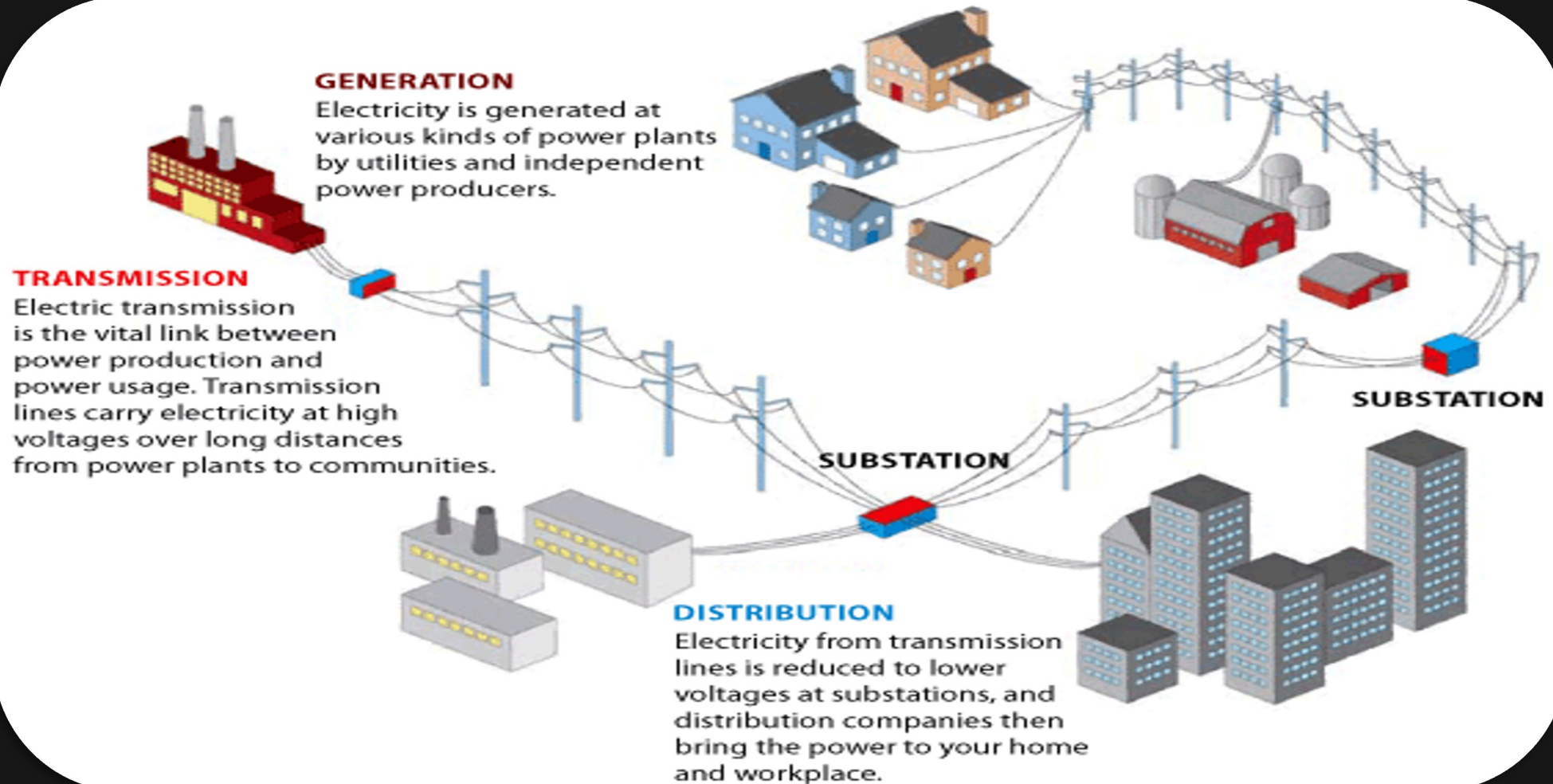


THE GRID

Illumicats
Forest High School Team 2
Kaleigh Berglund, Ethan Wood, and Emily-Rose Hudson



What is an Electrical Grid?

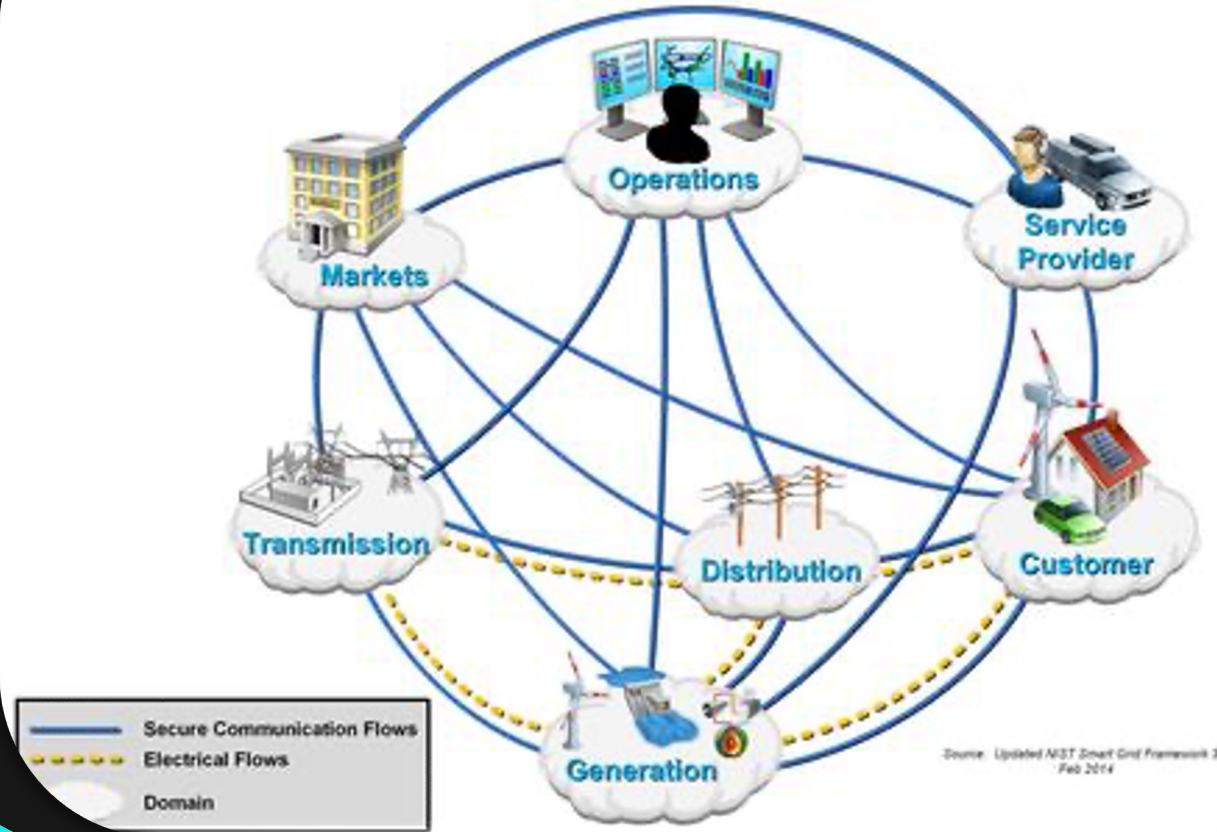


Background Information

What is a smart grid?

Why use a smart grid?

Conceptual Model



Design Process

- Research our community
- Gather data on energy usage and cycle patterns
- Feedback from mentors

User Type	Power Load per Area (kBtu/ ft ²)	Power Load per Area (kWh/ft ²)	Power Load per Area (kWyr/ ft ²)	Average Load Area (ft ²)	Total Power Load (kWyr)
Grocery Stores	444.0	130.13	0.01485	50,000	742.50
Police Station	124.9	36.61	0.00418	11,000	45.98
Schools	104.4	30.60	0.00349	75,000	261.75
Pre School /Daycare	131.5	38.54	0.00440	8,000	35.20
Hospital/ ER	426.9	125.11	0.01428	326,000	4655.59
Senior Living Center	213.2	62.43	0.00718	58,000	416.44
Fire Rescue	124.9	36.606	0.00418	14,000	58.49
Fleet Management (Office)	116.4	34.11	0.00389	63,000	245.00
Duke Energy	89.3	26.1	0.00299	15,000	44.81

Stores	Peak during afternoon	Weekends, During winter holidays
Police Station	Peak during day	Peaks during weekends and during holidays
Schools	Peaks during the day	Falls throughout the summer
Pre School /Daycare	Peak during day	Peaks throughout the summer
Hospital/ ER	During evenings	During the fall and winter
Senior Living Center	Peaks during day	Peaks during fall and winter
Fire Rescue	Peaks during evenings	Winters and July
Fleet Management	Peak during day	Peaks during weekends and during holidays
Duke Energy	Peaks during day	Throughout entire year
Electrical Substation	Peaks during day	Throughout entire year
Churches	Mornings	Sundays, and during Christian holidays (Easter, Christmas)
Water reclamation	Peaks during the day	Throughout entire year
Animal Control	Afternoons	Winter + Summer season



Click for Activity 2

Microsoft Word Document



Click for Activity 3

Microsoft Word Document



Click for Activity 4

Microsoft Word Document

The Proposal

Highest
=
Red

High
=
Orange

Medium
=
Yellow

Low
=
Green

Least
=
Blue



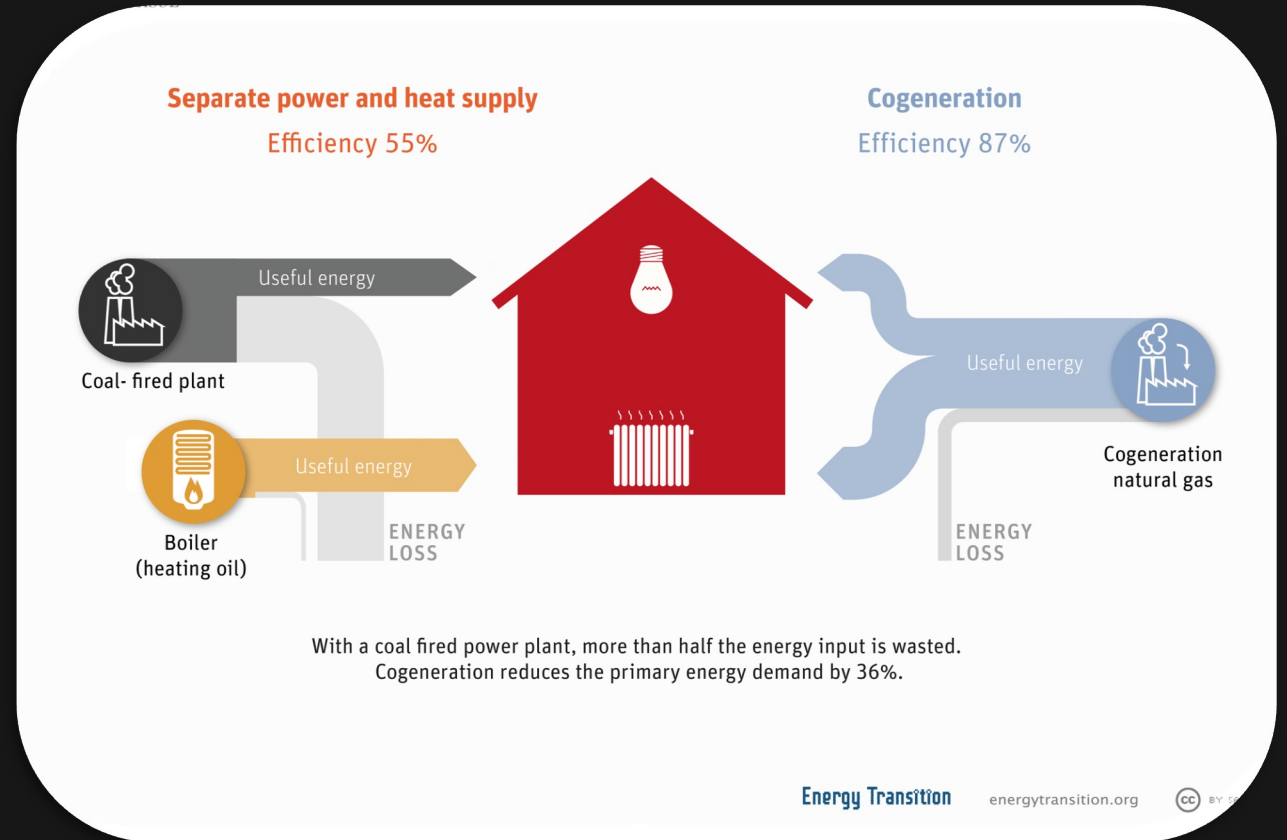
Click for Activity 5



Using Cogeneration

What is
Cogeneration?

How is this useful?



Highest Priority

Duke Energy
Office

Electric
Substation



High Priority

**Water
Reclamation**

Hospital

Gas station



Medium Priority

Police
Department

Fire
Department

Fleet
management

Animal
Management

Animal
Hospital



Low Priority

Senior
Living
Center

Grocery
Stores

Schools

Churches

Post
Office



Least Priority

Banks

Residential



Power Supplied

Design 3			
Priority Level	User Type	How much power is supplied? (kW)	When is the power supplied or cycled?
Highest	Duke Energy (Office)	50	24/7
Highest	Electrical Substation	10	24/7
High	Water Reclamation	10	24/7
High	Gas Station	4000	5am-12am Power supply lowers at night
High	Hospital	1000	24/7 *Have generators
Medium	Hospital Supplies	1000	5am-12am
Medium	Police Department	300	24/7 *Have generators
Medium	Fire Department	300	24/7 *Have generators
Medium	Fleet Management	750	24/7 *Have generators
Medium	Animal Hospital	300	9am-5pm cycle to a lower power any other time
Low	Senior Living Center	500	24/7
Low	Grocery Store	750	7am-10pm Cycle to a lower power any other time
Low	Schools	600	6am-5pm cycle to a lower power any other time (could be a shelter during emergencies) *Have generators
Low	Churches	100	9am-5pm Cycle to a lower power any other time (could be a shelter during emergencies) *Have generators
Low	Post Offices	50	9am-5pm
Least	Banks	30	9am-5pm cycle to a lower power any other time
Least	Residential	250	24/7



Any questions?

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