- 8) Allow and promote multi-functional use of existing and future linear corridors
- 9) Coordinate and partner with state and local governments on multi-purpose projects (trails, parks, ball fields, etc.)
- 10) Education and outreach is necessary for conservation of energy, i.e. competition among students K-12/college.

- 11) Empower local PEF reps to coordinate/negotiate with local and state governments
- 12) Expand local liaison staff to at least 1 per county.

**b. Transmission Corridors Considerations**

- 1) Optimize use of existing transmission and transportation corridors
- 2) Allow and promote multi-functional use of existing and future linear corridors
- 3) Coordinate and partner with state and local governments on multi-purpose projects (trails, parks, ball fields, etc.)
- 4) Recreation facilities within route
- 5) Willingness to focus on other economic uses to collocate
- 6) Develop a strategic plan in cooperation with Florida Turnpike Authority to optimize Suncoast Parkway 2/RTA corridor.
- 7) Optimize use of existing transmission and transportation corridors
- 8) Willingness to focus on other econ. uses to collocate
- 9) Make environmental considerations a priority
- 10) Develop Best Management Practices (BMP's) for corridor management
- 11) Work with private property owners to put corridors into productive, compatible agriculture uses

**c. New Technology**

- 1) Use new technology
- 2) Research new technology to improve efficiency
- 3) Have long range plan to research global alternative and/or renewable energy resources
- 4) Expand use of nuclear power generation and recycling of spent fuel.
- 5) Work towards future construction of desalination plant (private/public partnership)

- 6) Continue to expand programs that assist people and business to implement energy efficiency through equipment upgrades and energy conservation
- 7) Coordinate with local governments on partnerships and co-op projects

**d. Structure and Landscape**

- 1) Go underground
- 2) Continue to explore utilization of underground transmission
- 3) Monopoles – Cortin
- 4) Landscaped/walled nicely substations
- 5) Low profile substation equipment

**e. Other**

- 1) PEF provide more conservation incentives for consumers
- 2) Provide assistance to Inglis/Yankeetown for planning and preparation for the impacts of the new plant and corridor.
- 3) Help redevelop the old infrastructure in Inglis (move it)
- 4) Utilize utility corridor for secondary access to Lecanto school complex and linear parks.
- 5) Underground Distribution lines
- 6) Obvious financial incentives to conserve

## **Remarks of Mr. Jeffrey Lyash, President, Progress Energy Florida**

Jeffrey Lyash, President of Progress Energy Florida, was present to hear the recommendations developed by the conference participants and was asked to respond to each of the recommendations on behalf of PEF.

Mr. Lyash thanked participants for their hard work and their willingness to give up their time to help in this new process, as these sessions are invaluable for getting the community's perspectives and priorities regarding important issues facing all of us. Mr. Lyash reviewed the Most Desirable Future statement and remarked that PEF shares the community's expression of its Most Desirable Future.

Mr. Lyash complemented participants on capturing the industry and national dynamics when looking to the future. He noted that there are many important and complicated issues to tackle over the next 30 years. From fuel resources, sustainability, being good stewards of the environment, growth in both population and economy - energy is a driver of quality of life. Progress Energy is constantly thinking about these difficult issues and about how PEF can best serve the needs of communities.

PEF is focusing on a Balanced Solution which includes: building the best energy efficiency programs; developing and deploying environmentally friendly and practical renewable technologies; and investing in existing plants to improve efficiencies and lower emissions (for example, PEF will be spending \$1.2 billion at Crystal River to reduce emissions at that facility).

In addition to all these efforts, PEF's Balanced Solution also takes into account the fact that PEF will need to build new infrastructure. PEF is looking at nuclear because it generates the most megawatts of electricity with minimum land and water use and no air emissions.

In responding to the participants, Mr. Lyash addressed the recommendations put forth by the USC participants:

**Provide assistance to Inglis/Yankeetown for planning and preparation for the impacts of the new plant and corridor.**

Plant has many positive impacts: jobs, taxes, can have an impact on all things – roads, schools, other services. Will work to minimize negatives and maximize positives. Progress would like for you to join working groups to assist in this effort.

**Help redevelop the old infrastructure through Inglis**

Not sure what is the right answer. We need to examine further as we go through the process.

**Utilize utility corridors to have joint projects/joint use with communities.**

Will take a look at these issues and look for opportunity for joint projects and/or joint use. Assuming we can maintain access for maintenance, etc. we will entertain roads, trails.

**Desalination Plants**

Open to discussion. Will not likely be an owner/operator of desalination plant but could partner to use waste heat, for example.

**Communications (town halls meetings, mailings, etc.)**

Yes, we are going to take your input and form working groups and continue to reach out, creating citizen advisory groups as needed. We would like to get more information on our web site. For example we are now putting outage information on the website.

**Long range plan to research renewable energy**

This is part of the Balance Solution plan. We executed a contract to buy power from an E-grass fuel power plant which will generate 130 MW. We also are working on a wood waste gasification project in north Florida. Biomass is one of the more available resources. Photovoltaic is currently expensive, but believe it will be economic someday. We have a goal of putting a PV (photovoltaic) system on all high schools. At Homosassa State Park, we have a PV-Hydrogen

demonstration. Under our direct load control program you can install a solar hot water heater and potentially save hundreds a year.

### **Underground transmission**

News is not good for substantial use of undergrounding. 80-percent of distribution lines built today are underground. For higher voltage transmission even more challenges. Normally we will bury lines only in very specific situation because undergrounding can be 5 to 20 times more expensive than overhead and we believe it is a cost customer can not bear. Environmental impact is also large such as the need to trench 30 to 50 feet wide and deep to set concrete. So we may use undergrounding in spots, but not for all construction.

### **Education (Conservation, K12, Ongoing multi-media campaign, increased PEF commitment to Public Education)**

Go to [www.savethewatts.com](http://www.savethewatts.com). You can do a home energy audit to find ways to save energy and it will also tell you your carbon reduction as a result. The idea of reaching out to elementary is a great idea – we generally have focused on the high school level. We are also funding college design projects for renewable resources.

### **Expand the use of nuclear power generation and use of spent fuel**

It's important to stress that no one source of energy can solve our energy needs. Solar is not enough and neither is nuclear power, but nuclear is part of the solution. Currently, 20 percent of power generated in the United States and we need more because of nuclear's lack of air emissions and low physical footprint. Two-thirds of energy is left in spent fuel - as a nation we need to focus on reprocessing spent fuel. Representatives from Progress Energy will be traveling to France to learn how they are reprocessing fuel. France recycles 100 percent of their fuel. But we also need to put the magnitude of the issue into context. The amount of nuclear waste generated in the last 50 years in the United States would be about the size of a football field, a few feet deep. If the waste was reprocessed it would amount to only one end zone.

### **Minimize impact on communities**

We know transmission lines are unpopular, which is why we have opened a dialogue with communities to minimize their impact.

### **Monopole/Cortin**

Years ago we built lattice towers but now using monopole where possible. With Cortin (the rust patina type monopoles) there seems to be split opinions. Using a Cortin pole (or not) is largely a matter of what the public desires (about the same cost).

### **Reduce Substation Impacts/improve landscaping**

We try to build in a manner that blends in. Progress normally can move a proposed substation blocks or miles to get them in preferred locations.

### **Conservation**

Conservation needs to include energy efficiency. As we are sitting here we are wasting energy – the room too cold, bulbs are incandescent (not compact fluorescent). PEF has leading energy efficiency programs, but they are not good enough. They need to be expanded such as “Save-the-Watts”. We also need to realign industry to strengthen incentives for both the customer and shareholder to take action for energy efficiency. We need to better align customer and PEF interests so that we can reach a business model that encourages PEF to invest in energy efficiency. Creating such a model will require changes at all levels - legislature, Commission, Progress Energy, and everyone in this room. Believe this is critical. It starts in K-12 and goes through to today.

### **Develop Strategic Plan with Florida Turnpike Authority**

Co-location with highways is a definite priority. You can help with this because we don't always get support from Turnpike Authority or DOT. Need citizens to express support. In some cases PEF is prohibited from co-locating with highways. There is a legislative fix to these old laws. In the next legislative session we expect this will be a topic.

### **Make environmental considerations a priority.**

Absolutely - both on siting and in policy considerations.

### **Coordinate with local governments**

Yes, whether its collocation, making other uses of the routes or desalinization plants. We will do our best to be cooperative.

### **Work with private property owners to create compatible agricultural use**

Not unusual for transmission lines to cross farms. Not opposed to that type of design.

### **Best practices for corridor management**

Yes, will look at co-location.

### **Empower PEF reps to coordinate with communities**

We try, but if you feel we are dragging our feet please do not hesitate to let us know. We need your input to know.

### **Comments from audience:**

- Please consider underground since this is going through our community.
- Barge canal is fresh water now, needs to not be damaged by nuclear plant. Will become dead zone if plant is built.

Mr. Lyash response: As part of the site certification process Progress Energy must do an environmental impact study. The new plants use much less water and should have a negligible impact on environment. Hot water will not likely be pumped back into the canal. This issue will be studied exhaustively.

A community working group will be formed to further refine recommendations developed during the conference.

Individuals may submit comments via the toll free number for the project 888-238-0373 or by email to [baseloadtransmission@pgnmail.com](mailto:baseloadtransmission@pgnmail.com).

You may also contact Gail Simpson, Progress Energy Florida's Manager of Public Policy, at (727) 820-5509.

## APPENDIX A - USC Participants

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## **APPENDIX B - Background Report Advisors**

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## **APPENDIX C - Leadership Team**

Brent Whitley  
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Sierra Properties I, LLC

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Levy County Visitors Bureau

Duane Chichester  
President  
Hernando Progress, Inc.

Harold Ross  
Owner  
Ross Hammock Ranch, Inc.

Jim Bierly  
President  
Audubon Society

Jimmy Brooks  
Community Affairs Coordinator  
Southwest Florida Water Management  
District

Kevin Cunningham  
Owner  
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Jean Lamb  
Sr. Energy Del Process Analyst  
Progress Energy Florida

Martha Barnwell  
VP, North Coastal Region  
Progress Energy Florida, Inc.

Pam Blair  
Executive Director  
Nature Coast Business Development  
Council

Rosemary Fagler  
Community Relations Manager  
Progress Energy Florida

Susan Kirk  
Former City Commissioner  
City of Crystal River

## Glossary

Please note that ***bold italicized text*** refer to terms that are defined elsewhere in the Glossary.

**Baseload** – A baseload power plant is expected to operate in most hours of the year.

**Blackout** – A total loss of power over an area, usually caused by the failure of major generating equipment or transmission facilities.

**Brownout** - Abnormally low voltage that causes voltage-sensitive equipment, such as computers, motors, and certain types of lighting, to be degraded in performance.

**Conductor** – A conductor is the part of a ***transmission*** line that actually carries the electricity - in other words, the wire itself. The wire or conductor is just one part of a transmission line; other parts include the poles and the insulators from which the conductor is hung. A conductor must have enough capacity to carry the highest ***demand*** that it will experience, or it could overheat and fail.

**Contingency** - A contingency is an unplanned outage of a critical system component such as a ***transmission*** line, ***transformer*** or ***generator***.

**Demand** - Demand is the amount of electricity being used at any given moment by a single customer, or by a group of customers. The *total* demand on a given system is the sum of all of the individual demands on that system occurring at the same moment. The *peak-demand* is the highest demand occurring within a given span of time, usually a season or a year. The total peak-demand that a ***transmission*** or ***distribution*** system must carry sets the minimum requirement for its ***capacity*** (see also the definition for ***energy***).

**Distribution** - Distribution lines and distribution ***substations*** operate at lower ***voltage*** than the ***transmission*** systems that feed them. They carry relatively small amounts of electricity to local customers. Distribution lines use shorter poles, have shorter wire spans between poles, and are usually found alongside streets and roads, or buried beneath them. A typical distribution ***voltage*** would be 13.2 ***kV***.

**Easement** – Limited right to use another’s land for a specific purpose.

**FDEP (Florida Department of Environmental Protection)** – The FDEP is Florida’s authority that oversees the Siting Certificate Application (***SCA***).

**FPSC (Florida Public Service Commission)** - The FPSC is Florida’s authority in legal proceedings that involve utility regulation, statutes and related issues, including the “Needs Application” process.

**DSM (Demand-Side-Management)** – Demand-side-management, is intended to satisfy local growth in electrical ***demand*** without the need to build new ***transmission*** lines.

**Fault** - A fault is the failure of a line, *transformer*, or other electrical component. Once such a component has failed (due to overheating, short-circuiting, physical breakage or other trauma) it is automatically taken out of operation by a circuit breaker that quickly turns the component off. Once it has been “tripped off,” it no longer poses a threat to human safety, but its loss may present a difficult burden to the remaining system (see also the definition of *redundant* below).

**Generation or Generator** - A mechanical generator is a device that converts mechanical *power* from an engine, water wheel, windmill, or other source, into electrical power. Generators have internal parts that spin as they make electricity, similar to an electric motor.

**kWh (kilowatt-hour)** – A kilowatt hour is one thousand watt-hours. A watt-hour is a measure of the amount of electric energy generated or consumed in a given period of time.

**kV (kilovolt)** - A kilovolt is a thousand volts. Volts and kilovolts are measures of *voltage*.

**Load** - see *demand*.

**MW (Megawatt)** - A megawatt is one million watts. Watts and megawatts are measures of power. To put this in perspective, the peak power demand for the state of Florida is approaching 50,000 MW, or 50,000,000,000 watts.

**N-0 or N-1 or N-2** - The term N minus zero (or one or two) refers to the failure of important equipment. Although these terms sound complex, they are actually quite simple. “N” is the total number of components that the system relies on to operate properly. Only rarely does anyone try to calculate its actual value; it is simply a generic term to describe all the components of a given system. The number subtracted from N is the number of components that may fail in a given scenario, although more information is needed to denote just what component or components are assumed to have failed. Therefore, N-0 means that no components have failed and the system is in a normal condition. N-1 means that only one component has failed. N-2 means that two components have failed at the same time, which is generally worse than having only one fail (see also the definition of *contingency* above).

**PEF** – Progress Energy Florida, the second-largest electric utility in the state of Florida.

**Power** - Power is the same thing as *demand*.

**Redundant** - Facilities that have backups or alternate ways of operating are said to be redundant, that is, their function can be sufficiently provided even after they suffer a breakdown or failure. The more crucial a component or system, the greater the need for it to be redundant.

**Renewable power source** - A renewable power source is any power source that does not rely on a *finite* fuel resource to keep it running, such as coal, oil, or natural gas, which will eventually run out. Renewable power sources include solar, wind, and hydro generators, because sunlight, wind, and running water will not run out. Generators that burn replaceable fuels also qualify as renewable power sources. Examples include bio-diesel generators that run on crop-derived fuels, and wood-burning generators.

**ROW (Right of Way)** - A right of way is the long but narrow strip of property on which a **transmission** line is built. It may be owned by the utility, or it may be an **easement**.

**Substation** - A substation is a fenced-in area where several **transmission** and/or **distribution** lines come together and are connected by various other equipment for purposes of switching, metering or manipulating **voltage**. Often they contain **transformers**.

**Transformer** – A transformer is a device that connects high-**voltage** equipment to lower-voltage equipment and allows **power** to flow from one to the other. Different voltages are used because higher voltages are better for *moving* electricity over a long distance, but lower voltages are better for *using* electricity in machinery and appliances. Transformers are commonly described by the two (or more) voltages that they connect, such as “115/13.2-kV”, signifying a connection between 115-kV and 13.2-kV equipment.

**Transmission** - Transmission lines and transmission **substations** operate at high **voltage** and carry large amounts of electricity from centralized **generation** plants to lower voltage **distribution** lines and substations that supply small towns and neighborhoods. A few transmission lines or even one may be capable of supplying an entire region or metro area. Transmission lines use poles or structures, have long wire spans between poles, and usually traverse fairly straight paths across large distances. Typical transmission **voltages** include 500 **kV**, 345 kV, 230 kV, 115 kV, and 69 kV.

**Voltage** - Voltage in an electric **transmission** or **distribution** system is much like water pressure in a system of pipes. If the pressure is too low, the pipes cannot carry enough water to satisfy the needs of those connected to them. If the voltage is too low, the electric system cannot carry enough electricity to satisfy the needs of those connected to it.