Approved, March 23, 2021
Virtually Zoom
Park Ridge, NJ

MAYOR AND COUNCIL MEETING
WORK SESSION
March 09, 2021
6:45P.M.

Present: Councilmembers Capilli, Cozzi, Epstein, Fenwick, Ferguson, Metzdorf, and Mayor Misciagna
Absent:
Also Present: Julie Falkenstern, BA
Magdalena Giandomenico, Borough Clerk
Durene Ayer, Borough CFO
John Schettino, Esq. Utility Attorney
Bill Beattie, Operations Director
Tim Kennedy, Utility Board Member
Jeff Rutowski, Utility Board Member

Mayor Misciagna read the compliance statement earlier as required by the Open Public Meeting Act, P.L. 1975, and Chapter 231.

I. Presentation: "Tutorial on Wholesale Power Delivery for the for Park Ridge Electric Department: Benefits of Peak Shaving Generation Plant" By: Bill Beattie, also present Jeff Rutkowski and Tim Kennedy

**Please see the presentation attached at the end of the minutes*.

i. Councilman Capilli asked when we say gas, do we mean diesel or natural? It would be natural Bill Beattie said.
ii. Councilman Fenwick asked if we have a company run a plant will that effect our de facto monopoly that our municipal power company has providing power to our residents, would another company now be able to sell power? Bill Beattie said no. Councilman Fenwick also asked what is the lifespan of a gas power peak shaving plant? Bill Beattie 25-30 years. Councilman Fenwick asked would a natural gas plant put additional requirements or burdens on our fire department, regarding additional certificates or equipment? Bill Beattie doesn't think so, but he would double check.
iii. Mayor Misciagna stated that we now have a possession of about 30 acres of wetlands because of our affordable housing settlement, which can maybe be used.
iv. Mayor Misciagna asked if everyone is comfortable with Bill Beattie and the Utility Board going to the next step and exploring this with more detail, all in favor.

II. **Administrator Report** Borough Administrator Falkenstern updated the Mayor and Council on:

a. Gas Usage – Considering what occurred in Palisades Park, Tom Padilla and Julie Falkenstern are looking at the two towns gas usage and making sure everything is documented. It is monitored, but Woodcliff Lake and Park Ridge are reconfirming since they use the Borough pumps.
b. Parking Passes: Parking passes for the commuter lot are up in April, that is the normal year cycle. Last year the Borough only sold 50 passes in 2020 by April and with Covid we stopped buying them. To make is smooth this year, the Borough will not issue refunds, but will allow those sold to be valid in 2021 and use the remainder of the 2020 stickers in 2021 to not buy new ones.
c. Marijuana Ordinance: It was distributed to everyone this afternoon for introduction on 3/23/2021 and if anyone has any additional questions please contact the Borough Attorney. Council President Epstein said Bocchi did speak to PIM's attorney and they are okay with it and they appreciated the Borough working together with Borough businesses.

III. **CFO Report:** Borough CFO Durene Ayer spoke about the current operations of the finance department. The draft budget will be presented shortly.

i. Councilman Capilli asked with the budget, that the Police Chief asked for the breakage in the retiring officers' salary be applied to overtime, is that occurring? Councilman Fenwick said that is something which is still being discussed.

IV. **PRAA:** Councilmen Ferguson spoke about the need for two more defibrillators, which cost around $1,600 apiece. One for Colony field and one for the Sulak field, we have one for memorial field. PRAA also maintains the equipment at memorial field, which is used by residents and others as well. Councilman Fergusons asked about the possibly of using the monies from the field fees to upgrade/fix the equipment there and purchase the two defibrillators. Council President Epstein agreed that if we buy them, they should be paid for by field fees and maybe registration fees. Borough Administrator Falkenstern said the contractual item that comes out of the field fees is the lightning detection, but she will look into what amount is available in field fees and maybe some of that money can also come out of open space.

Open Work Session adjourned to Closed Session at 7:55pm
On a motion made by Council President Epstein and Seconded by Councilman Metzdorf to confirm. Motion carried unanimously.

Respectfully submitted,

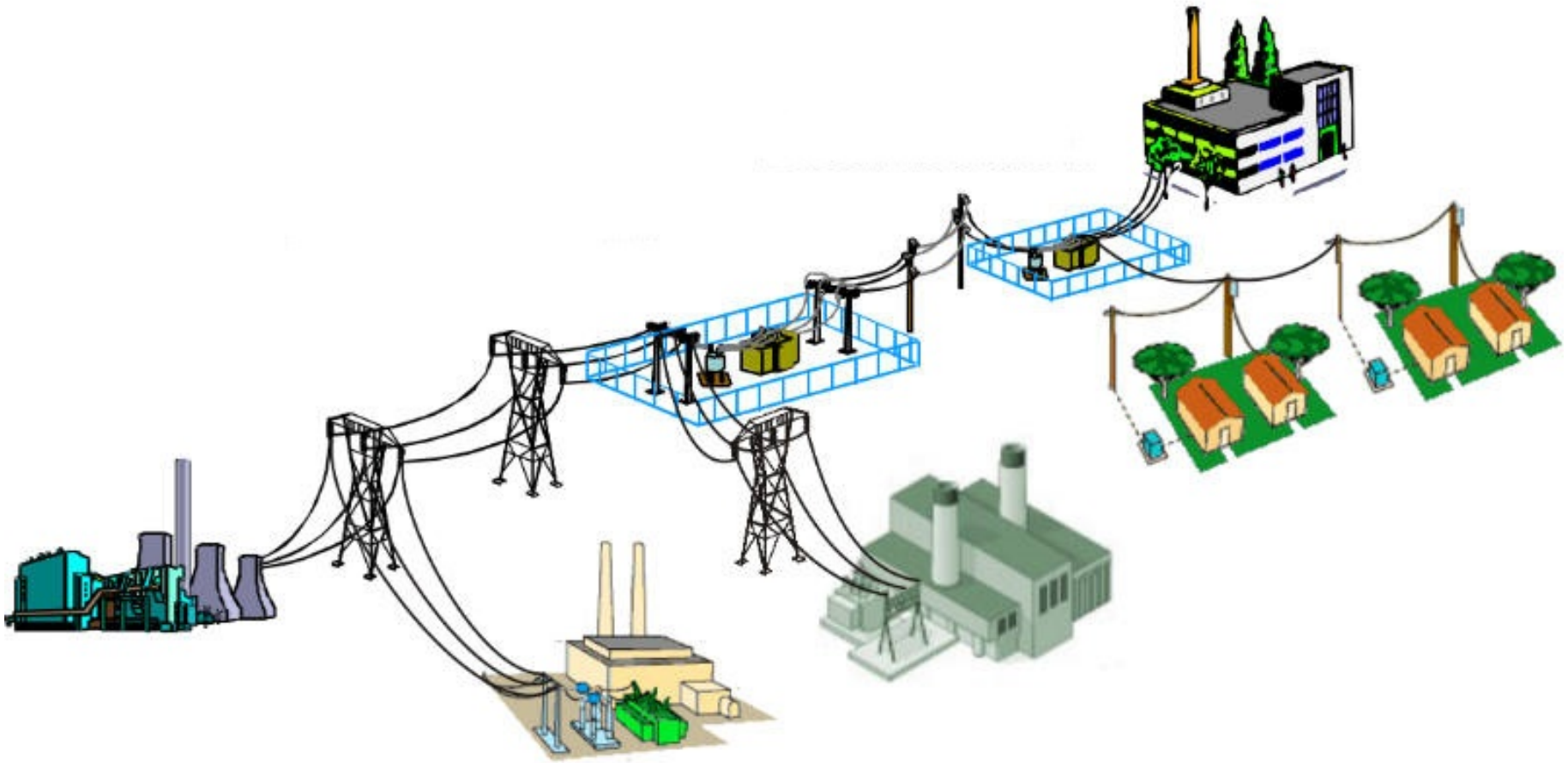
Magdalena Giandomenico

Magdalena Giandomenico

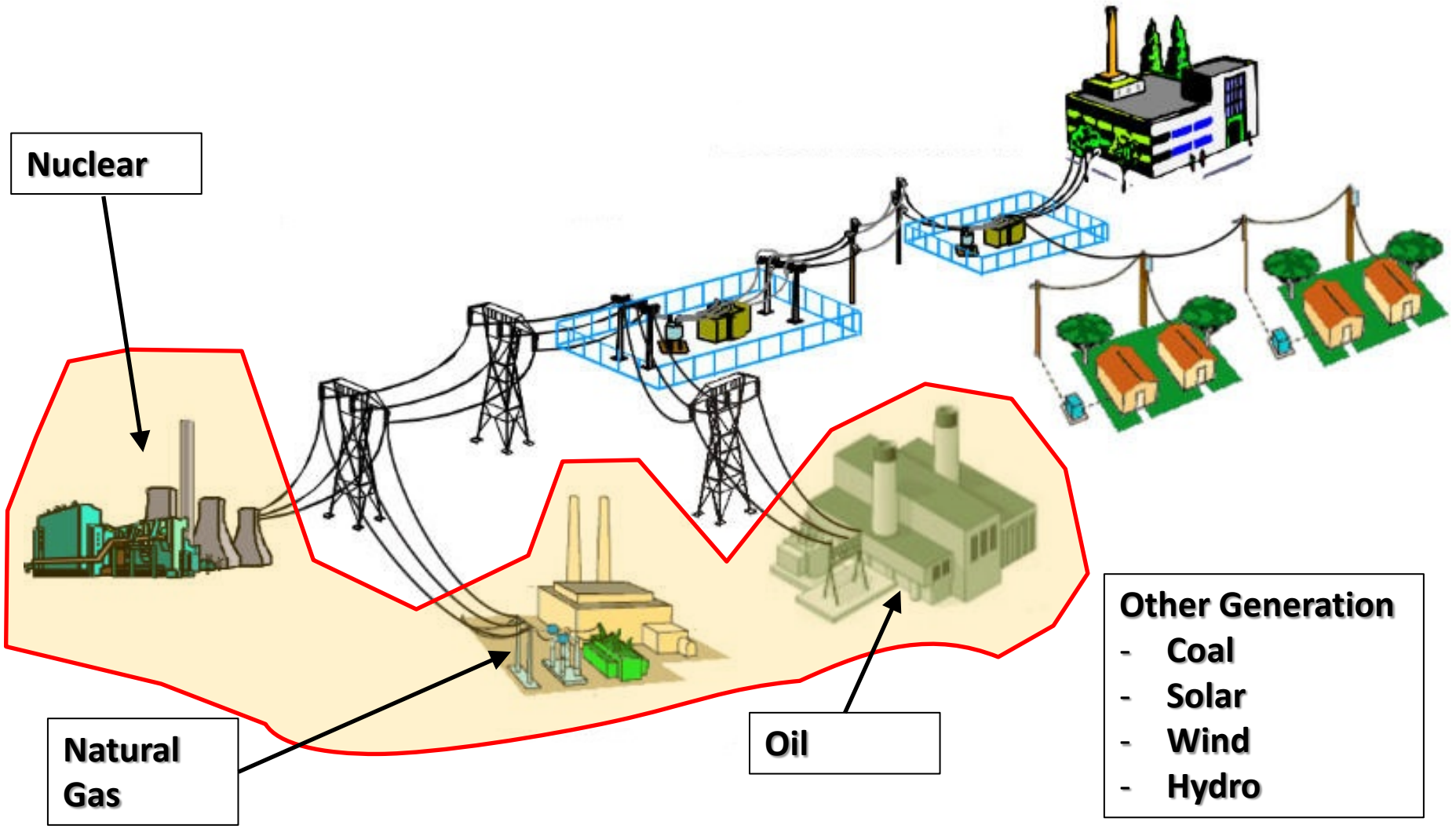
Tutorial on Wholesale Power Delivery for the for Park Ridge Electric Department

Benefits of Peak Shaving Generation Plant

Components of Power Delivery System from Generation to Customer

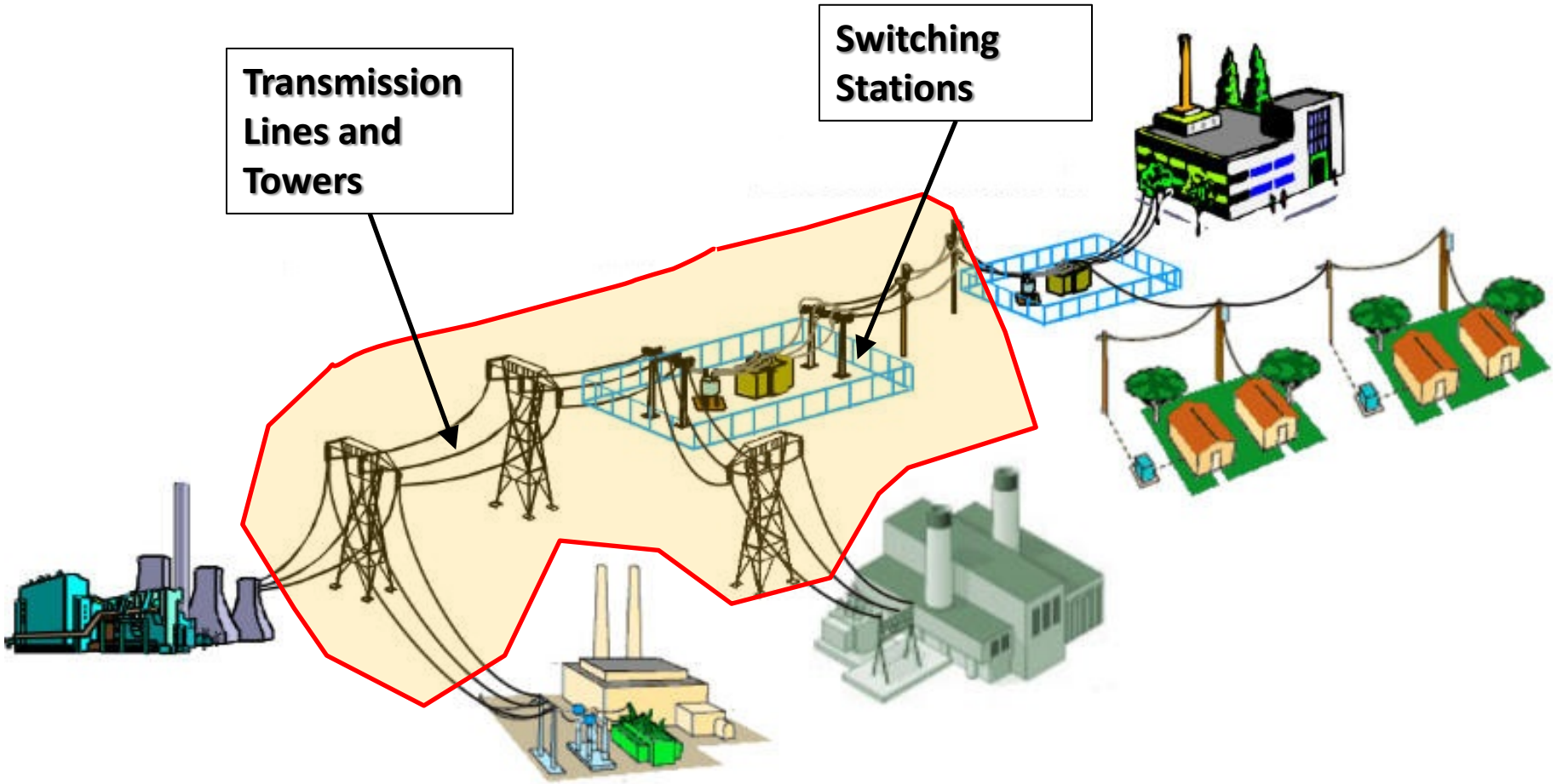


Components of Power Delivery System from Generation to Customer



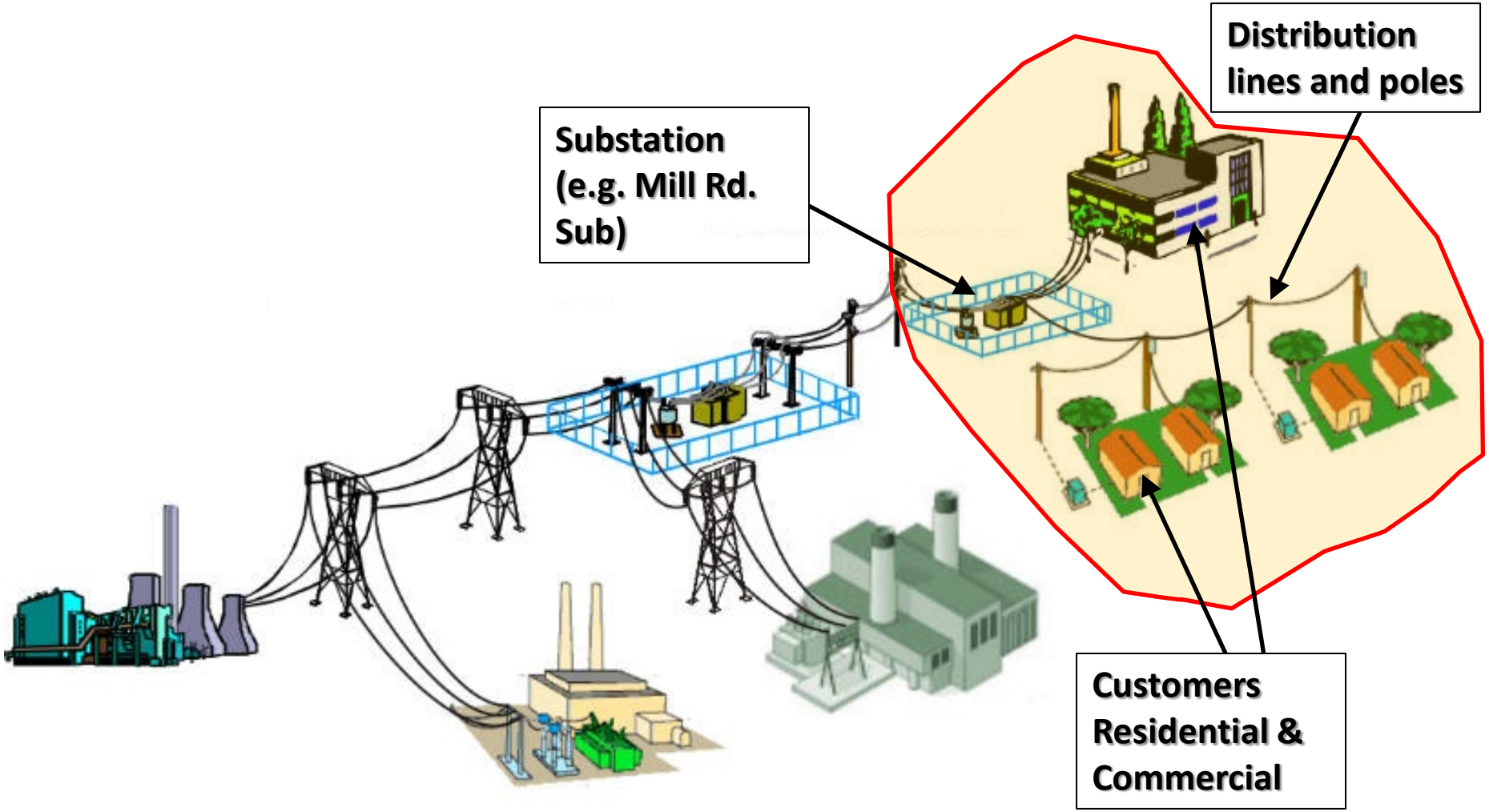
Generation - Where the Energy is Created

Components of Power Delivery System from Generation to Customer



Transmission - Grid that delivers energy to different regions of the country

Components of Power Delivery System from Generation to Customer



Distribution - Local delivery to end customers – **THIS IS WHAT WE DO IN PARK RIDGE**

Costs of Power Delivery System from Generation to Customer
Generation - Energy and Capacity Components

Energy

- The electrical power that is generated at the power plants (i.e. the electrons that are pushed out of the power plants onto the grid).
- Energy is a commodity and we need to purchase all of the energy that is delivered and consumed by our customers.
- The energy market is deregulated and we purchase our requirements by going out to the market with competitive RFP's to only solid credit rated energy suppliers.
- Price of electricity is closely linked to fuel prices (i.e. natural gas)
- **We have taken advantage of very low future energy prices and have contracted for a majority of our energy needs through 2029.**

Capacity

- Many power plants are not needed until the high demand periods in the summer or during emergencies.
- If power plants only made money by selling energy, many of them would close and we would not have enough plants available when needed in the summer to meet the peak demand (which would be catastrophic).
- To keep the plants around for when they are needed, they can get paid to be available when called on. This is called Capacity.
- This market is deregulated and generators bid their prices to be available, and are selected, in annual auctions run by our grid operator (PJM).

Costs of Power Delivery System from Generation to Customer Transmission

- Transmission costs are what we pay for the operation, maintenance, and expansion of the regional transmission grid.
- The cost for transmission is regulated by the Federal Energy Regulatory Commission (FERC).
- The PJM transmission grid is broken up into delivery zones (we are located in the PSEG Zone).
- FERC has approved a number of large projects for PSE&G and the costs are updated and adjusted each year beginning January 1.
- **Due to these major improvements, our transmission costs have increase significantly over the past eight years.**

Transmission Upgrades Push Electricity Prices for Residential, Commercial Customers

TOM JOHNSON | FEBRUARY 6, 2020 | ENERGY & ENVIRONMENT

Increases projected to be modest, after most recent power auction, but BPU does raise concerns about money utilities are pumping into transmission

2 COMMENTS

Transmission tower

New Jersey residential and small-commercial customers will likely see their monthly electric bills increase slightly this June, a mild reversal of the past few years when prices were relatively stable or dipped because of low natural gas prices.

PSE&G announces it will spend $10 billion on transmission line upgrades

Public Service Electric & Gas at work last year on a high-voltage transmission line in Livingston, part of the North Central Reliability Project. Today, PSE&G announced it would spend $10 billion over the next five years to upgrade its transmission lines. *(Star-Ledger file photo)*

Costs of Power Delivery System from Generation to Customer Distribution

- Distribution is the final component of the electric delivery system. **This is what we do in Park Ridge.**
- The power flows into our Mill Road substation, it is metered, and then we take it from there.
- We own and maintain the Substations (Mill Road and Brae Blvd), poles, wires, transformers, meters, etc.
- The cost for the distribution includes our operating costs, capital expenditures, and debt service (approved in our annual budget).
- For Investor-Owned utility companies (e.g. PSE&G), the rate charged to the customers for the distribution is regulated by the New Jersey Board of Public Utilities.
- **In Park Ridge, our rates for this service are self-regulated by the Park Ridge Mayor and Council.**

Substations

Transformers

Poles & Street Lights

Meters

Power Lines

Costs of Power Delivery System from Generation to Customer
Breakdown of Power Costs & Our Rate Components

2021 Wholesale Power Budget		
Energy	$ 2,163,862	36.0%
Capacity	$ 1,213,031	20.2%
Transmission	$ 2,479,119	41.2%
Other	$ 159,376	2.6%
Total	$ 6,015,387	

In 2021, our total residential rate is 15.43¢ per KWH (including the monthly fixed charge). The approximate component cost breakdown is as follows:

3.44¢/KWH – Energy Component
1.50¢/KWH – Capacity Component
3.78¢/KWH – Transmission Component
0.20¢/KWH – Other (cost to operate regional grid)
1.02¢/KWH – Losses (transformer/wire losses and unmetered street lighting)
5.49¢/KWH – Distribution Costs (PR's cost to own and operate the distribution system and run our electric utility)

Costs of Power Delivery System from Generation to Customer
Historic Power Costs Components

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Energy	4,841,213	4,816,265	4,510,959	4,631,999	4,224,220	3,849,412	3,469,000	3,005,707	2,482,785	2,318,922	2,163,862
Capacity	1,141,999	1,089,868	1,781,839	1,540,924	1,271,843	1,600,007	1,589,000	1,504,889	1,151,548	1,012,037	1,213,031
Transmission	592,446	556,641	789,063	1,093,690	1,374,484	1,165,237	1,609,000	1,991,230	2,512,000	2,545,886	2,479,119
Others	336,811	265,885	252,300	156,156	205,206	121,409	88,000	128,848	112,423	134,588	159,376
Total	6,912,469	6,728,660	7,334,161	7,422,769	7,075,753	6,736,065	6,755,000	6,630,674	6,258,755	6,011,433	6,015,387

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Historic Power Costs Components

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The Energy Price component has decreased significantly since 2011
This is the competitive component that we purchase through RFP's

June 2020-May 2021

Date Purchased	Price	Company
12/15/2016	**34.89**	BP
1/11/2017	**32.80**	Nextera
1/11/2017	**31.75**	Nextera

June 2021-May 2022

Date Purchased	Price	Company
8/28/2017	**29.88**	Nextera
2/15/2018	**31.40**	PSEG
7/10/2018	**30.59**	Nextera

June 2022-May 2023

Date Purchased	Price	Company
7/10/2018	**30.20**	Nextera
1/15/2019	**30.65**	PSEG
5/14/2019	**31.95**	PSEG

June 2023-December 2024

Date Purchased	Price	Company
5/14/2019	**30.78**	BP
9/17/2019	**26.34**	BP
9/17/2019	**26.77**	BP

Jan 2025-December 2029 (Note: Five Year Contract)

Date Purchased	Price	Company
9/17/2019	**27.87**	BP
2/13/2020	**28.85**	BP

Price shown are in $ per MWH. 28.85 $/MWH is equal to 2.885¢/KWH (move the decimal one place to the left)

Costs of Power Delivery System from Generation to Customer
Historic Power Costs Components

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Energy	4,841,213	4,816,265	4,510,959	4,631,999	4,224,220	3,849,412	3,469,000	3,005,707	2,482,785	2,318,922	2,163,862
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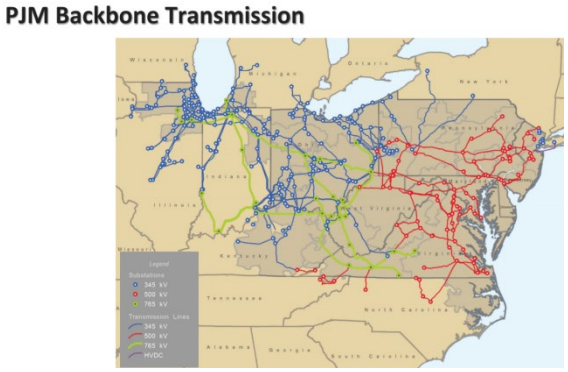
Total	6,912,469	6,728,660	7,334,161	7,422,769	7,075,753	6,736,065	6,755,000	6,630,674	6,258,755	6,011,433	6,015,387

The Transmission component has increased significantly since 2011
This is a FERC regulated component that we pay for the transmission system to get the power from the generators to our substation.

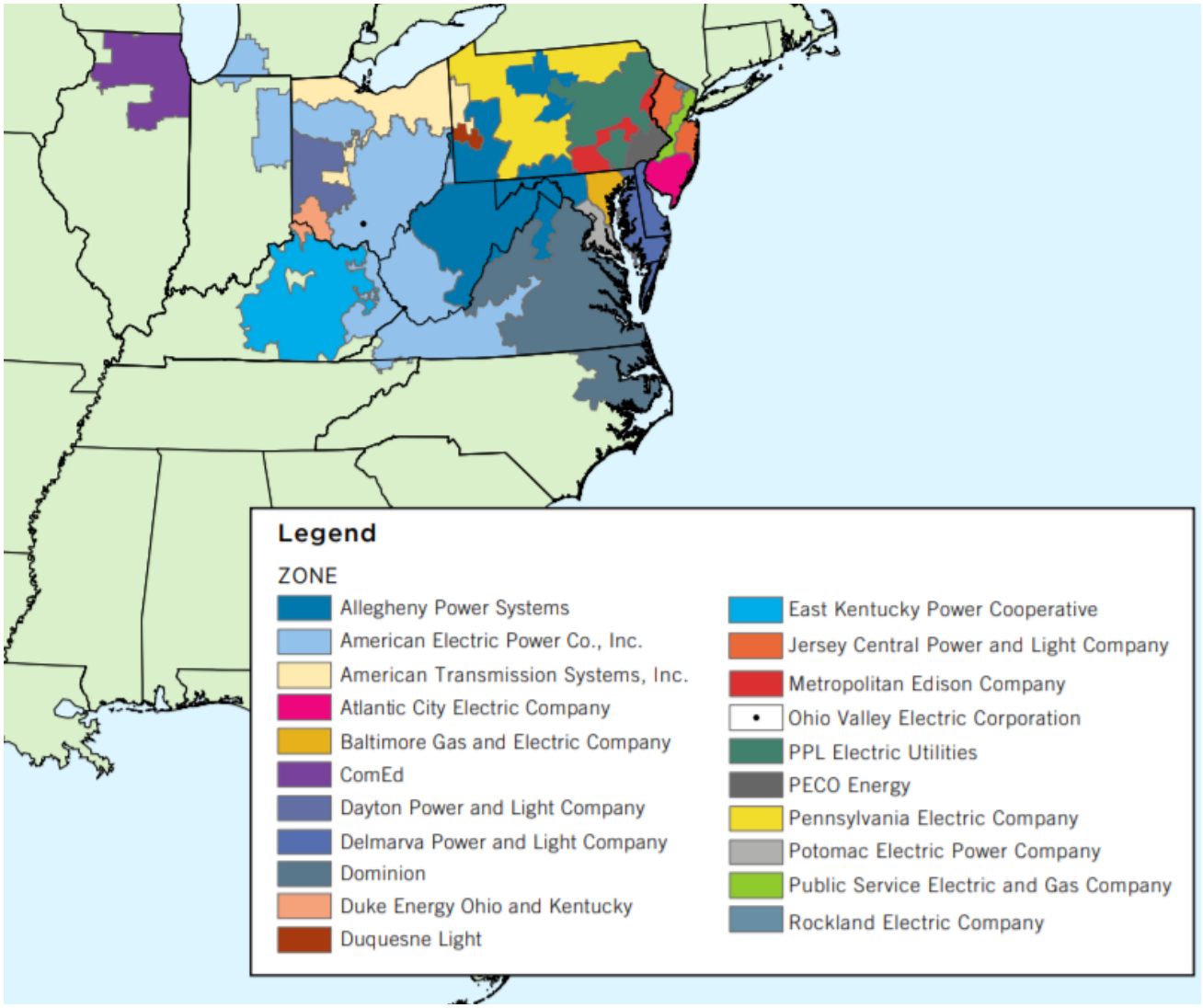
How is our Capacity and Transmission Costs Determined

First you need to know who is PJM?

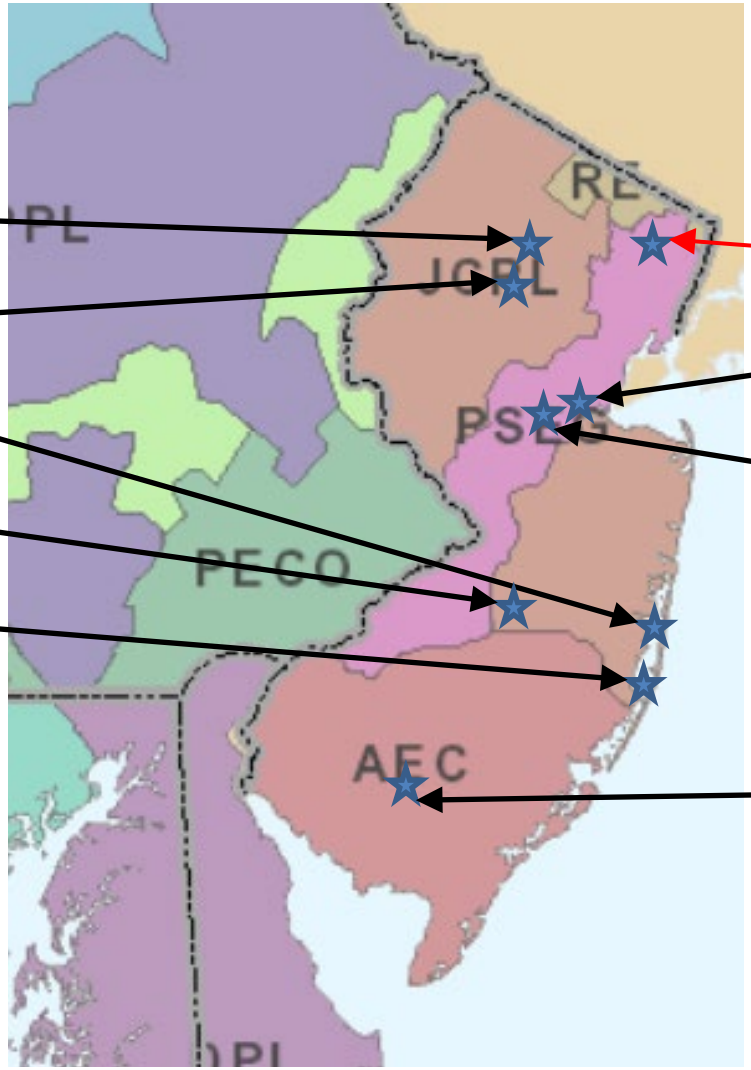


- **PJM Interconnection** is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.
- PJM originally stood for the Pennsylvania-New Jersey-Maryland Interconnection, with more States joining later.
- Acting as a neutral, independent party, PJM operates the wholesale electricity market and manages the high-voltage electricity grid to ensure reliability for more than 65 million people
- In other words, they are the **Operator of "The Grid".**
- They also provide the services for efficient wholesale trading and financial settlement.

There PJM grid is broken up in to regional transmission zones



Location of NJ Municipal Electric Utilities Regional Transmission Zones



JCPL Zone

- Butler
- Madison
- Lavallette
- Pemberton
- Seaside Heights

PSEG Zone

- Park Ridge
- South River
- Milltown

Atlantic Electric Zone

- Vineland

Determination of Capacity Rate

- PJM needs to make sure there is enough power plants ready to be operated when needed. This includes seasonal peaks and during emergency conditions. **This is imperative in order to maintain reliability of the grid.**
- In order to accomplish this, they use statistics and other data to determine what the load forecast is three years in the future. They then add a 15.8% reserve margin to that forecast.
- PJM also breaks up the grid into different zones as the cost for capacity at different locations varies. Park Ridge is in the PS Zone.
- They then perform an online auction to get prices from generators who promise to deliver the supply three years into the future, if needed. They then hold three supplemental auctions as time gets closer to the delivery year to adjust for changes in the predicted demand.
- After the final auction is completed an annual rate is calculated for each zone.
- **For June 2020 thru May 2021, our rate is $174.32 per MW-day.**
- **For June 2021 thru May 2022, our rate is $188.02 per MW-day**.

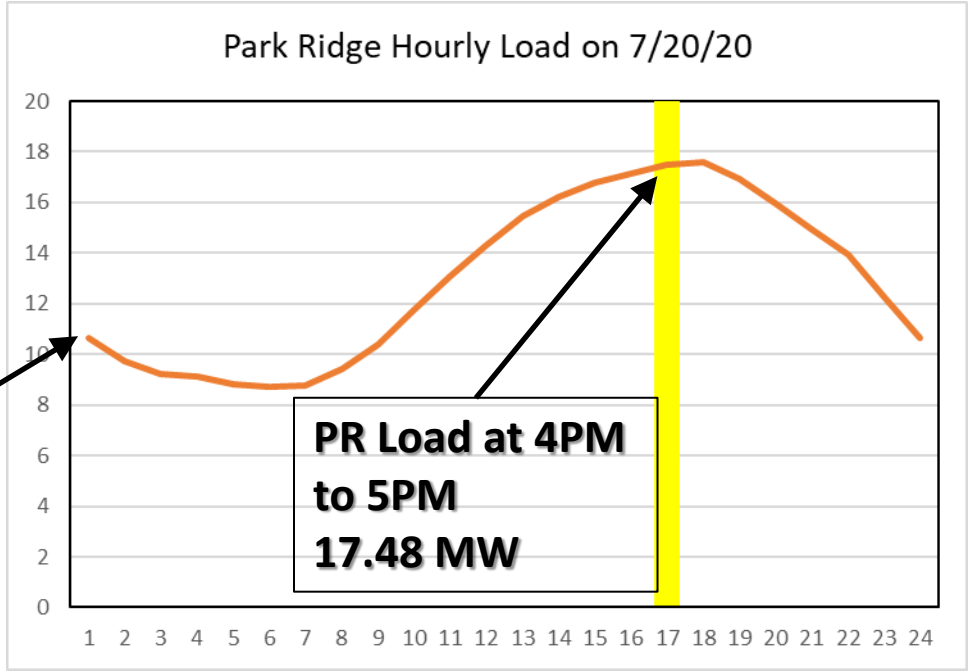
Determination our Capacity Obligation

- Every load serving entity that is connected to the PJM grid must pay a fee for Capacity. The generators need to get paid for promising to be available when needed (even if they are not used).
- Park Ridge is a load serving entity (i.e. we are one customer on the grid).
- To determine our capacity cost, a determination of our **Capacity Obligation** needs to be determined. That is, we need to pay for our share of the demand that our utility puts on the PJM grid. Our payment (along with everyone else's payment) will then be distributed to the generators who were awarded contracts in the PJM capacity auctions.
- Our Capacity Obligation is determined by the average of our system's load (i.e. meter readings) during the peak one hour timespan on the five days when the total load in the PJM grid hits it's peak.
- The obligation that is determined in one year, is then used to calculate the Capacity costs we will need to pay during the following year.
- A PJM year for Capacity is from June through May.
- For example, our capacity obligation that was derived from the five summer peak hours in 2020, will impact our capacity costs starting in June 2021.

Determination our Capacity Obligation

- Capacity rates are calculated based on the five highest PJM load hours of the year, known as 5 CPs (Coincident Peaks), and our share of that is based off of our municipalities meter reads during those five hours.
- Park Ridge's Capacity Obligation is generally around 20 megawatts (and has been flat for a number of years)
- In 2020, the dates and hours when PJM hit their peaks were as follows:
  - Mon 7/20/2020 4PM to 5PM
  - Mon 7/27/2020 4PM to 5PM
  - Thurs 7/9/2020 5PM to 6PM
  - Mon 7/6/2020 2PM to 3PM
  - Wed 7/29/2020 5PM to 6PM

Graph showing Park Ridge Hourly Load on PJM Peak Day 7/20/20



- **Based on Park Ridge Meter Readings during those five hours (along with some PJM scaling factors), our Capacity Obligation for the June 2021 thru May 2022 period was calculated as 19.72 MW**

Determination our Annual Capacity Costs

- Now that we have the Capacity Rate (which was determined by PJM Capacity Auctions) - **$188.02 per MW-day**
- And we have our Capacity Obligation - **19.72 MW**
- Our capacity cost is calculated as follows:

  $188.02 x 19.72 = $3,708 per day

  $3,708 x 365 days = $1,353,420 per year (from June 2021 – May 2022)
- This fee is broken up and charged to us in our PJM weekly bills.
- PJM takes these payments and distributes them to the appropriate generators.

- The capacity rate for the 2020-2021 term is **$174.32 per MW-day**
- Based on our five coincident peaks in the summer of 2019, our Capacity Obligation is expected to be around **18.87MW.**
- Our June 2020 – May 2021 capacity costs is calculated as follows:

  $174.32 x 18.87 = $3,289 per day

  $3,328 x 365 days = $1,200,485 per year (from June 2020 – May 2021)

Determination of Transmission Rate

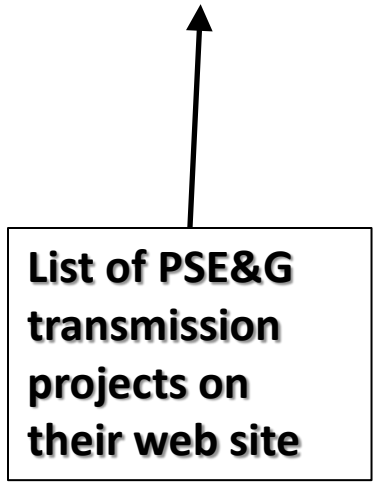
- Every user of the transmission system needs to pay for it (throughout PJM).
- Because Transmission lines cross state lines, the rates are regulated by the Federal Energy Regulatory Commission (FERC).
- Based on the costs to operate, maintain, and expand the transmission system, the owners apply to FERC for the rates to be charged to the users.
- The rates are approved based on the costs to operate the system plus a return on equity (11.68% for PSE&G).
- Once the rates are approved, PJM distributes the costs to the load serving entities (like Park Ridge) using a similar method to how Capacity is determined.
- Park Ridge is located in the PSEG Zone and the transmission system is owned by PSE&G.

Determination of Transmission Rate

- For the past 10 years, PSE&G has been performing significant improvements to their transmission system.
- PSE&G Web site has a page listing all of the projects they are working on (see list on right).
- Several years ago, FERC approved a "Formula Rate" methodology for PSE&G whereby the unit charges for their transmission service are determined for each year. Prior to the beginning of the year, PSE&G calculates the rate for the year by applying the template or formula to estimated or projected costs and system loads for the year. The resulting rates are used for billing during the subject year.
- We are advised of the new rate for the upcoming year each November. A meeting is held at PSE&G's headquarters when they go through their calculations and discuss the new rate. I usually attend this meeting.
- For 2021, our rate for transmission service is **$172,190 per MW-Year**.

Reliability Projects

- Aldene-Warinanco-Linden VFT
- 69kV Initiative
- Energy Strong Electric
- Energy Strong Gas Main Replacement
- Metuchen-Trenton-Burlington
- Newark Switching Station
- Roseland - Pleasant Valley
- Underground Transmission Upgrade Program
- Vegetation Management



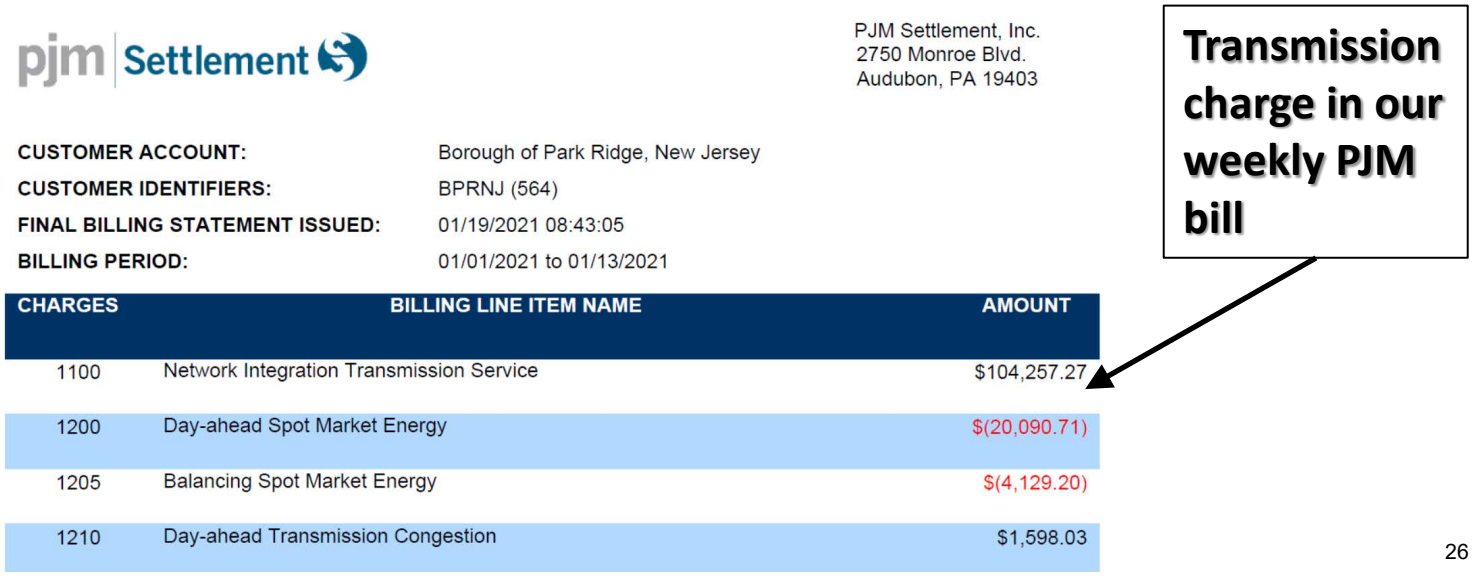
Determination our Transmission Obligation

- Similar to how our Capacity Obligation is determined, our **Transmission Obligation** is determined by the five highest peak but coincident with the PSEG transmission zone peaks (for Capacity it was based on the five highest peaks in the entire PJM grid).
- In 2020, the dates and hours when the PSEG Zone hit its peaks were as follows:
  - Wed 7/22/2020 - 4PM to 5PM
  - Mon 7/20/2020 - 5PM to 6PM
  - Mon 7/27/2020 - 5PM to 6PM
  - Tues 7/28/2020 - 3PM to 4PM
  - Tues 7/21/2020 - 5PM to 6PM
- Based on Park Ridge's Meter Readings during those five hours (along with some zonal scaling factors), our **Transmission Obligation** for the January 2021 thru December 2021 period was calculated as **17.02 MW.**

Determination our Annual Transmission Costs

- Transmission rates are different from Capacity rates in the fact that the rate term is from January 1 through December 31
- Now that we have the Transmission Rate (which was approved by FERC through PSE&G formula rate update) - **$172,190 per MW-Year**
- And we have our Transmission Obligation - **17.02 MW**
- Our gross annual transmission cost is calculated as follows:

  $172,190 x 17.02 = $2,930,674 per year (from Jan 2021 – Dec 2021)
- There are come credits received from other regions using the PSEG Zone. The net impact results in our **annual transmission cost of $2,479,119 per year (in 2021).**
- This fee is broken up and charged to us in our PJM weekly bills.
- PJM takes these payments and distributes them to the transmission owners.



pjm Settlement

PJM Settlement, Inc.
2750 Monroe Blvd.
Audubon, PA 19403

CUSTOMER ACCOUNT:	Borough of Park Ridge, New Jersey
CUSTOMER IDENTIFIERS:	BPRNJ (564)
FINAL BILLING STATEMENT ISSUED:	01/19/2021 08:43:05
BILLING PERIOD:	01/01/2021 to 01/13/2021

CHARGES	BILLING LINE ITEM NAME	AMOUNT
1100	Network Integration Transmission Service	$104,257.27
1200	Day-ahead Spot Market Energy	$(20,090.71)
1205	Balancing Spot Market Energy	$(4,129.20)
1210	Day-ahead Transmission Congestion	$1,598.03

History of PSEG Rising Transmission Costs & Comparison to Other Zones

- PSEG's transmission rates have been significantly increasing for the past eight years. Their rates are also significantly higher then other transmission zones in PJM

PSEG Transmission Rates Since 2012		
Year	PSEG Trans Rate ($/MW-Year)	% Increase
2012	35,717	
2013	53,953	51%
2014	70,697	31%
2015	96,521	37%
2016	110,916	15%
2017	120,931	9%
2018	130,535	8%
*2019	119,735	-8%
2020	156,503	31%
2021	172,190	10%

* In 2019, rates were reduced by a flow back of $157 million in accumulated deferred income taxes (ADIT) due to the Trump tax cuts.

Annual Transmission Revenue Requirements and Rates		
Transmission Owner (Transmission Zone)	Annual Transmission Revenue Requirement	Network Integration Transmission Service Rate ($/MW-Year)
AE (AECO)	$125,075,638	$45,693
AEP, AMPT (AEP)	$2,066,332,706	$95,597.51
South FirstEnergy (APS)	$120,322,073^	$13,930.04^
ATSI, AMPT (ATSI)	$831,978,941	$66,744.13
BC (BGE)	$209,965,346.90	$31,311
ComEd (CE)	$718,149,481.11	$34,280.85
Dayton (DAY)	$63,446,423**	$19,175.06**
Duke (DEOK)	$159,235,526	$32,143
Duquesne (DLCO)	$141,278,388.40	$53,072.27
Dominion (DOM)	$1,238,329,019	$61,729.41
Dominion Underground (DOM)	$14,410,946	$744.73
DPL, ODEC (DPL)	$135,227,058	$33,000
JCPL	$165,360,691*	$28,012.04*
OVEC	$11,256,927	$5,163.73
PE (PECO)	$135,037,645	$16,022
PPL, AECoop, UGI (PPL)	$596,505,385	$75,204
PEPCO, SMECO (PEPCO)	$173,482,676	$28,165.56
PS (PSEG)	$1,645,668,896	$172,189.67
Rockland (RECO)	$16,833,707	$42,548
TrAILCo	$253,750,977.57	N/A
Silver Run	$23,622,243	N/A
Transource WV	$11,055,915	N/A

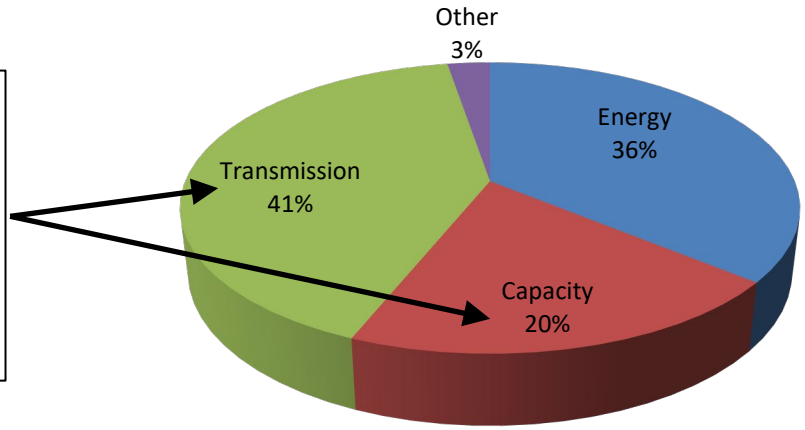
If Park Ridge were located in the JCPL Zone (were Butler & Madison are located), we would be paying $450,000 for transmission in 2021, as opposed to $2,479,119 .

Component Cost Breakdown

2021 Wholesale Power Budget		
Energy	$ 2,163,862	36.0%
Capacity	$ 1,213,031	20.2%
Transmission	$ 2,479,119	41.2%
Other	$ 159,376	2.6%
Total	$ 6,015,387	

Wholesale Cost Breakdown

Transmission & Capacity account for 61% of our total annual wholesale costs



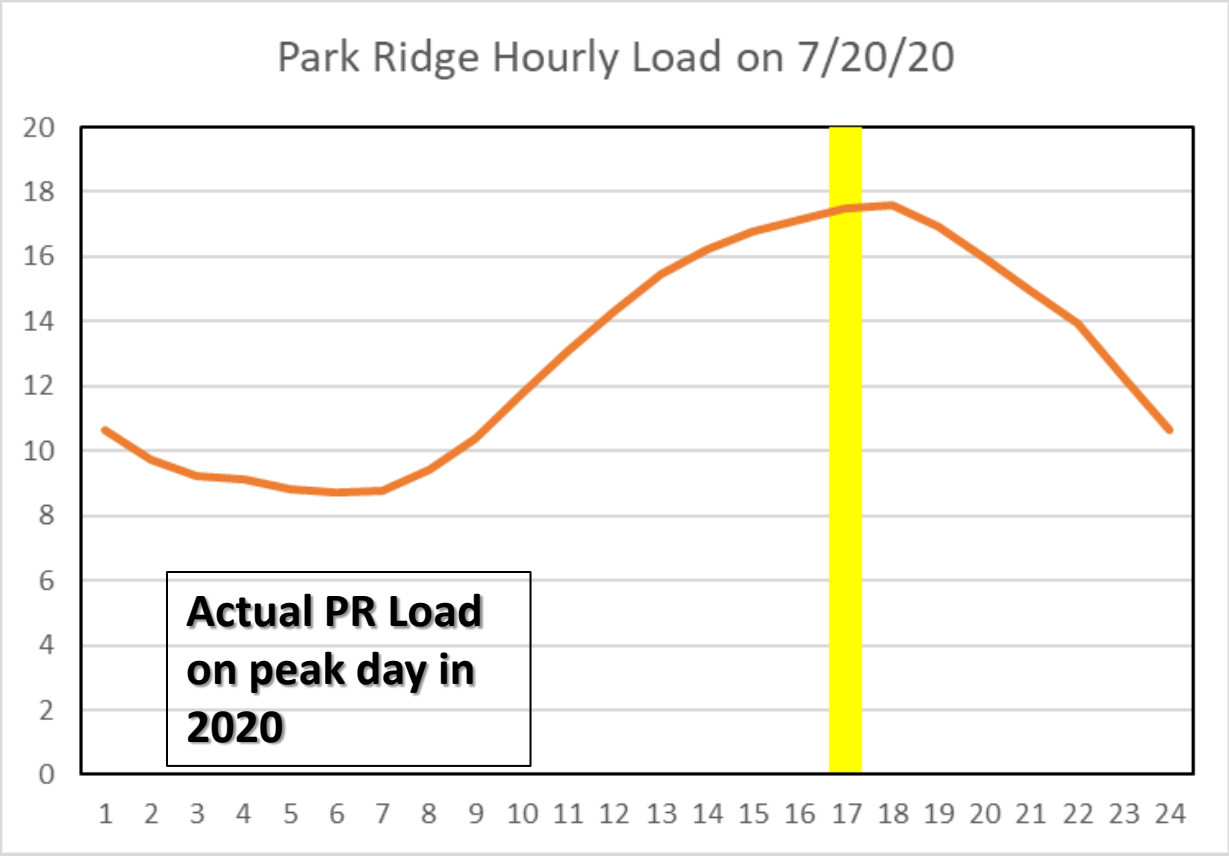
61% of our annual wholesale power costs are based on our load during 10 hours of the year (coincident peak hours).

How can we reduce our Transmission and Capacity costs?

- Because our transmission and capacity cost are based on our five highest coincident peak hour load, we can reduce our annual costs by reducing our peaks during these time periods. This would reduce our Capacity and Transmission obligations.
- We already try to reduce our peaks by shutting down our well pumps on the days that we may hit the peaks (and use the water in the tanks for the supply for a few hours).
- **A more significant way to reduce our peaks would be to own generation.**
- For each MW of peak load that we could reduce during the five coincident peaks, we could save the following on the following year's wholesale power costs (based on our Capacity rate effective 6/1/21 and Transmission rate effective 1/1/21):
  - **Capacity - Savings of $68,627 per MW reduction**
  - **Transmission – Savings of $172,190 per MW reduction**
- If we were to install generation in our town, this is referred to **"Behind the Meter Generation"**. That is, to PJM, we look like one customer with all of our incoming power metered at our substation. By installing generation in our distribution system, it is located behind the meter.

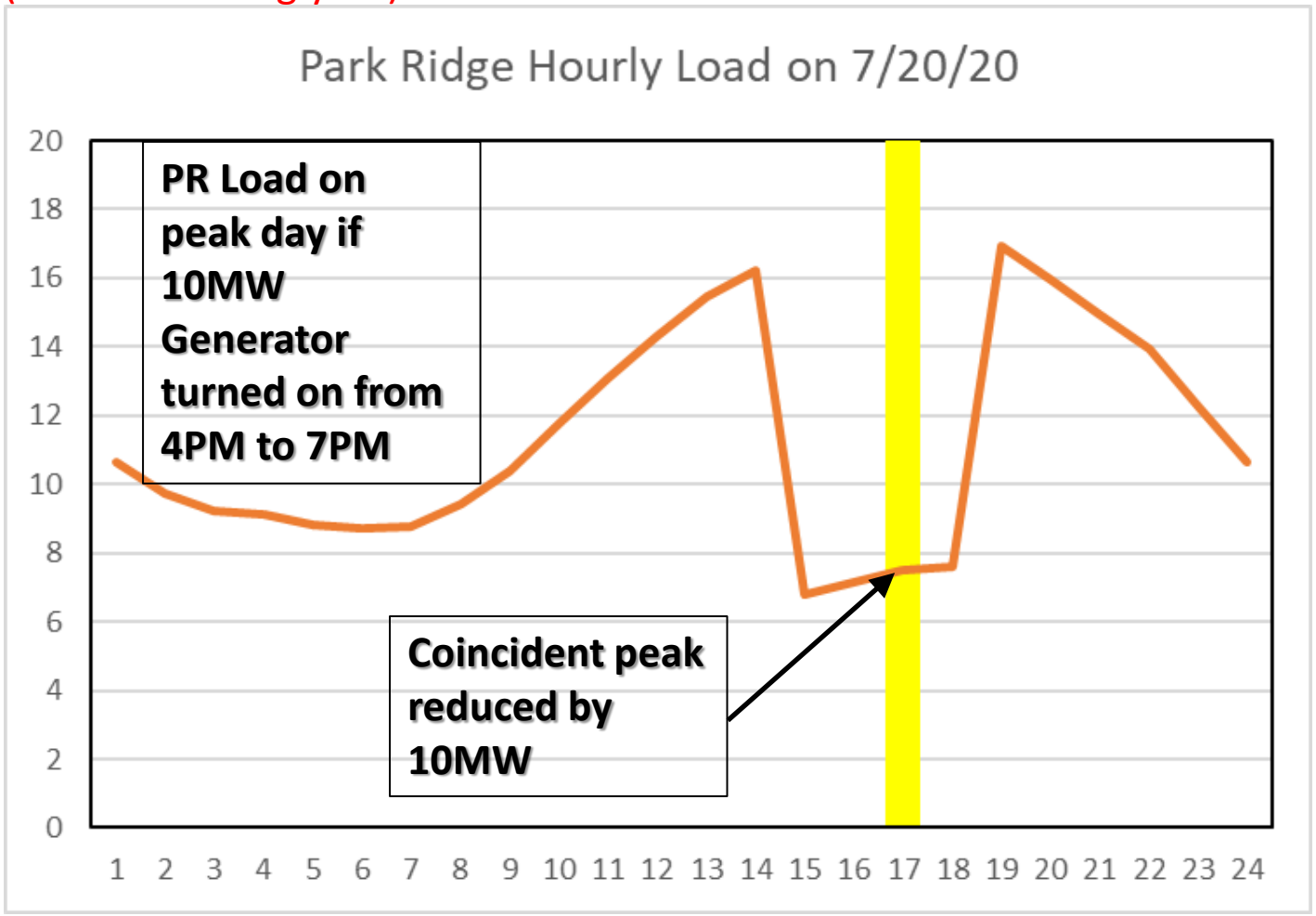
How can we reduce our Transmission and Capacity costs?

- If we were to own generation, and were able to run it during the five peak coincident days and hours, our Capacity and Transmission obligations, and consequently or costs would be reduced.
- This is called behind the meter generation.



How can we reduce our Transmission and Capacity costs?

- For example, if we had a 10MW power plant (or battery storage), and we were able to run the plant on the peak days, we could potentially save $686,270 on our capacity costs and $1,721,900 on our transmission costs (in the following year).



How can we reduce our Transmission and Capacity costs?

Options to shed peak load

Power Generating Plant

- Many companies manufacture various size generators that can be turned on and synched with our power system. When connected and synched, the amount of power that is generated reduces the amount of power that we need to pull from "The Grid".
- Main fuel source options for these generators would be diesel fuel or natural gas. Natural gas is cleaner (easier for air permitting) and as long as the natural gas supply is available (which is very reliable), the generators can run for an indefinite period of time.
- Due to newer technology, the generators can be designed with very high sound attenuated enclosures so there is minimal sound originating from the property while they are running.
- Alternatively, generators could be installed in an aesthetic building that would also be designed to attenuate the sound.

Examples of Potential Power Generating Plant Configurations

Series of Smaller Generators Interconnected (0.5 MW Each)

Larger Generator Units (2MW each)

Generators Enclosed in Building

How can we reduce our Transmission and Capacity costs?

Options to shed peak load

Battery Storage (or Energy Storage)

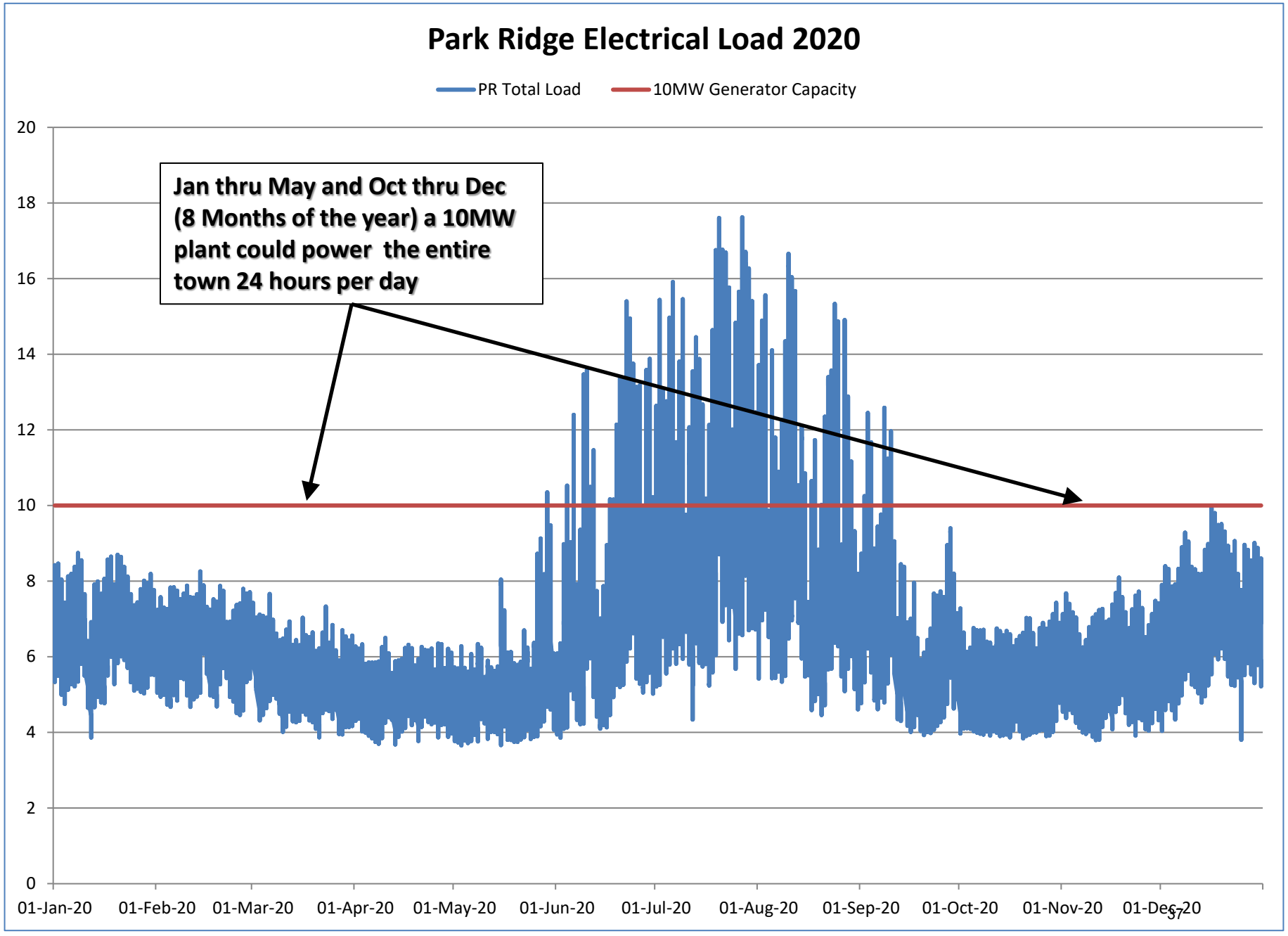
- A relatively new technology that has emerged is called energy storage. A large bank of high efficiency batteries (e.g. Lithium Ion) are charged during off peak hours and then discharged when needed to reduce peak demand.
- Just like generators, when units are discharging, the amount of power that is pushed into the system, reduces the amount of power that we need to pull from "The Grid".
- Advantage of using batteries is there are no local emissions. It should be noted that when the batteries are charging, depending on the generators that are operating in the grid, some could be fossil fuel plants.
- A major disadvantage of energy storage is that there is a limited time span that the batteries can discharge (e.g. 2 hours)
- Another significant disadvantage is that they cannot be used for backup power for any considerable length of time.
- Batteries degrade over time (i.e. ten year lifespan).
- The Borough of South River recently went out to bid and has awarded a contract with a firm to install and operate a battery storage system.

Examples of Potential Power Generating Plant Configurations

Typical Energy Storage units – One unit can deliver 2MW for 2 hours. For 10 MW system, we would need 5 units (each one the size of tractor trailer box).

Major Advantage of Power Generator vs. Energy Storage
Preparing for Catastrophic Weather Event

- **One major advantage of owning generation as opposed to energy storage is it provides backup power during power failure emergencies**. If sized large enough, the generators could provide enough power to supply the entire town during a majority of the year.
- During catastrophic weather events (e.g. hurricane, Nor'easter, etc.), there is a good chance that our incoming power supply could be out for days.
- The December 24, 2020 Nor'easter took down one of our incoming power feeds. This also occurred during Tropical Storm Sandy (October 2012).
- In both cases, Park Ridge was extremely fortunate (LUCKY) that only one of our two incoming power feeds was taken down. Had both of them come down, Park Ridge would have most likely been out of power for two to three days minimum.
- Both of these events were not hurricanes. For these events we experienced peak wind gusts in our area of around 50-70 miles per hour.
- If we ever do experience a real hurricane (which is highly likely over the next 10 years), there is a good probability that both of the incoming power lines feeding Park Ridge will be out.
- If we were to have a 10 MW generating plant in Park Ridge, it could be used to provide power to the town during a town wide power failure.


Park Ridge Electrical Load 2020
PR Total Load
10MW Generator Capacity
Jan thru May and Oct thru Dec (8 Months of the year) a 10MW plant could power the entire town 24 hours per day
20
18
16
14
12
10
8
6
4
2
0
01-Jan-20
01-Feb-20
01-Mar-20
01-Apr-20
01-May-20
01-Jun-20
01-Jul-20
01-Aug-20
01-Sep-20
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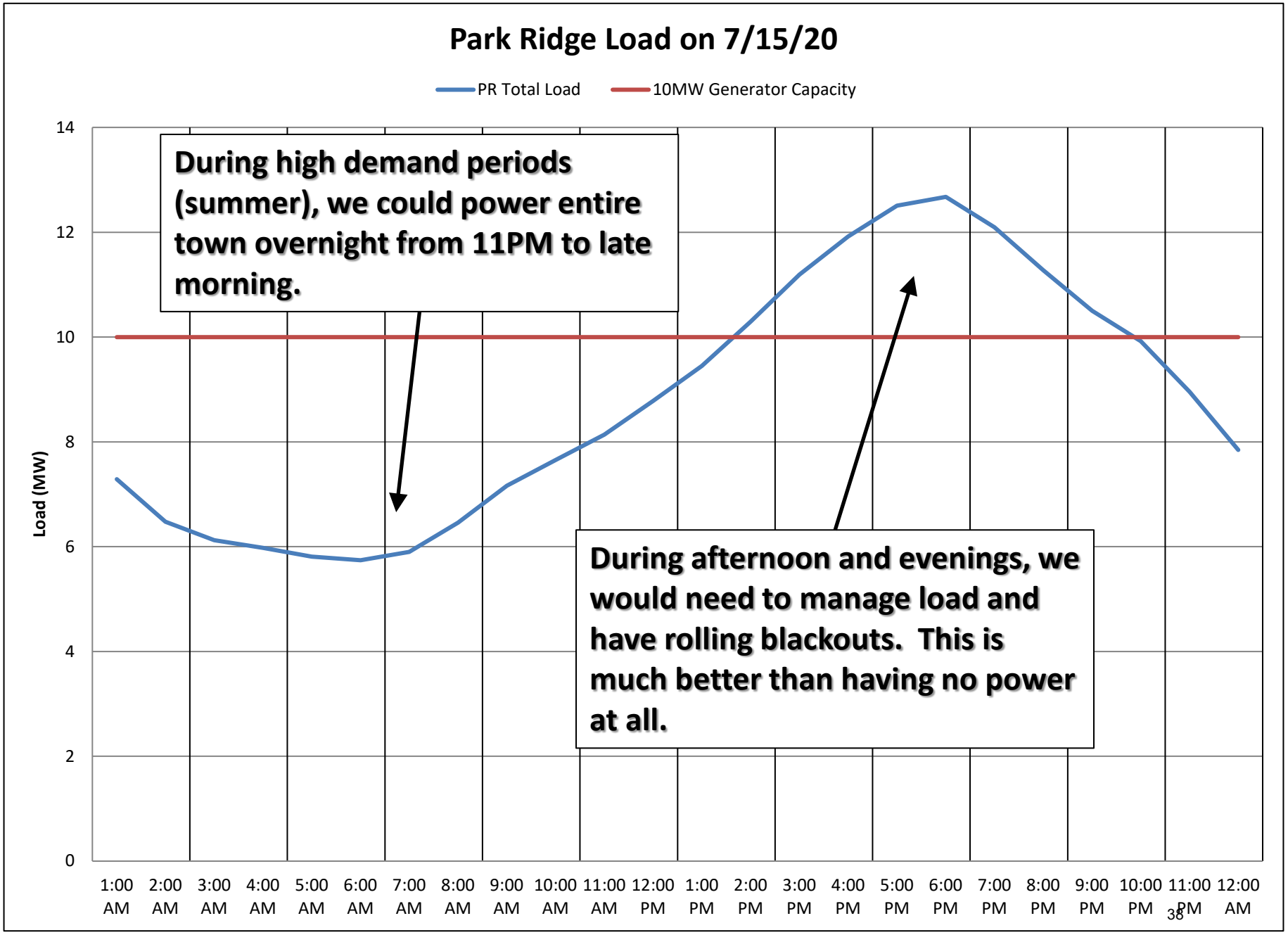
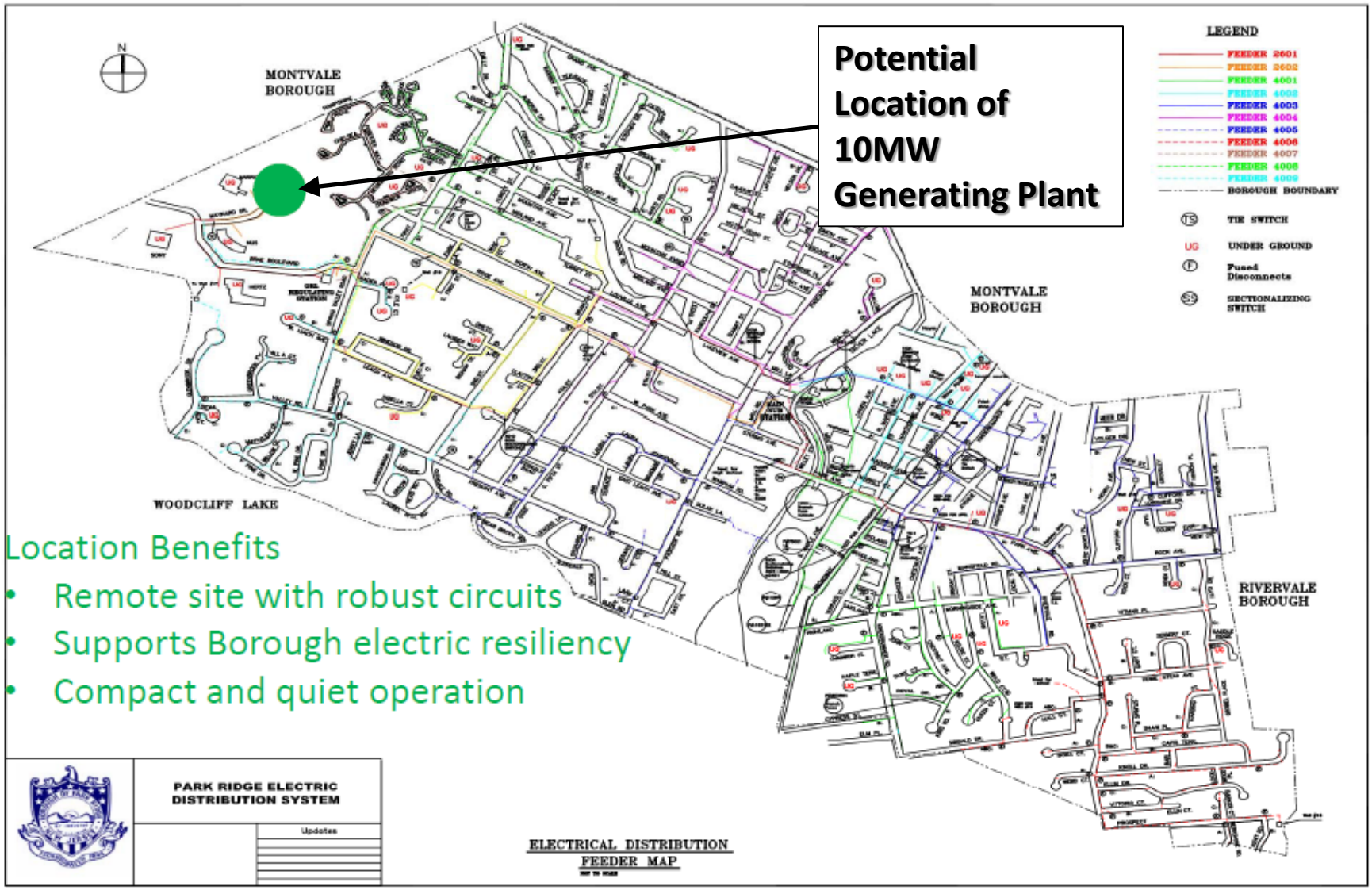
01-Dec-20


Park Ridge Load on 7/15/20
PR Total Load
10MW Generator Capacity
During high demand periods (summer), we could power entire town overnight from 11PM to late morning.
During afternoon and evenings, we would need to manage load and have rolling blackouts. This is much better than having no power at all.
Load (MW)
0
2
4
6
8
10
12
14
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM

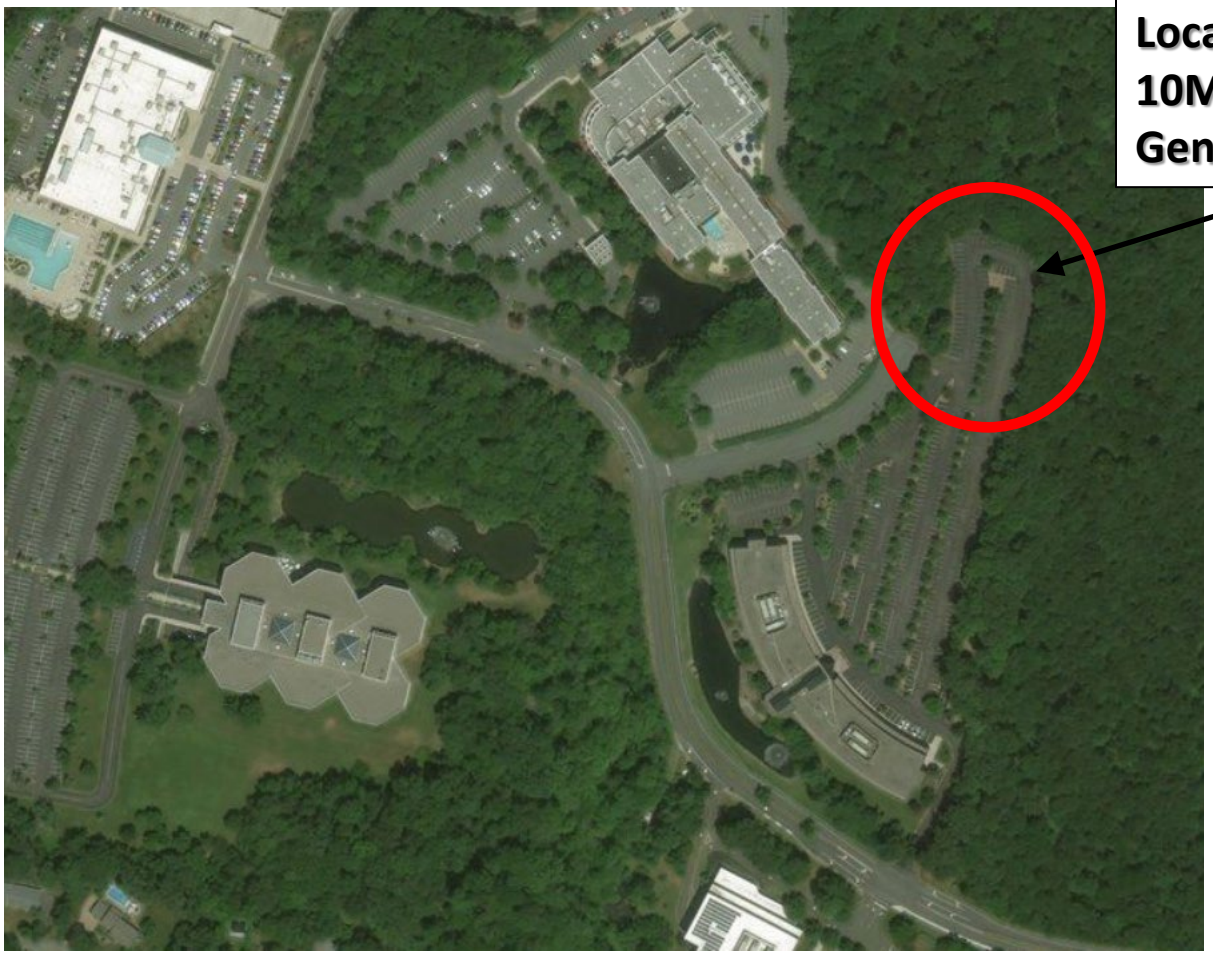
Where could we situate a generating plant?

- There are several factors that determine a good location to install a generating plant.
- The plant should not be located near any residential neighborhoods.
- The plant needs to be able to connect to the distribution system where the system can handle the total load.
- It should not be installed in area where there is a potential for flooding.
- We have surveyed the town and feel that we have one ideal location.
- This is the back parking area at one of our corporate buildings on Brae Blvd.
- We have spoken with the owners of the property and they were receptive to the idea of providing an easement or leasing the property for a peak shaving plant.

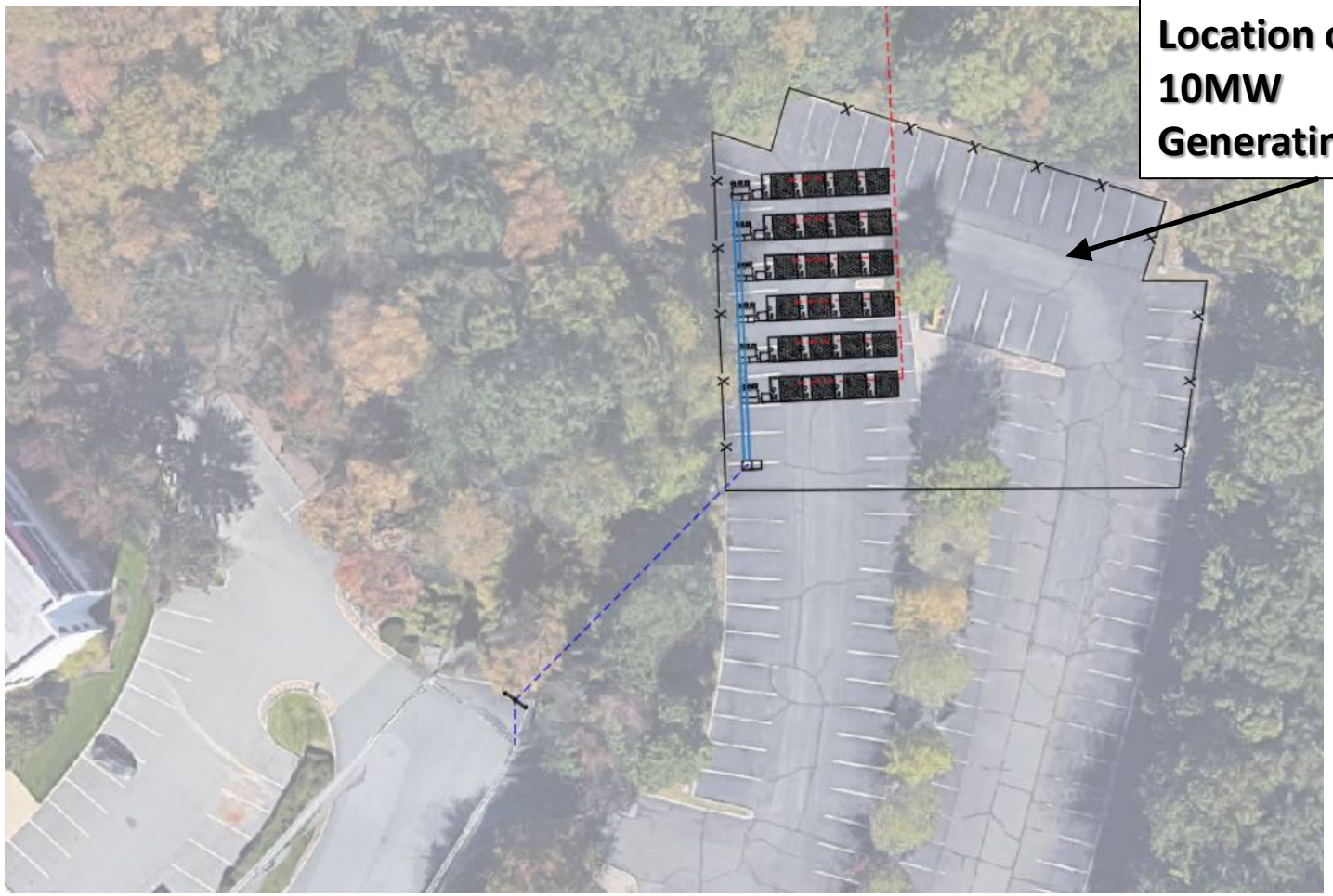
Where could we situate a generating plant?



Where could we situate a generating plant?



Where could we situate a generating plant?



How could we fund the purchase of a generating plant (or energy storage system)?

- The cost of a 10MW generating plant is in the neighborhood of 8 to 10 million dollars.
- We could bond for the purchase and pay for it over time (e.g. 30 years).
- If operated correctly, it could save us over $2,000,000 per year, so it would be a sound financial investment (along with the benefit of having the backup power during emergencies).
- However, there are some risks associated with owing the plant. For example, if PJM changes the rules on how Transmission and Capacity costs are allocated, it could effect the financial payback for the plant.
- Alternatively to owning it, we have been approached by several companies that are willing to install and operate the plant at no up front cost to the municipality. This arrangement is available for both the installation of a generating plant or energy storage.
- There are different scenarios that could be considered to share in the financial benefit. For example, one financial scenario that has been presented is where the owner of the plant (i.e. investors) take 80% and the Borough gets 20% for a certain number of years (e.g. 10 years), and then from then on the Borough gets 80% and the owner gets %20.
- There are numerous other alternative financial arrangements and this would be vetted out in a competitive procurement process.

How would we operate the plant?

- To properly operate the plant, we would need to know what days and times that it should be turned on to shave a potential peak.
- There are companies that specializing in monitoring the PJM loads, weather conditions, and other factors and they decide when to operate the plant.
- Along with shaving the peak, there are other times when there can be a financial benefit of running the plant. This includes times when the local energy spot prices are very high. In addition, there are PJM functions (e.g. spinning reserves and frequency regulation), whereby a small plant like the one proposed can make additional revenue.
- The companies that have expressed interest in partnering with Park Ridge to install a plant, all have either their own expertise, or have contracts with companies that perform the operation.
- The plants can be remotely dispatched and monitored.
- During power failures, we would contact the operating company and have them turn on the plant in what is called island mode. In this mode, our system would be disconnected from the grid and we would be generating all of our power internally.
- Once the grid power was restored, we would coordinate shutting down the plant and switching the grid power to supply the load to the Borough.
- Included in the operating agreement would be scheduled maintenance of the plant.

How would we operate the plant?

Examples of monitoring and forecasting software programs used by companies who would dispatch the generating plant at the appropriate times to shave peaks and during other financial beneficial periods.

Park Ridge Electric Customers' Impact

- If the we do nothing, we will continue to pay the high price for our Capacity and Transmission component costs and it has been predicted that both Capacity and Transmissions costs will continue to rise significantly for the next few years.
- If we decide to move forward with the installation and operation of a peak shaving generating plant using the method where there are no up-front costs or risks to the Borough, a conservative potential financial benefit has been estimated at $250,000-$300,000 per year for the first 10 years (while the investors get 80% of the financial benefit).
- After 10 years, the Borough would then save $900,000 - $1,500,000 per year (80% of the benefit would go to the Borough).
- These estimates are in today's dollars and would be scaled up due to increased costs and inflation.
- Over a 20 year period, the Borough could conservatively realize a total savings of around $12 to $15 Million.
- **More importantly, we would have a very large backup generator available should a system wide power failure occur.**

Next Steps…

If the Mayor and Council are on-board with pursing the installation of "Behind the Meter Generation", our next steps would be as follows:

- Secure the access to the property. Although the owners of the property being considered were receptive to the idea, we would need to firm up the arrangement through an access agreement.
- We would need to determine the best method to go out for competitive proposals. There are several methods that could be considered to provide competitive proposals and have flexibility for the review and award of a contract. One New Jersey approved method is called "Competitive Contracting".
- Once procurement method was determined, we would develop the specifications for the request for proposals.
- One option would to include request for both generating plants and for battery storage. We could then evaluate both types of proposals before making an award.
- Once an award was made, we would then contract for the project and proceed with the installation and operation.

Questions?