



RELIABILITY & RESILIENCY OF LOUISIANA'S ELECTRIC GRID

PRESENTATION BY THE LOUISIANA PUBLIC SERVICE COMMISSION

23 SEPTEMBER 2021

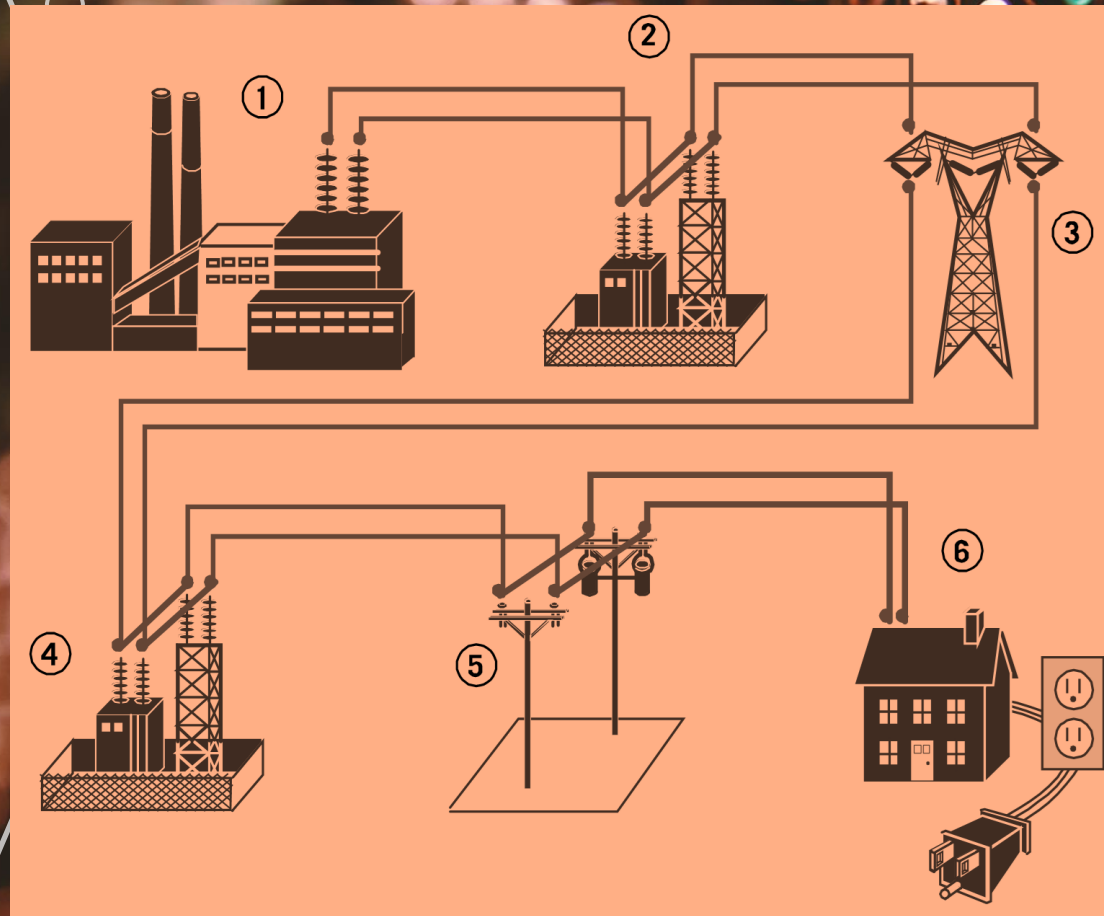
WHERE DOES ELECTRICITY COME FROM?

GENERATION

TRANSMISSION

DISTRIBUTION

FINAL DELIVERY



GENERATION

- Power is generated by turning an energy source into electricity (see...magic!)
- Here in Louisiana, we use:
 - Natural gas—88.72%
 - Crude oil—6.88%
 - Nuclear—3.84%
 - Coal—0.56%
- This contributed to the issues we faced this past February

TRANSMISSION

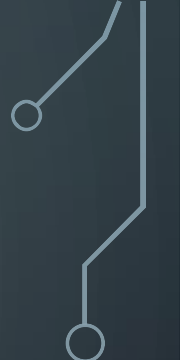


- Voltage is “stepped up” at a substation for transmission
- Carries the electricity over long distances from the generating plants
- Lead power into “step down” substations, or to large, industrial customers

DISTRIBUTION

- Voltage is decreased at the “step down” substation
- Lines branch out to serve larger commercial customers and residential areas



FINAL DELIVERY

- Smaller lines are used to connect individual homes and small businesses to the grid
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WHERE DOES THE POWER GO?

Western
Interconnection



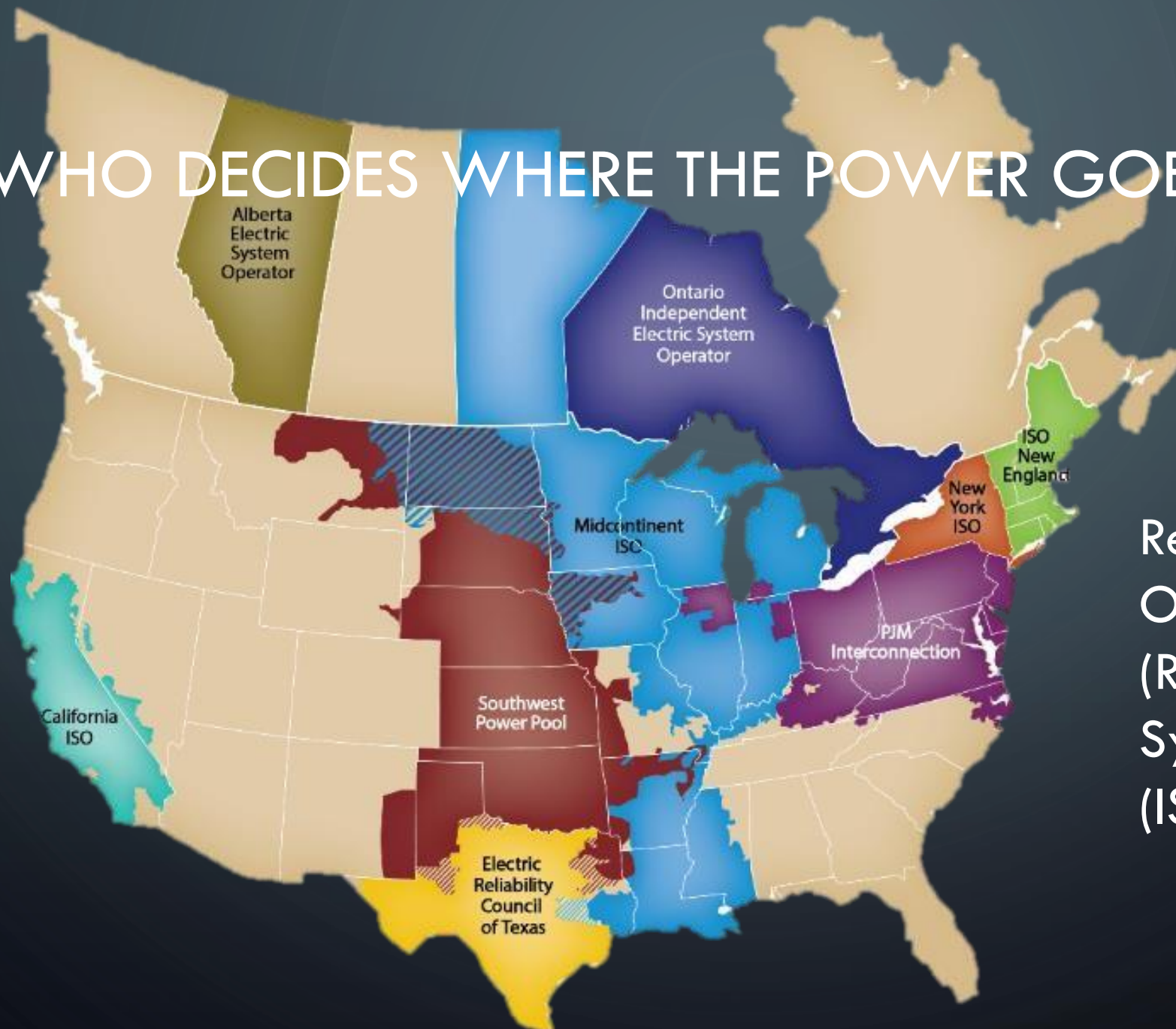
Eastern
Interconnection



Electricity Reliability Council of Texas
Interconnection



WHO DECIDES WHERE THE POWER GOES?



Regional Transmission
Organizations
(RTOs)/Independent
System Operators
(ISOs)

RTOs/ISOs are responsible for:

- Dispatching power plants
- Planning for expansion & new resources
- Controlling transmission voltage & switching lines in and out of service
- Keeping the grid balanced between generation & load
- Forecasting & scheduling generation to ensure sufficient generation is available to meet forecasted load, plus backup power if needed
- Providing the platform for electricity wholesale market transactions and managing that process



Louisiana's RTOs/ISOs

- Midcontinent Independent System Operator (MISO)—Entergy Louisiana & Cleco
 - Operates in 15 states and one Canadian province
 - Over 180 members
 - 65,800 miles of transmission lines
- Southwest Power Pool (SPP)—SWEPCO
 - Operates in 14 states
 - 104 members
 - 60,000 miles of transmission lines



WHY DOES THE POWER GO OUT?

DISTRIBUTION FAILURES

- Most common type of outage
- Usually impact small geographic area
- Can be caused by weather, animals, balloons, car crashes, etc.
- Make up the longest duration outages after a storm

TRANSMISSION FAILURES

- Much rarer than distribution outages
- Can have huge consequences over very large geographical areas
- Can be caused by weather, but could also be equipment failure, computer issues, or even human error

OR...SUPPLY SHORTAGES

- Sometimes there just isn't enough electricity to meet an unusually high demand
- To help balance the demand & supply of electricity, customers who have opted into Demand Response and Emergency Demand Reduction tariffs will be called upon to reduce their demand
- The utilities will also issue public pleas for energy conservation
- As a last resort, and to prevent a catastrophic cascading blackout, power to consumers may be temporarily disrupted on a rotational basis
- ISOs/RTOs instruct their Load Balancing Authorities to implement load shedding according to pre-planned and approved schedules

FEBRUARY LOAD SHED EVENTS

SATURDAY,
09/13/2021

- Both SPP & MISO have issued cold weather alerts to their grid operators

SUNDAY,
09/14/2021

- Both RTOs declare Conservative Operations until further notice
 - At this alert, the systems are operated as conservatively as possible.
- All utilities put out public notices asking customers to curtail usage

MONDAY,
09/15/2021

- @05:00, SPP declared an Energy Emergency Alert (EEA) Level 1, meaning all available generation resources were in use and committed, and, that maintaining the required resources for the Balancing Authority (BA) was becoming an issue
- Non-firm wholesale energy sales were curtailed
- @07:00, MISO declared a Max Gen Alert, which prepared them for a Max Gen Event occurring in the near future

FEBRUARY LOAD SHED EVENTS

MONDAY, 09/15/2021 continued

- @07:22, SPP declared an EEA 2, meaning the system was becoming energy deficient. The BA was barely able to keep the minimum reserve, and they notified other BAs of the issue
- @10:08, a new record peak demand for SPP was reached, and they declared an EEA 3, meaning the BA was now unable to meet minimum contingency reserve requirements

MONDAY, 09/15/2021 continued

- @12:10, SPP implements their Load Shedding plan until 13:00 when service was restored to all customers
- @18:00, MISO issued a Max Gen Warning for the South region, and declared an EEA 2, where both RTOs remained through the night

TUESDAY, 09/16/2021

- @06:15, SPP declared an EEA 3 again
- @06:46, Load Shedding was again implemented in SPP's area until 10:07 when service was again restored to all customers
- @07:30, MISO also declared an EEA 3, and their Load Shedding plan was implemented until 13:32
- @18:30, both systems went to EEA 2
- @19:40, MISO again has a Load Shed event through 22:00

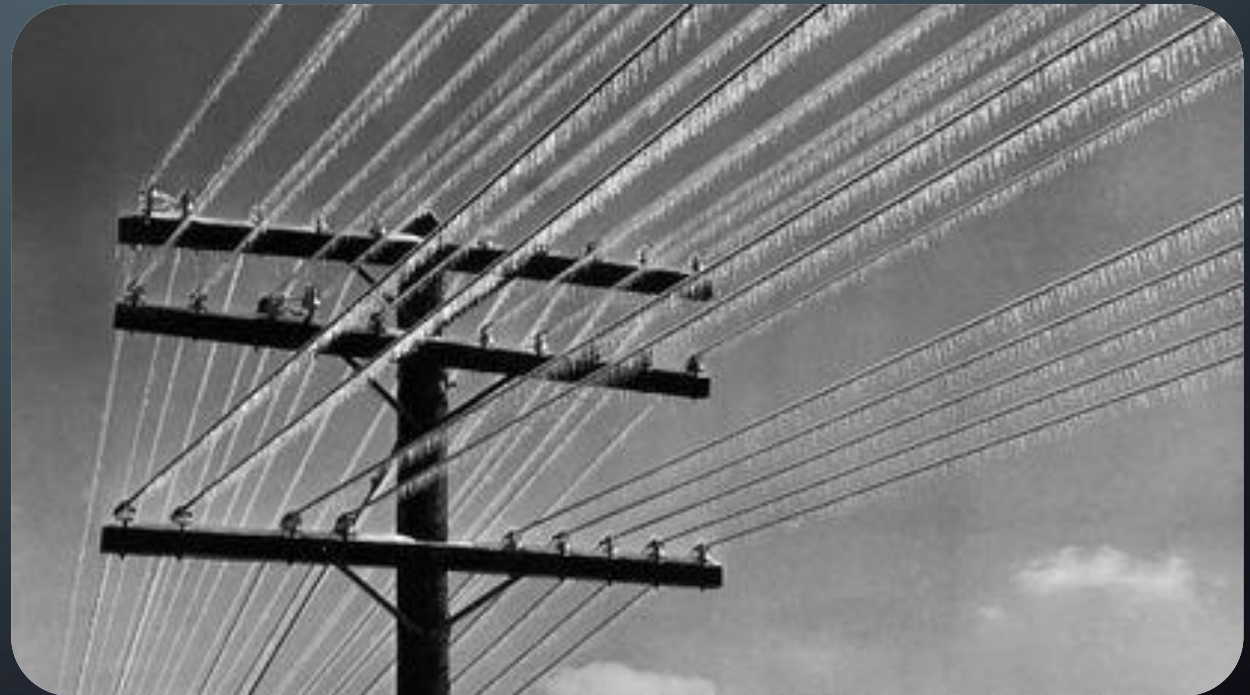
FEBRUARY LOAD SHED EVENTS

WEDNESDAY,
09/17/2021

- Both MISO & SPP continued to appeal to the public, through their member utilities, to curtail power usage as much as possible
- Both remain at an EEA 1 for the next two days

SATURDAY,
09/18/2021

- Normal operations are finally declared for both systems



LOUISIANA VS TEXAS

- Both states were dealing with the same situation:
 - Ice/sleet/snow on power lines & roads
 - Frozen Natural Gas regulators and pumps at power generating units, leading to decreased electricity output
 - Record-low temperatures leading to record-high peak demand
- Louisiana was able to take advantage of the multiple RTOs and avenues for electricity transmission throughout the region, and the implementation of their Load Shedding plans meant no one customer was without power for more than 2 hours
- Texas attempted to implement Load Shedding plans, but it wasn't enough to decrease the record-high demand, and they ran out of generation to bring online. The intended rolling blackouts became more prolonged outages, and, when demand still outpaced supply, more circuits began to be shut off, leading to millions being without power for more than 48 hours.

SO WE'RE GOOD?

- As we just learned last month, power is never guaranteed here in Louisiana, especially at the end of August/beginning of September.
- Our utilities are experts and leaders in the country for power restoration efforts
- But hospitals, nursing homes, and other healthcare facilities still need to be prepared for possible prolonged power outages, as they are some of the more “power hungry” facilities out there
 - Health care facilities need power for all of their daily operations—lighting, security systems, HVAC, electronic health records, and all of the electricity-dependent durable medical equipment strewn about
 - Also require power for their residents daily support needs—food, water, & transportation
- Without power, evacuation becomes necessary, along with the risks & dangers involved with evacuating these specific populations

STANDBY/TEMPORARY POWER GENERATION

- Standby power systems are complex and come with all new challenges that must be considered
- Their system components can be just as susceptible to the same hazards that knocked out the main power
- An incorrectly installed transfer switch to keep the facility off of the main power grid can be catastrophic for utility workers
- New devices must be tested, or, old devices in new locations must also be tested
- Must carefully consider exactly what needs to be run and be sure that the standby/temporary generator has that capacity
- Equipment failure is always an option, and finding the right part, or the right person to fix the right part, while in the middle of an emergency, can be extra challenging



CONTACT DETAILS

Jessica Kayuha, Utilities Specialist Supervisor

Jessica.Kayuha@la.gov

225-772-6107