Cayuga Power Plant: clearing the air

Irene Weiser

Sept. 10, 2015

OVERVIEW

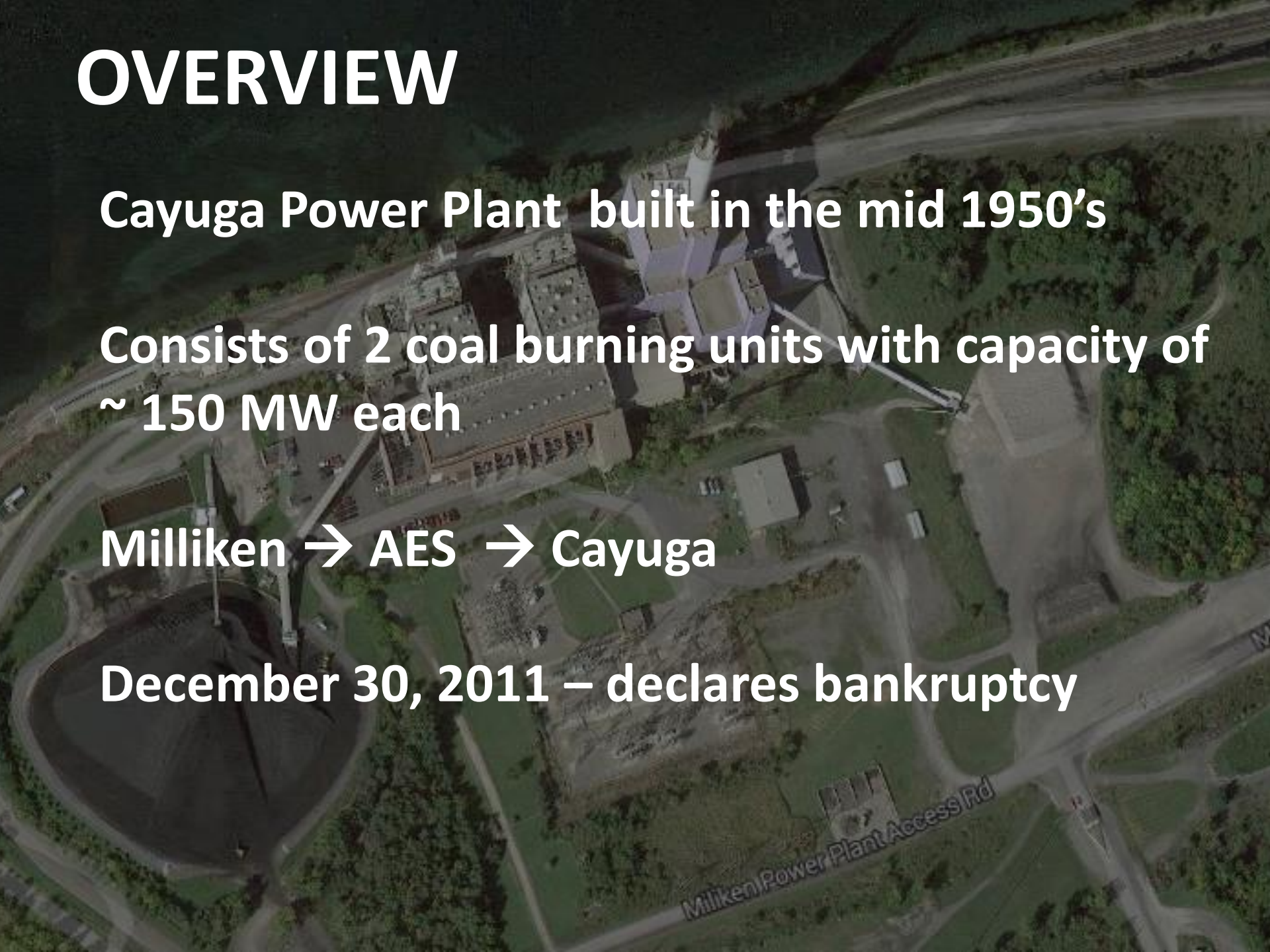
OVERVIEW

Cayuga Power Plant built in the mid 1950's

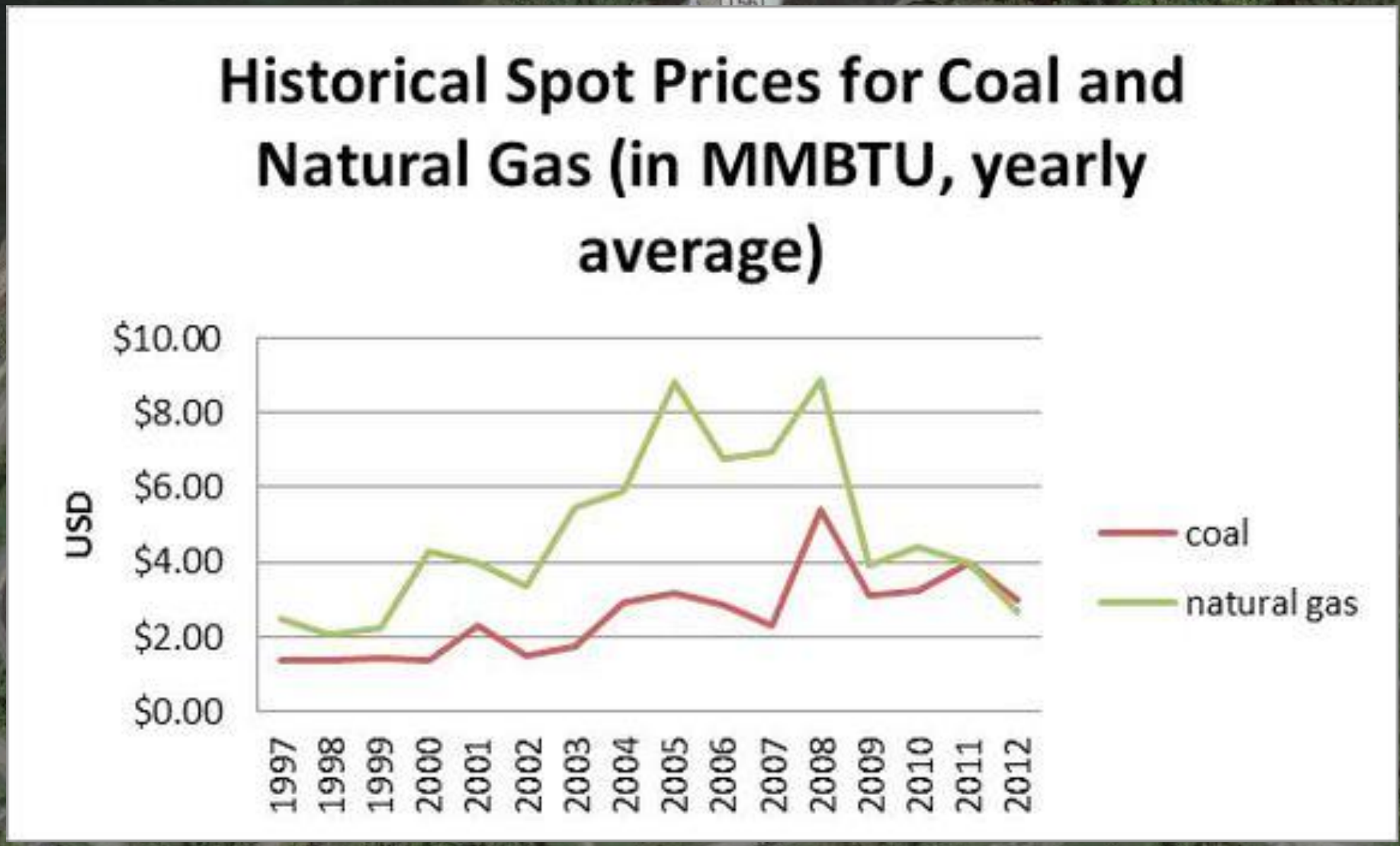
Consists of 2 coal burning units with capacity of ~ 150 MW each

Milliken → AES → Cayuga

December 30, 2011 – declares bankruptcy



rice of Coal vs “Natural” Gas



EPA issues Mercury & Air Toxics Standards

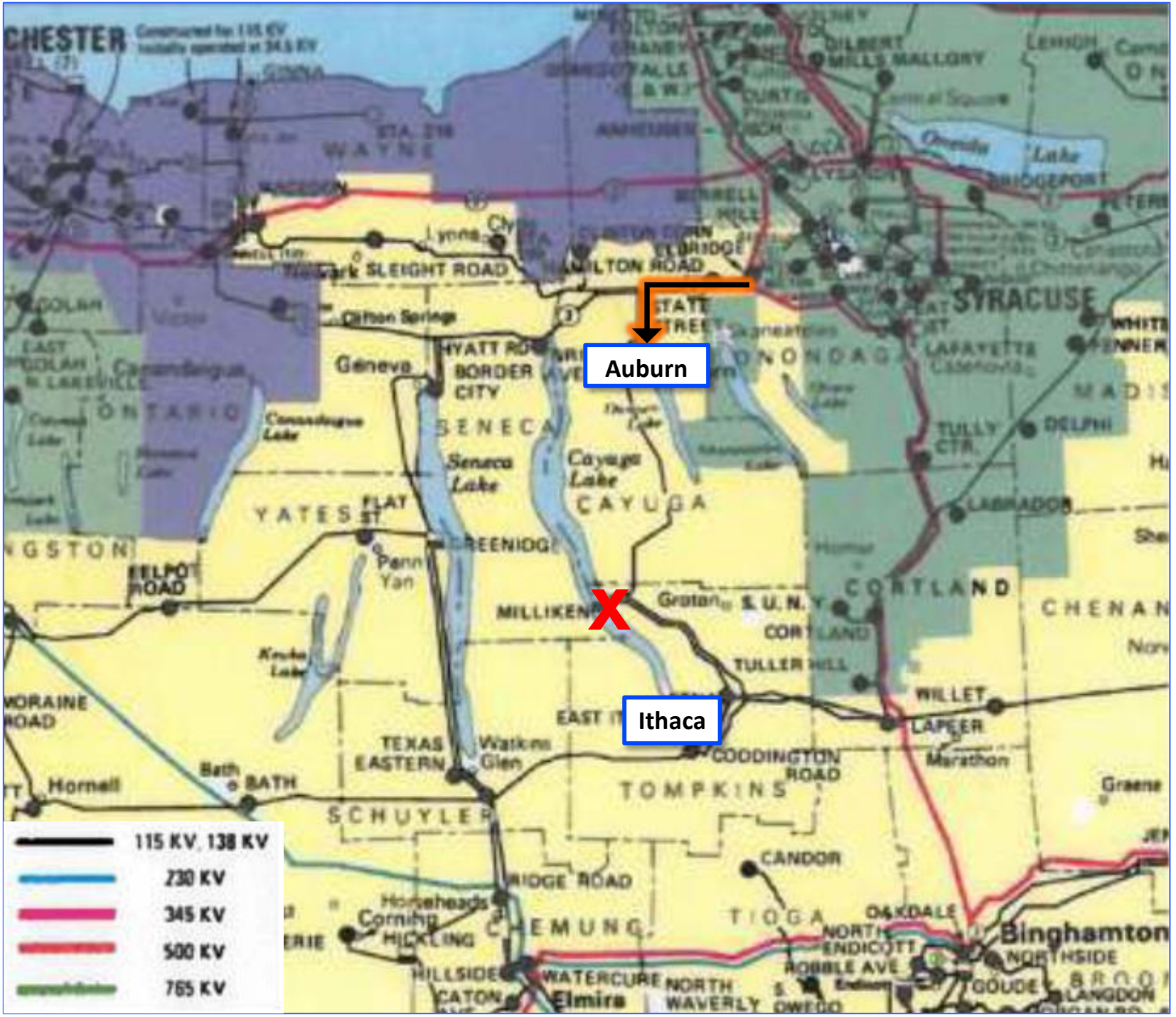
Dec. 11, 2011

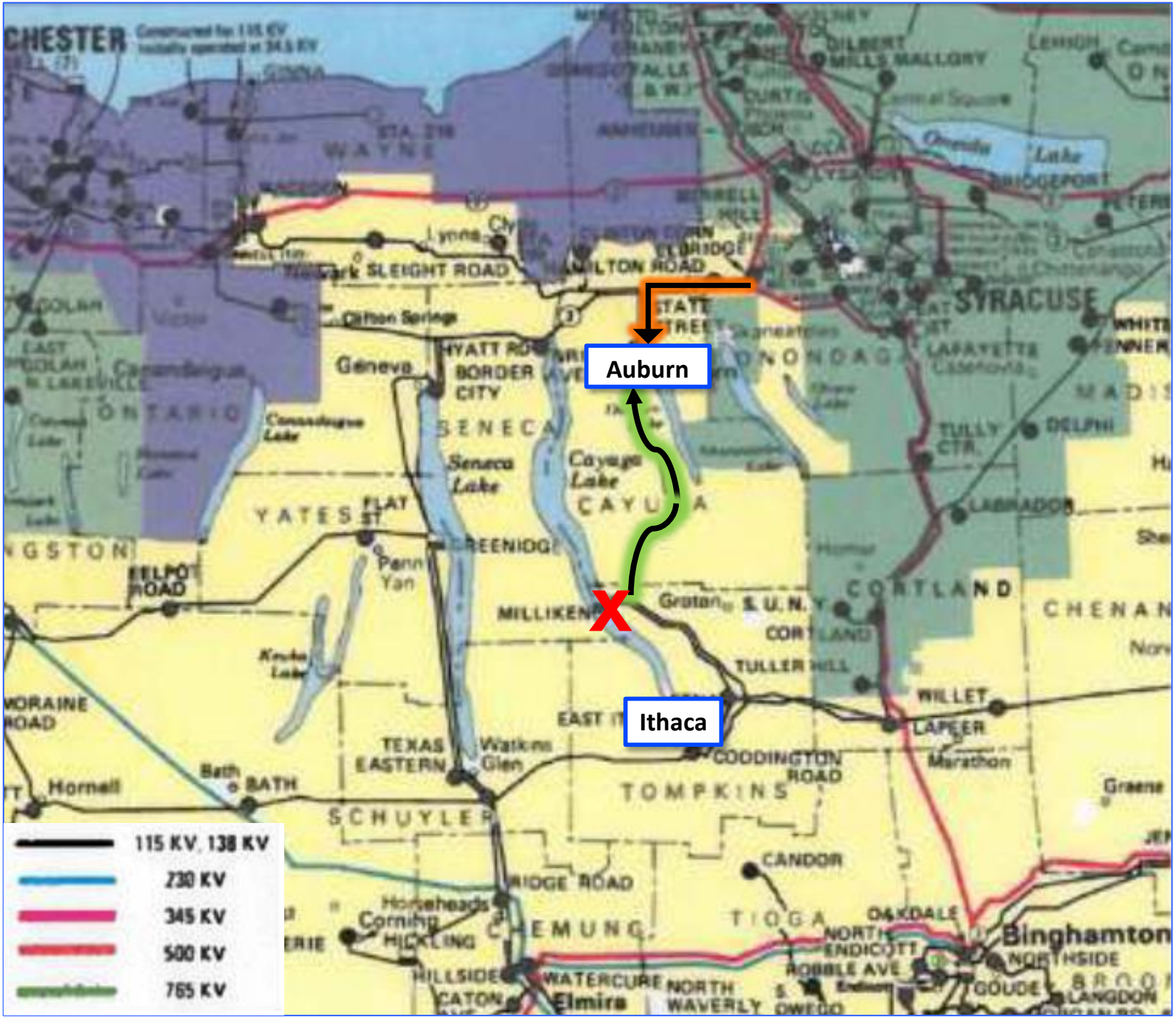

BANKRUPT
X
Ithaca

New York State Public Service Commission

RELIABILITY

Power is available when it is needed without stressing the system


Auburn
Ithaca
115 KV, 138 KV
230 KV
345 KV
500 KV
765 KV


Auburn
Ithaca
115 KV, 138 KV
230 KV
345 KV
500 KV
765 KV

New York State Public Service Commission

RELIABILITY

Transmission Line Upgrades

New York State Public Service Commission

RELIABILITY

Transmission Line Upgrades	Coal + FRACK Gas

New York State
Public Service
Commission

RELIABILITY
$UPPORT
$ERVICES

Meter Number	Current Meter Read Date	Reading	Billing Period
9998[redacted]	12/24/14	76268 E	29 days
Type of read: A - Actual, E - Estimate			

Electricity Delivery Charges

Basic service charge	15.11
Delivery charge	33.17
Transition charge	-3.82
Revenue decoupling mech	-3.09
Reliability support svcs. chg.	1.99
NY state assessment	1.61
SBC/RPS charge	6.31
Subtotal Electricity Delivery	$51.28

RELIABILITY $UPPORT $ERVICES

	Monthly	Cap Ex	Total/yr
2013	**$2.4m**	**$4.3m**	**$33.2m**
2014-17	**$2.7m**	**$42m**	**$155m**
Total			**$188m**


Fix
Grid
Gas +
Coal
PSC

	Transmission Upgrades	Gas plus Coal
COST:	$55m	$145m

Transmission Upgrades	Gas plus Coal
COST: $55m	$145m + externalized costs

	Transmission Upgrades	Gas plus Coal
COST:	$55m	$145m + externalized costs
BENEFITS:		
Jobs:	0 (-60)	30 (-30)

	Transmission Upgrades	Gas plus Coal
COST:	$55m	$145m + externalized costs
BENEFITS:		
Jobs:	0 (-60)	30 (-30)
Taxes:	0	~$1.8m/yr

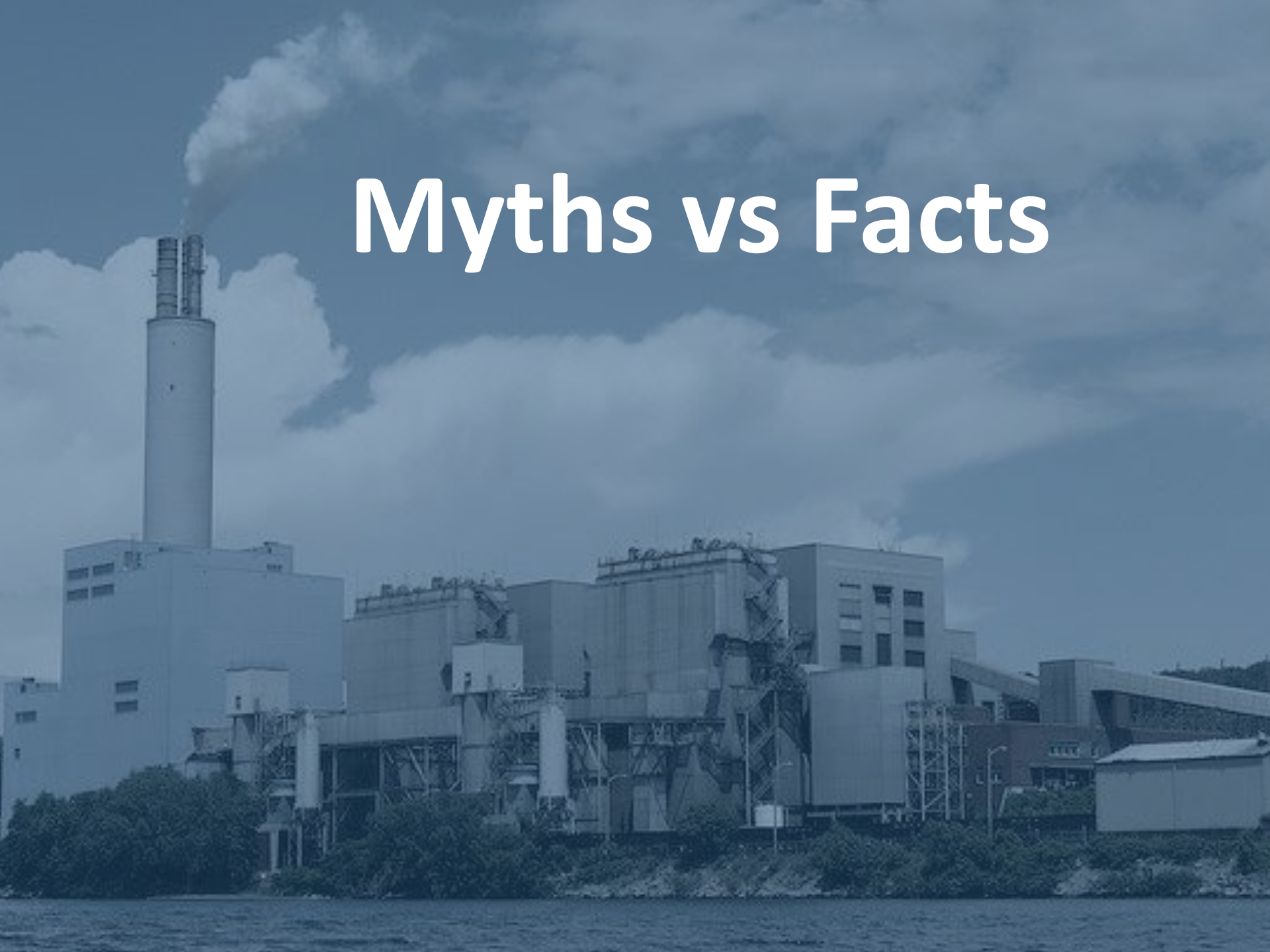

Fix
Grid
Gas +
Coal
PSC
Future
Past

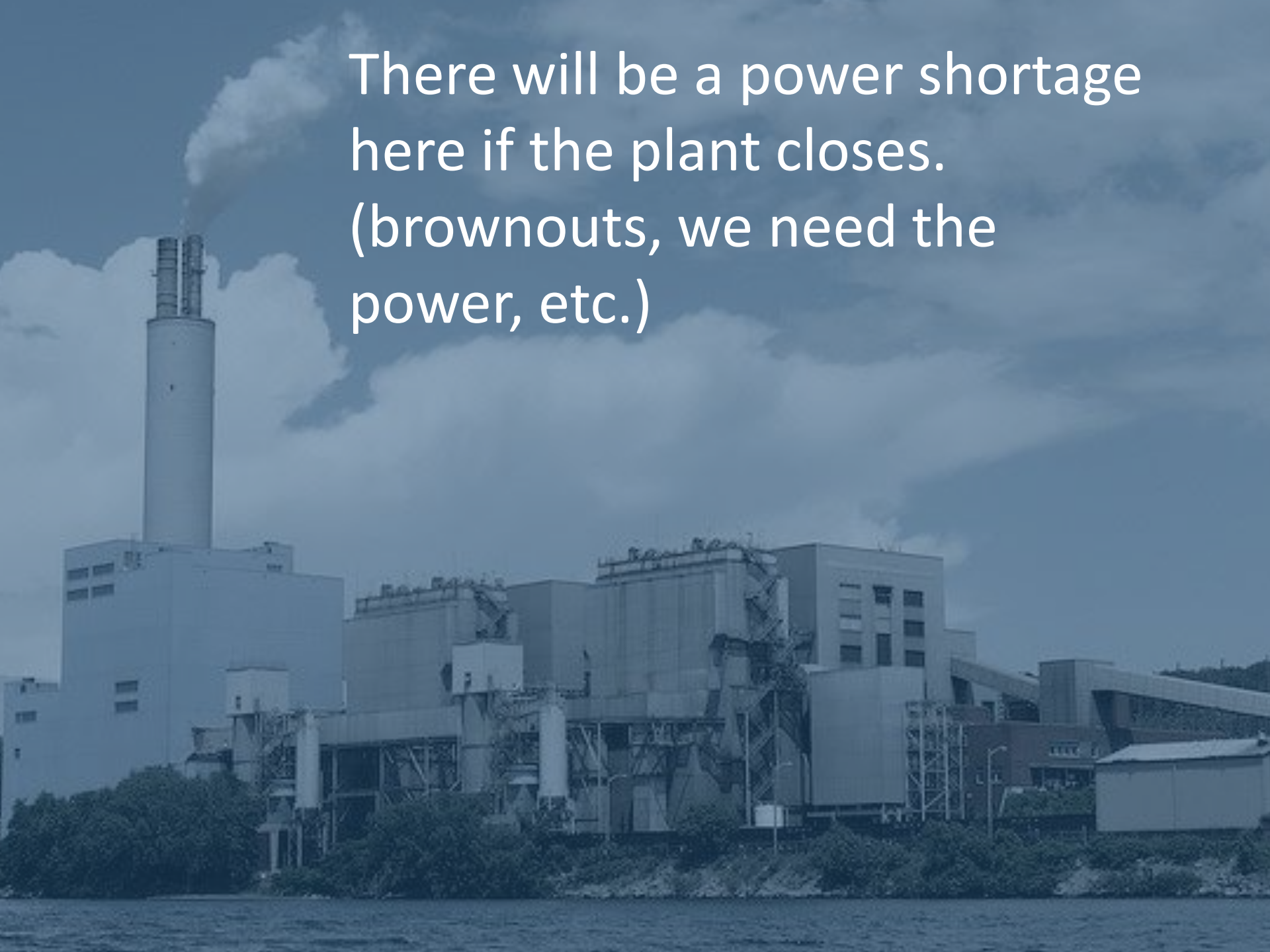

Fix Grid
March 2013
Gas + Coal
PSC
Future
Past


Fix Grid
March 2013
Gas + Coal
PSC
Future
Past
$240m
RSS + wires
$330m
RSS + convert

New York Set To Revive Renewable Energy Industry

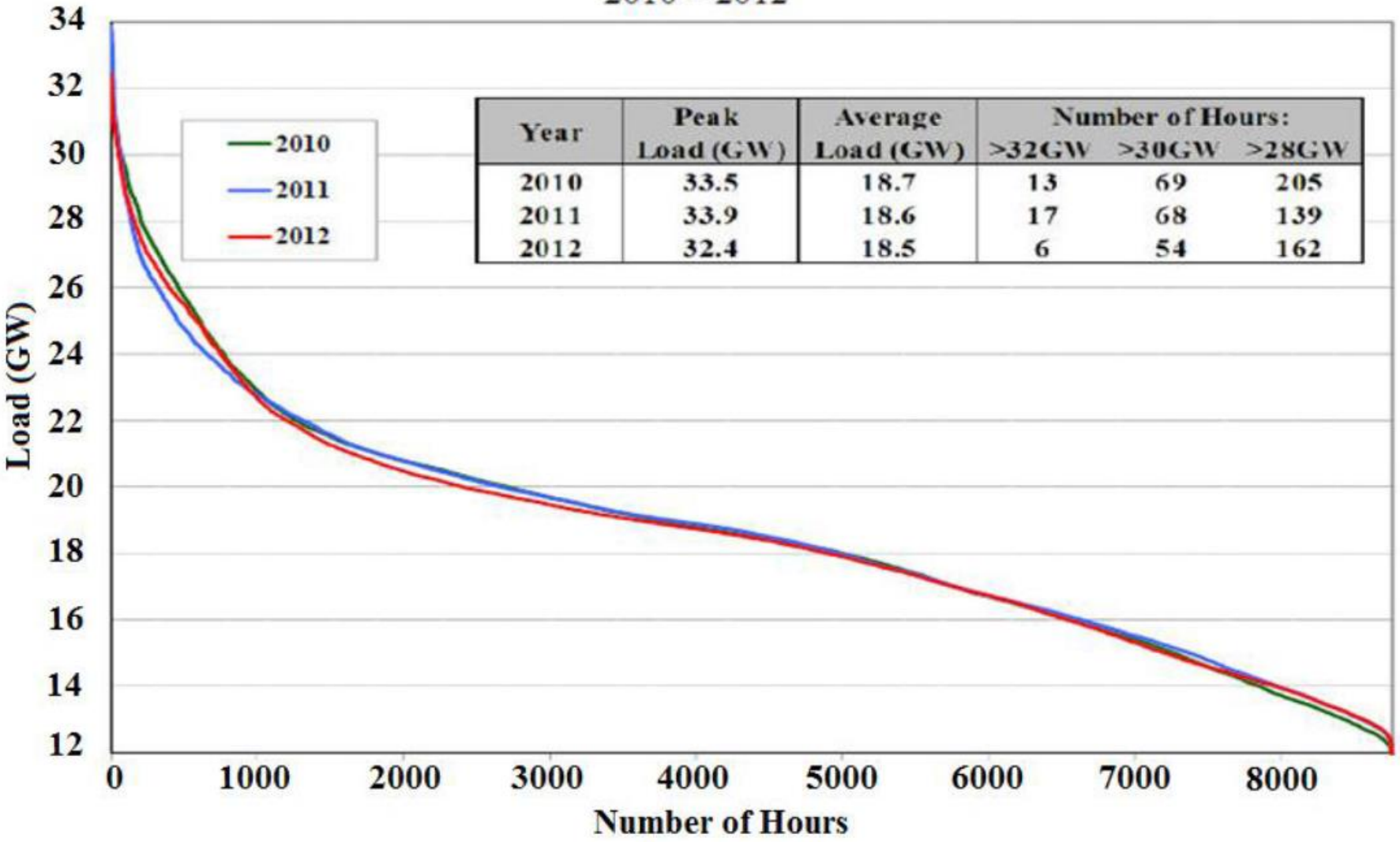
NYSERDA proposes a long-term commitment to the next generation of large scale renewables through a **$1.5 billion public investment over ten years...**


Myths vs Facts


There will be a power shortage here if the plant closes. (brownouts, we need the power, etc.)

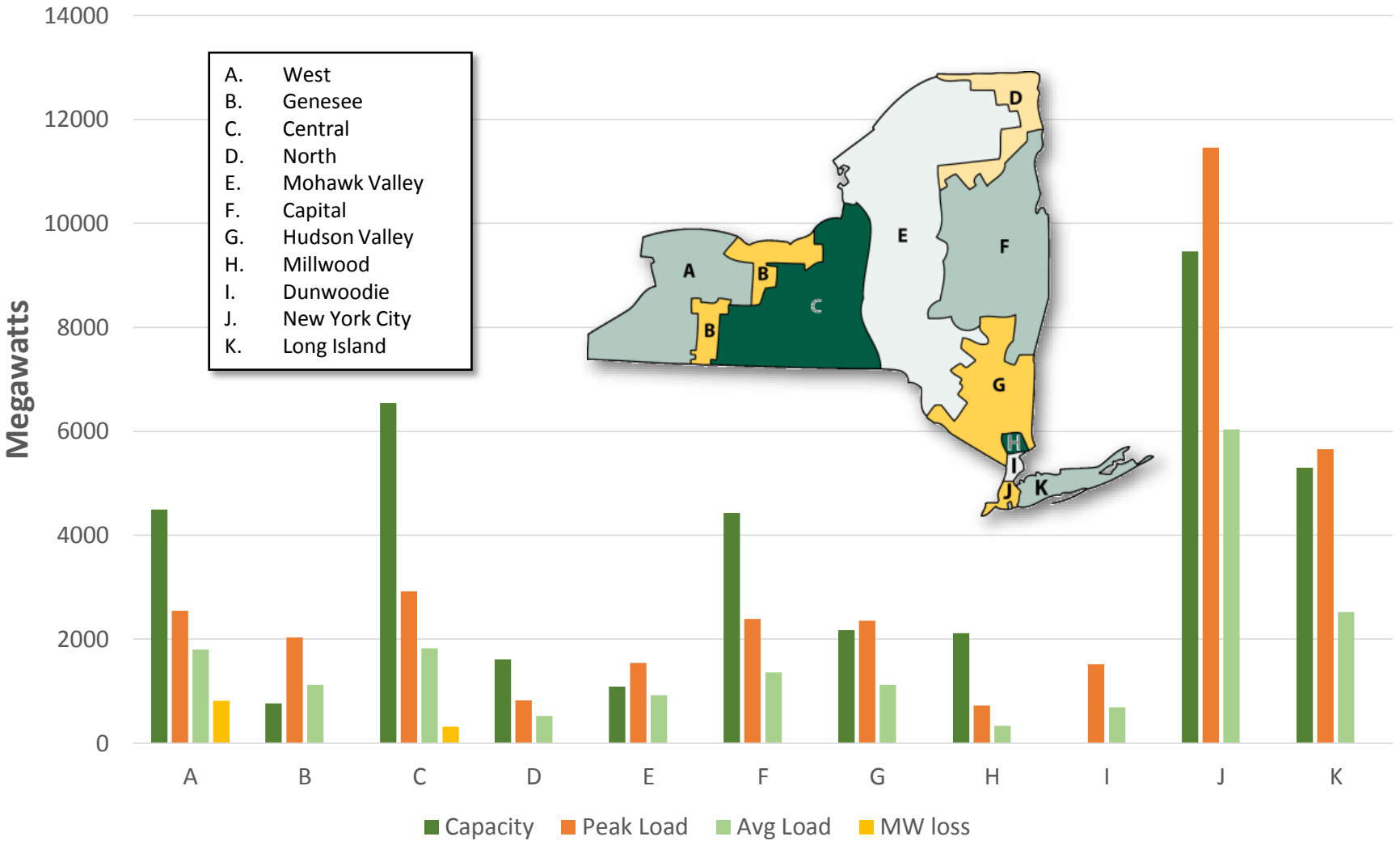
NYCA Load Duration Curve

Figure A-11: Load Duration Curves for New York State
2010 – 2012



Year	Peak Load (GW)	Average Load (GW)	Number of Hours: >32GW	>30GW	>28GW
2010	33.5	18.7	13	69	205
2011	33.9	18.6	17	68	139
2012	32.4	18.5	6	54	162

NY Control Area – Zonal Capacity and Loads



Ithaca Transmission Project

Oct. 2006: The electric transmission system that supplies Ithaca and the surrounding area is currently dependent on nearby power generation resources to be available and operating to ensure reliable service. Ordering Clause 9 of the PSC's order in Case 05-E-1222 issued on August 23, 2006, requires NYSEG to submit all government and regulatory filings necessary to reinforce transmission infrastructure in the Ithaca area.

To comply with the ordering clause, **NYSEG is proposing the Ithaca Transmission Project to eliminate the transmission limitations in the Ithaca area and maintain adequate normal and contingency service throughout NYSEG's Ithaca Division during extended outages (forced or planned) of the AES-owned Cayuga Station generating units.**

NOW IN SERVICE, NYSEG's ITHACA TRANSMISSION PROJECT WILL ENHANCE RELIABILITY ACROSS THE REGION

FOR IMMEDIATE RELEASE

Ithaca, NY, August 26, 2010

NYSEG's Ithaca Transmission Project, which **eliminates the reliance on local generation to ensure reliable service in the region**, is now in service after approximately a year of site and construction work.

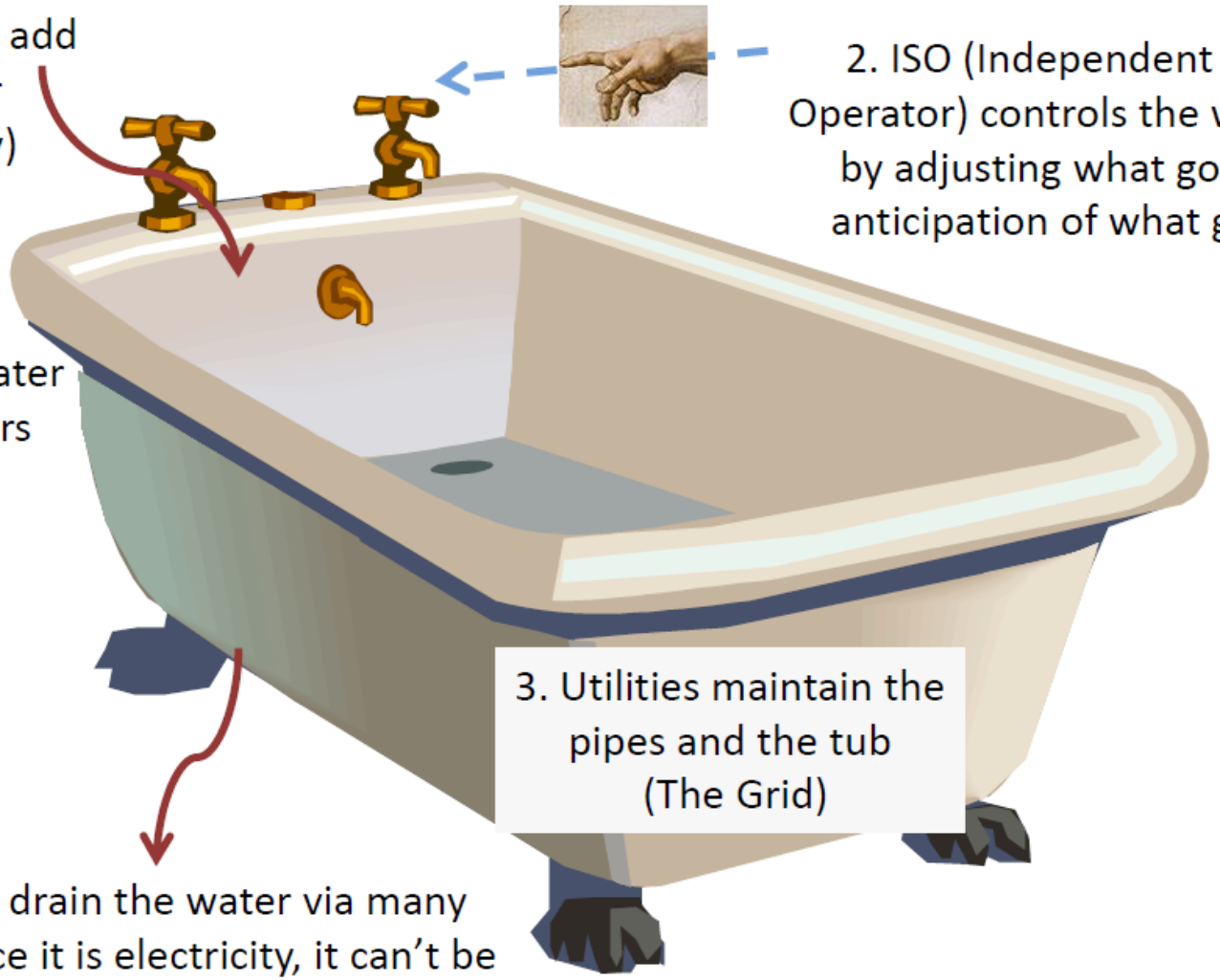
Auburn
Ithaca
SYRACUSE
Binghamton
Geneva
Seneca Lake
Cayuga Lake
SENECA
CAYUGA
YATES
TOMPKINS
SCHUYLER
CORTLAND
ONTARIO
WAYNE
SLEIGHT ROAD
HAMILTON ROAD
STATE STREET
HYATT RD
BORDER CITY
GREENIDGE
MILLIKEN
Groton
CORTLAND
TULLER HILL
ETNA
WILLET
LAPEER
Marathon
COODINGTON ROAD
EAST
TEXAS EASTERN
Watkins Glen
Hornell
BATH
Penn Yan
KELPOT ROAD
MORAINE ROAD
CANDOR
TIOGA
OAKDALE
CHEMUNG
Elmira
WATERCURE
HILLSIDE
HICKLING
Corning
Horseheads
NORTHSIDE
GOUDEY
LANGDON
NORTH WAVERLY
LABRADOR
TULLY CTR.
DELPHI
CHENANGO
LAFAYETTE
Clifton Springs
115 KV, 138 KV
230 KV
345 KV
500 KV
765 KV

If The Grid Is A Bath Tub & Electricity Is Water...

1. Generators add the water (electricity)

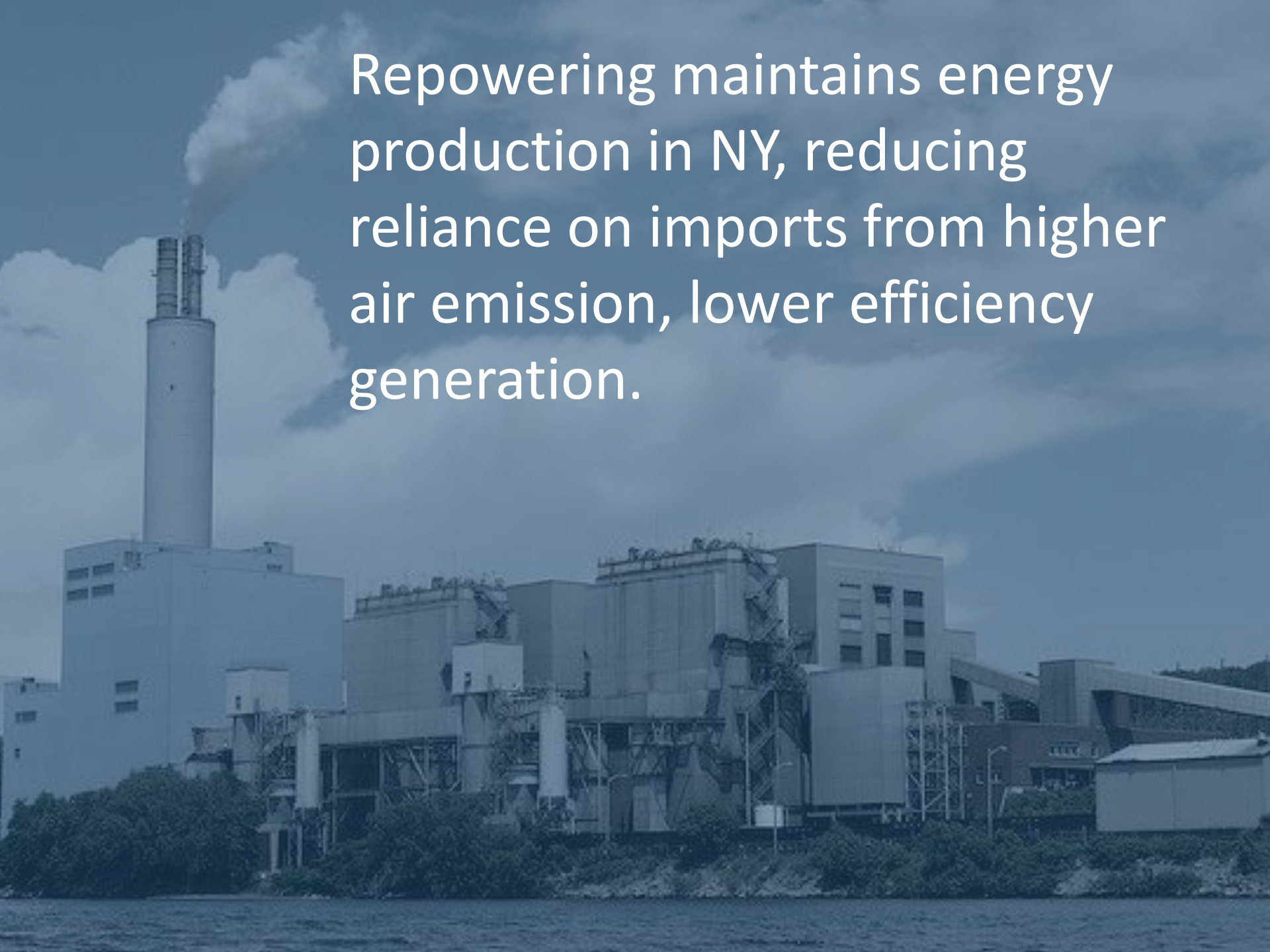
Suppliers buy water from generators and sell it to consumers

4. Consumers drain the water via many drains (and since it is electricity, it can't be stored so there's no plug for the drain)



2. ISO (Independent System Operator) controls the water level by adjusting what goes in, in anticipation of what goes out

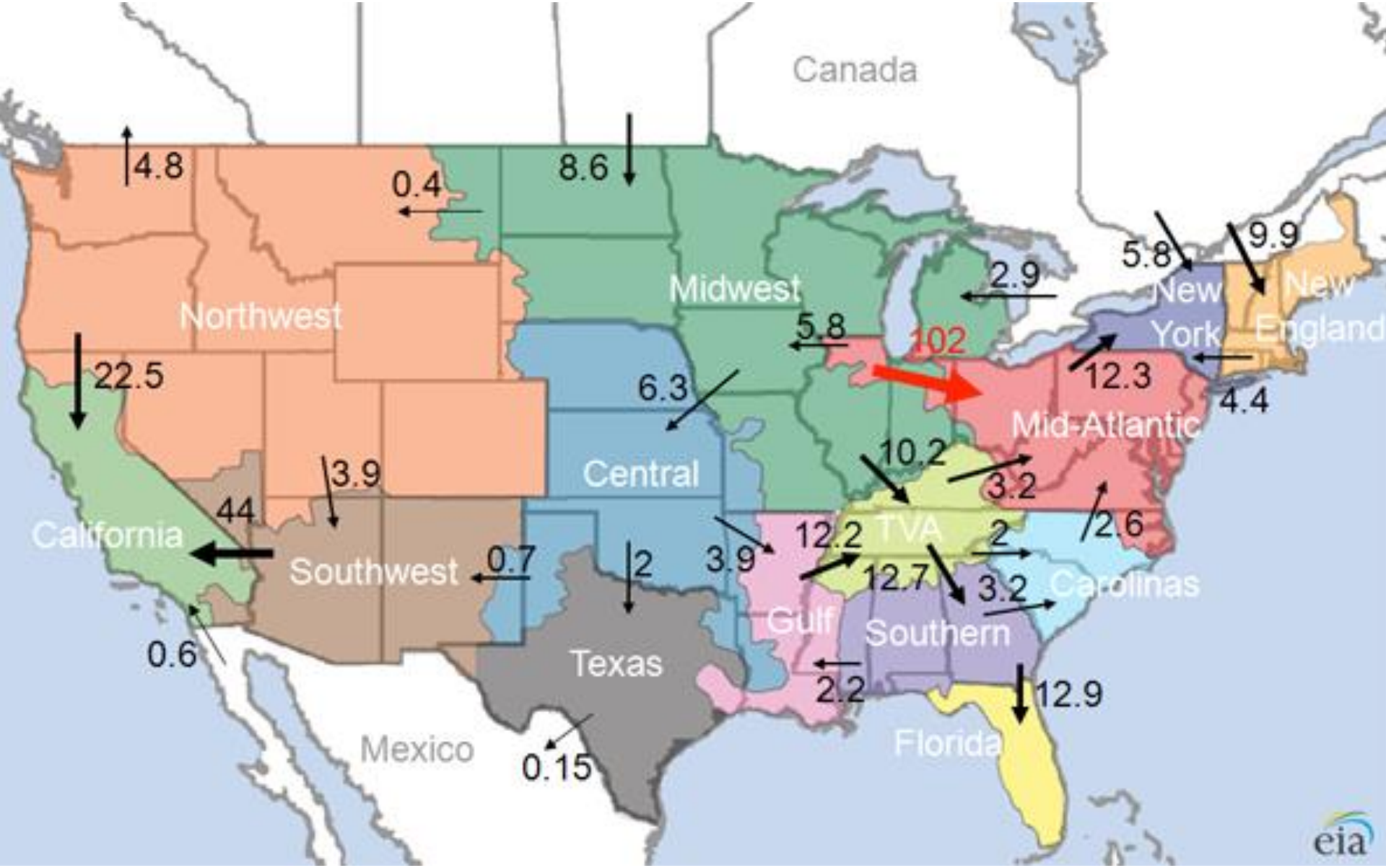
3. Utilities maintain the pipes and the tub (The Grid)

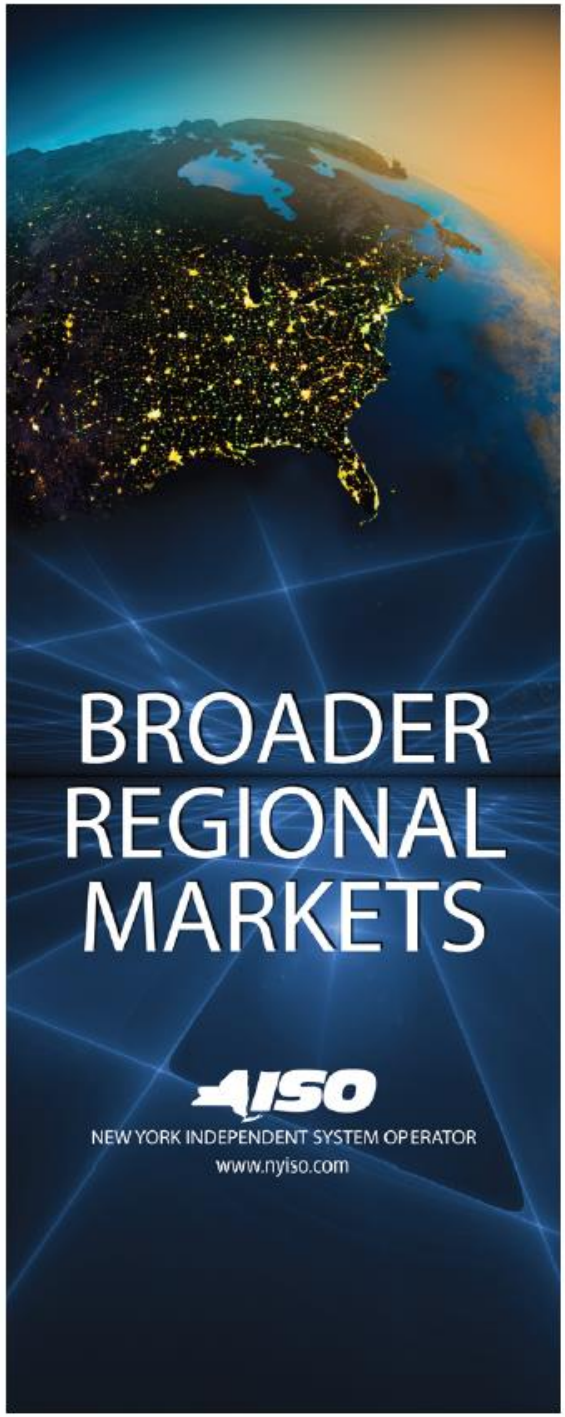


Repowering maintains energy production in NY, reducing reliance on imports from higher air emission, lower efficiency generation.

Annual net power flow among regions in North America, 2010

(million megawatt-hours)

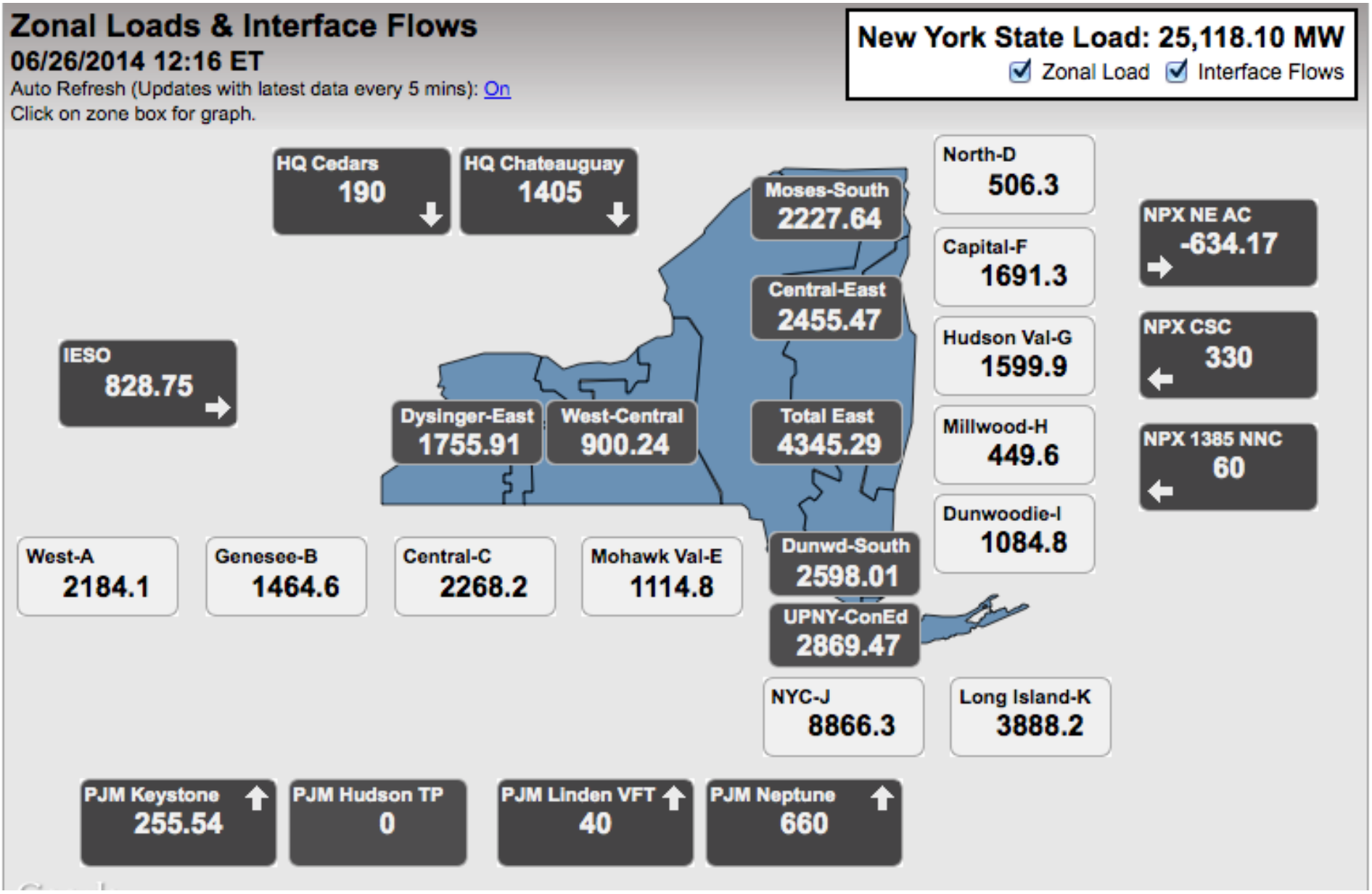




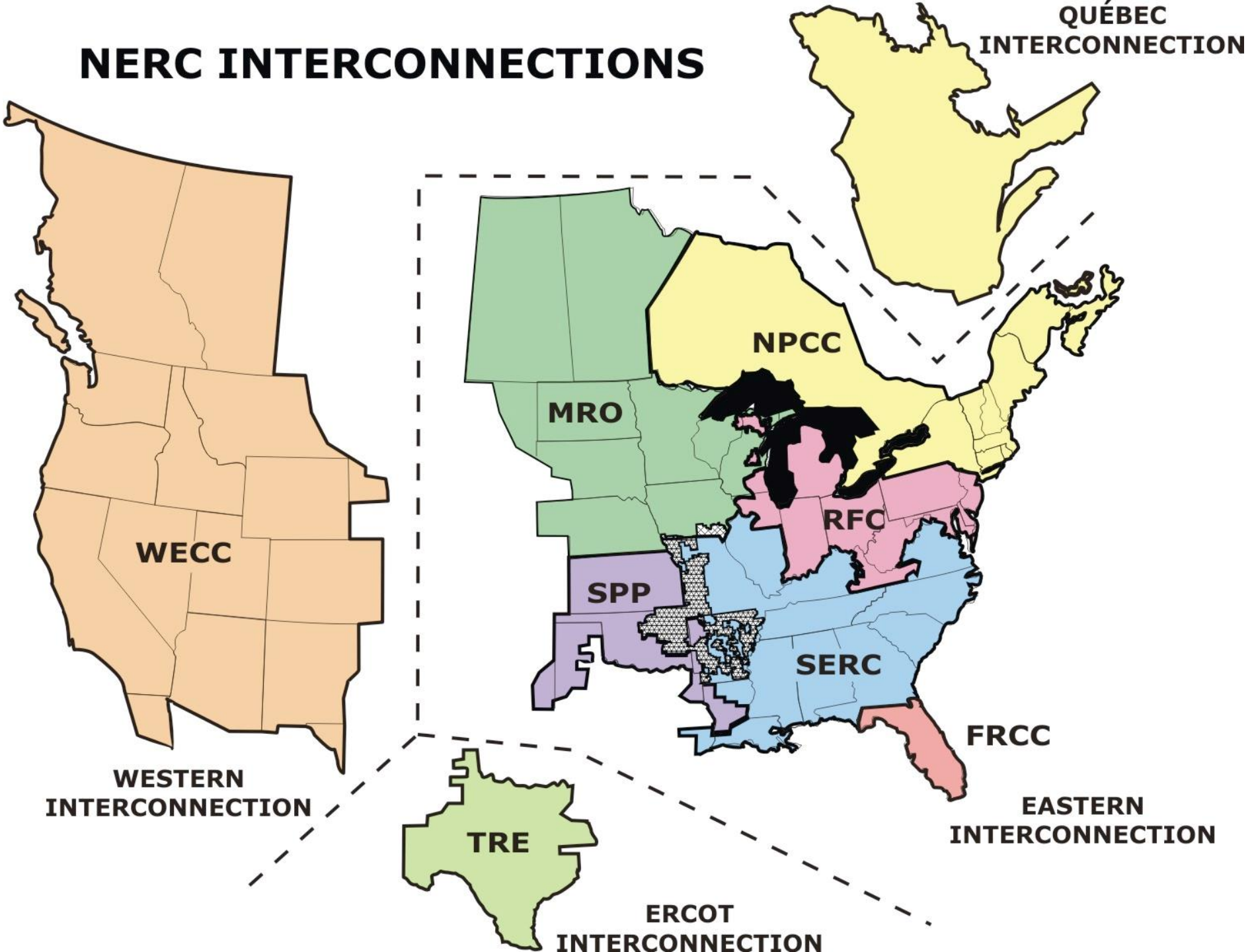
Begun in 2010, with inclusive, collaborative efforts of neighboring electric grid operators, the NYISO's Broader Regional Markets initiatives seek to mend differences, or "seams," in interconnected grids; **enhancing the efficiency of existing resources and reducing costs for power consumers.**

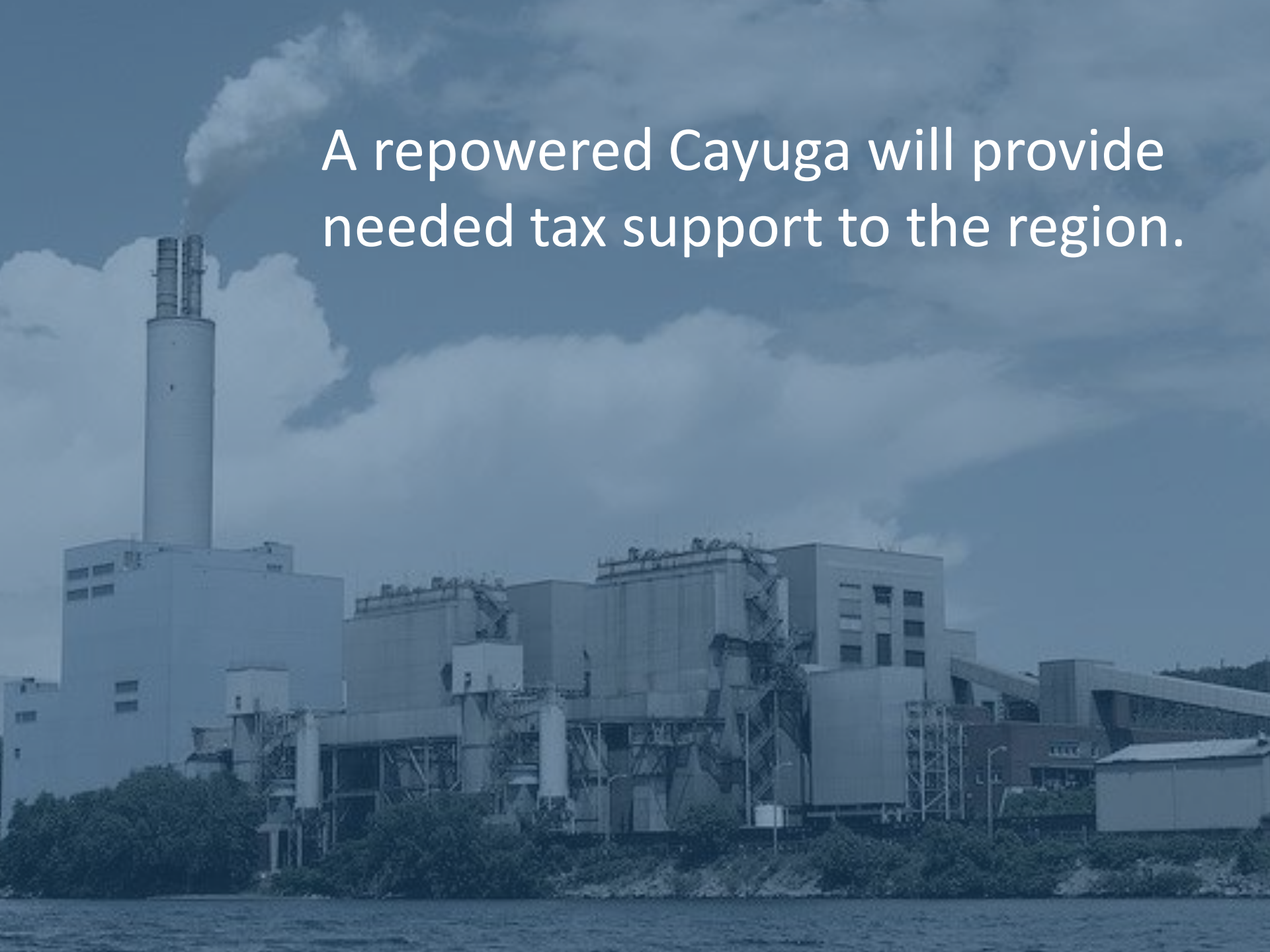
Among the improvements achieved through collaborative analyses and planning with other grids have been **more efficient interregional scheduling practices and power flows**, and more **cost-effective solutions** for transmission system constraints.

The combined initiatives are **projected to save New York $193 million** a year and save the region $362 million annually.


Zonal Loads & Interface Flows
06/26/2014 12:16 ET
Auto Refresh (Updates with latest data every 5 mins): On
Click on zone box for graph.
New York State Load: 25,118.10 MW
Zonal Load
Interface Flows
HQ Cedars
190
HQ Chateauguay
1405
Moses-South
2227.64
North-D
506.3
Capital-F
1691.3
Central-East
2455.47
Hudson Val-G
1599.9
Millwood-H
449.6
Dunwoodie-I
1084.8
NPX NE AC
-634.17
NPX CSC
330
NPX 1385 NNC
60
IESO
828.75
Dysinger-East
1755.91
West-Central
900.24
Total East
4345.29
West-A
2184.1
Genesee-B
1464.6
Central-C
2268.2
Mohawk Val-E
1114.8
Dunwd-South
2598.01
UPNY-ConEd
2869.47
NYC-J
8866.3
Long Island-K
3888.2
PJM Keystone
255.54
PJM Hudson TP
0
PJM Linden VFT
40
PJM Neptune
660

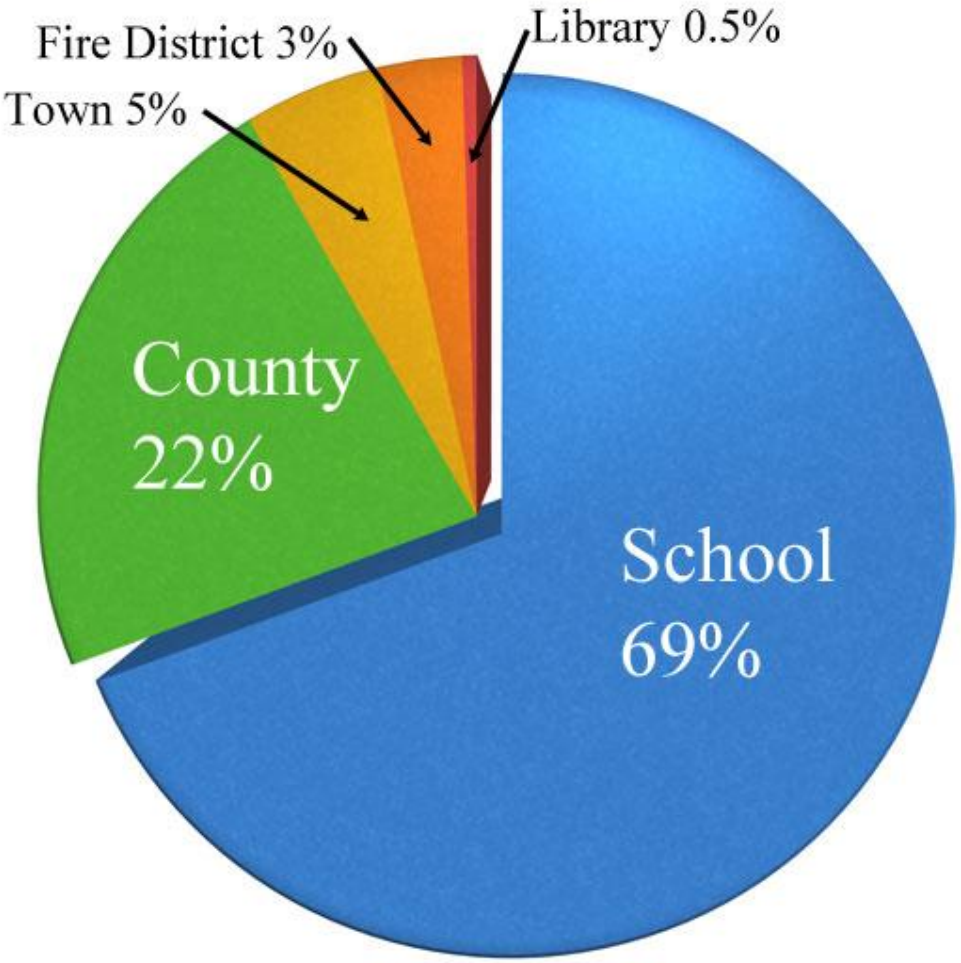
NERC INTERCONNECTIONS




A repowered Cayuga will provide needed tax support to the region.

CAYUGA POWER PLANT PILOT

TAX BENEFICIARIES



PAYMENTS ON $60,000 VALUATION

Recipient	Tax Revenue
School	$1,269,222.00
County	$411,927.00
Town	$88,177.00
Fire	$54,169.00
Library	$9,162.00
Total	**$1,832,657.00**

A Losing Proposition:

Why the Proposal to Repower the Cayuga Plant Should Be Rejected

Institute for Energy Economics and Financial Analysis
IEEFA.org

August 2015

David Schlissel, Director of Resource Planning Analysis
Cathy Kunkel, IEEFA Fellow
Appendix by Tom Sanzillo, Director of Finance

Cayuga's Financial Viability

IEEFA prepared a cash flow analysis to evaluate the risk to NYSEG ratepayers of continued investment in the Cayuga plant under the terms of the company's Revised Repowering Proposal. IEEFA looked at Cayuga's profitability under a range of assumptions about future plant operations and electricity market costs:

1. with and without the $9.6 million annual cash-infusion from NYSEG ratepayers currently proposed by the Revised Repowering Proposal;
2. with Unit 1 burning coal or gas during winter months, and
3. under a range of future energy market and capacity prices, natural gas prices, carbon dioxide (CO_2) emission allowances prices, and future plant operating and maintenance costs.

IEEFA concludes from this cash flow analysis that:

1. Cayuga is unlikely to be profitable in almost all of the years 2018 to 2027 unless NYSEG's ratepayers provide the $9.6 million annual cash infusion required by the Revised Repowering Proposal; and
2. The plant is very likely to be unprofitable following the 2027 end of the Revised Repowering Proposal's 10-year term once the cash infusion from ratepayers ends.

Figure 9: **Annual EBITDA Earned During the Years 2018-2027 by Cayuga in the Base and High Cases Examined by IEEFA.**

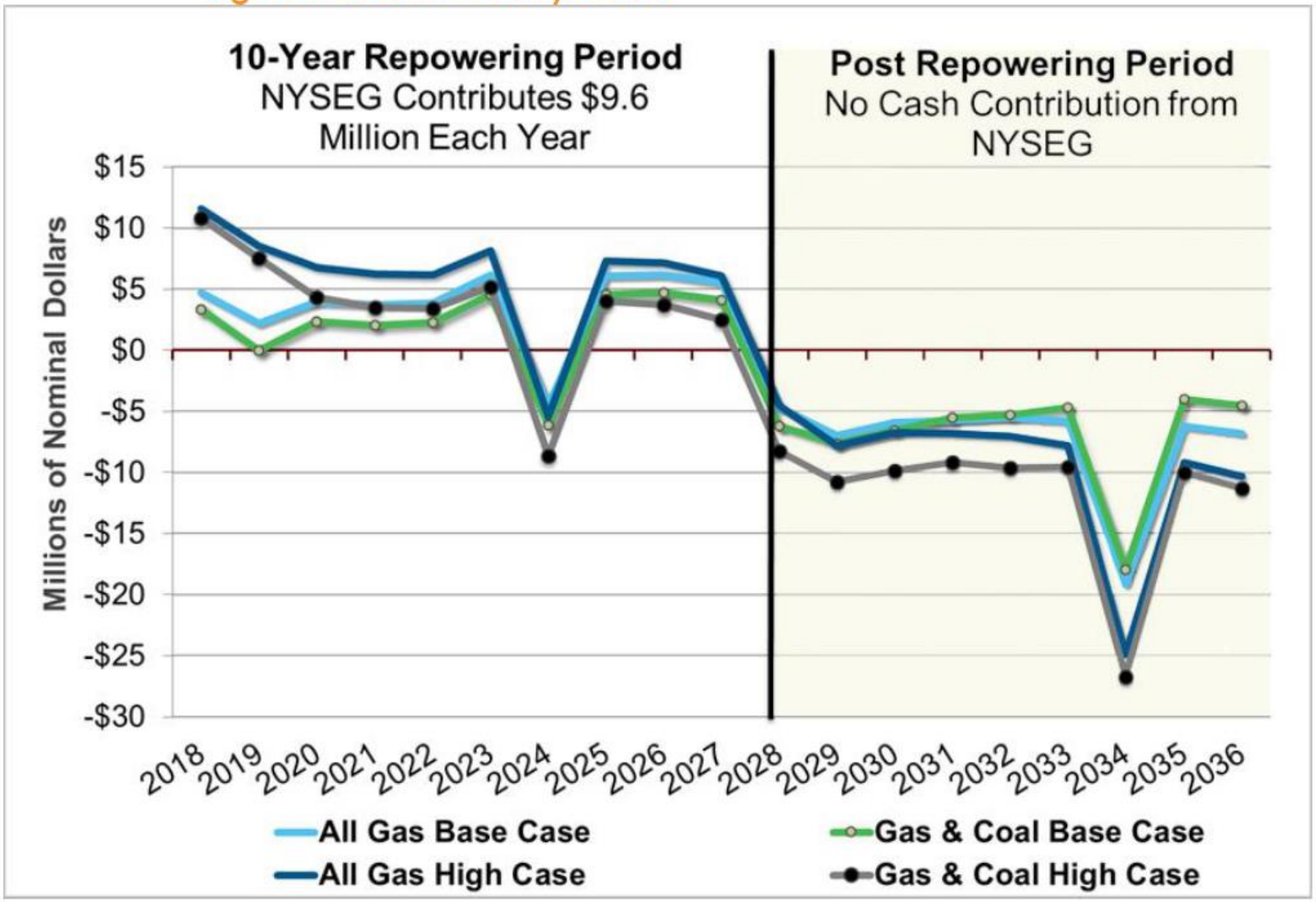
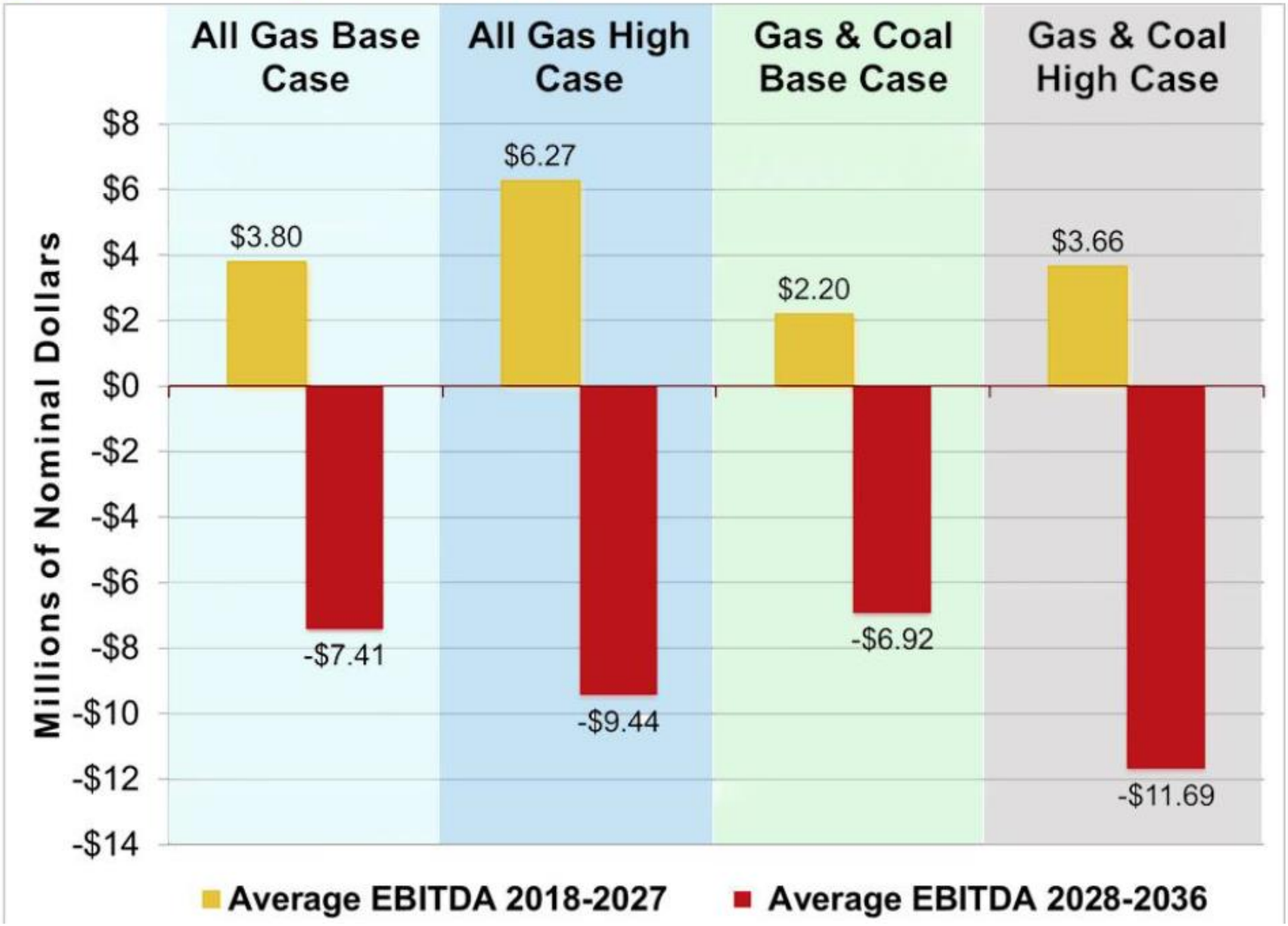
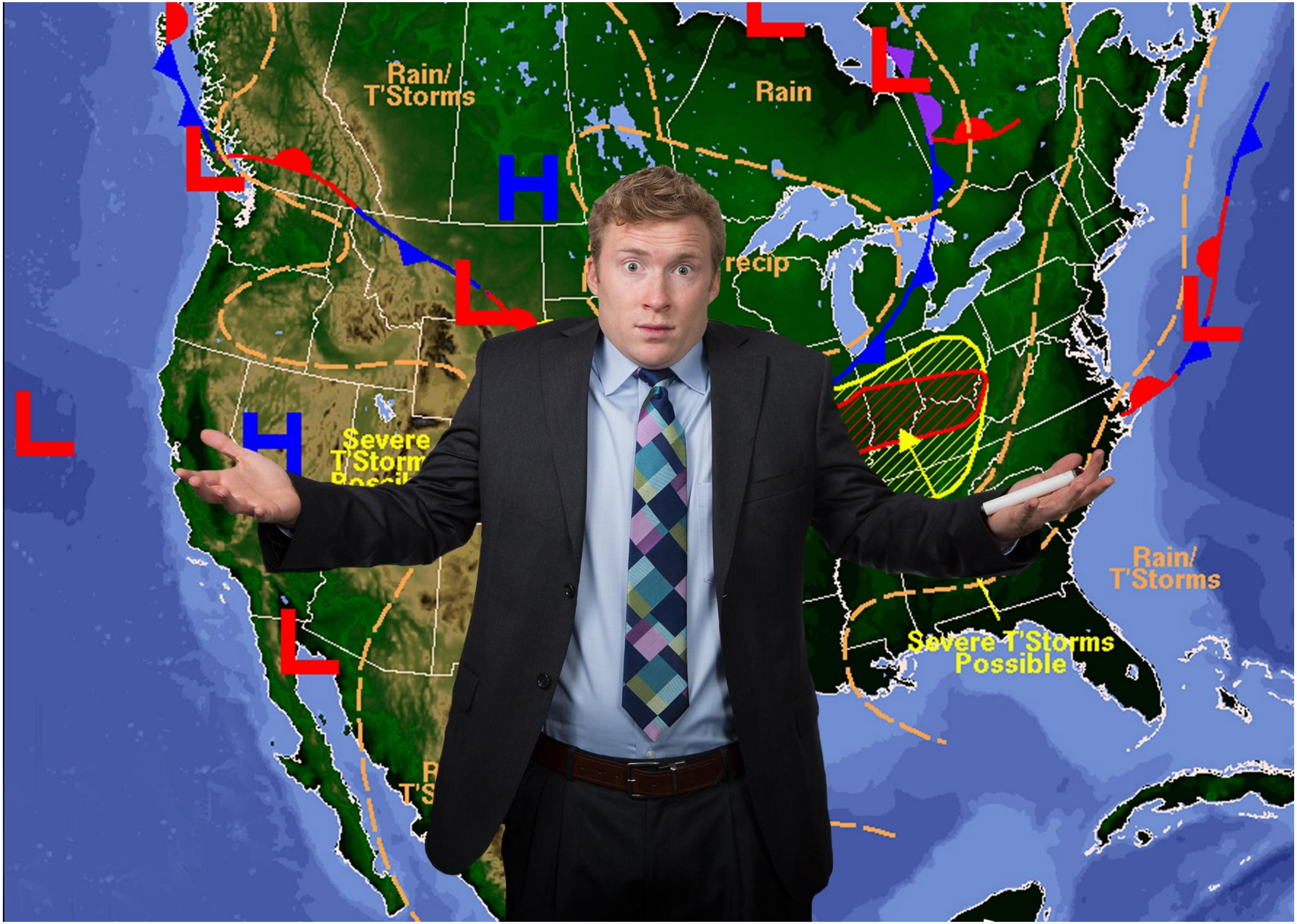


Figure 10: Average Annual Cayuga EBITDA for the Periods 2018-2027 and 2028-2036.

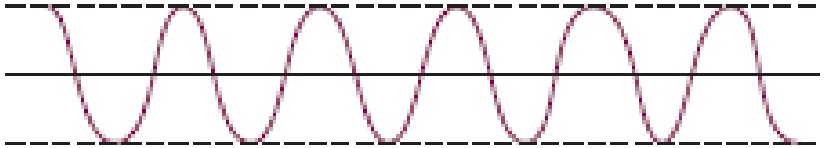




Rain/
T'Storms
Rain
Rain/
T'Storms
Severe T'Storms
Possible

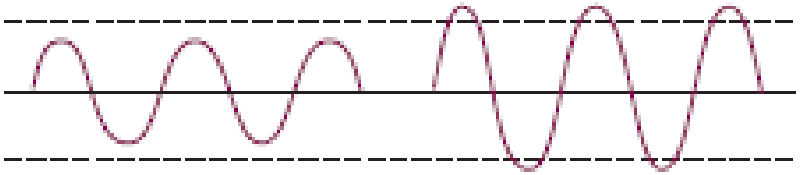

A repowered Cayuga will provide needed power quality to the region.

>> Normal Power

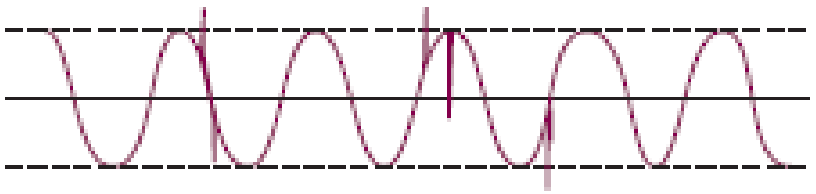


Undervoltage

Overvoltage

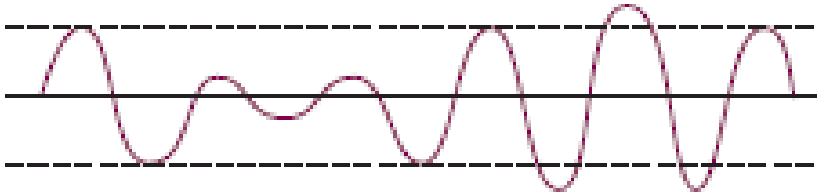


Spikes, Impulses, Surges

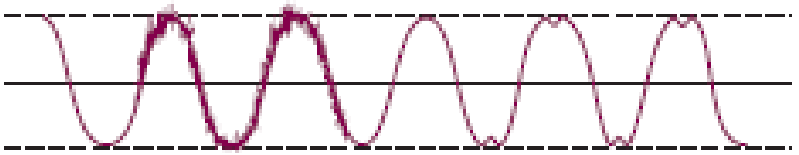


Sag

Swell



Electrical Noise, Harmonic Distortion

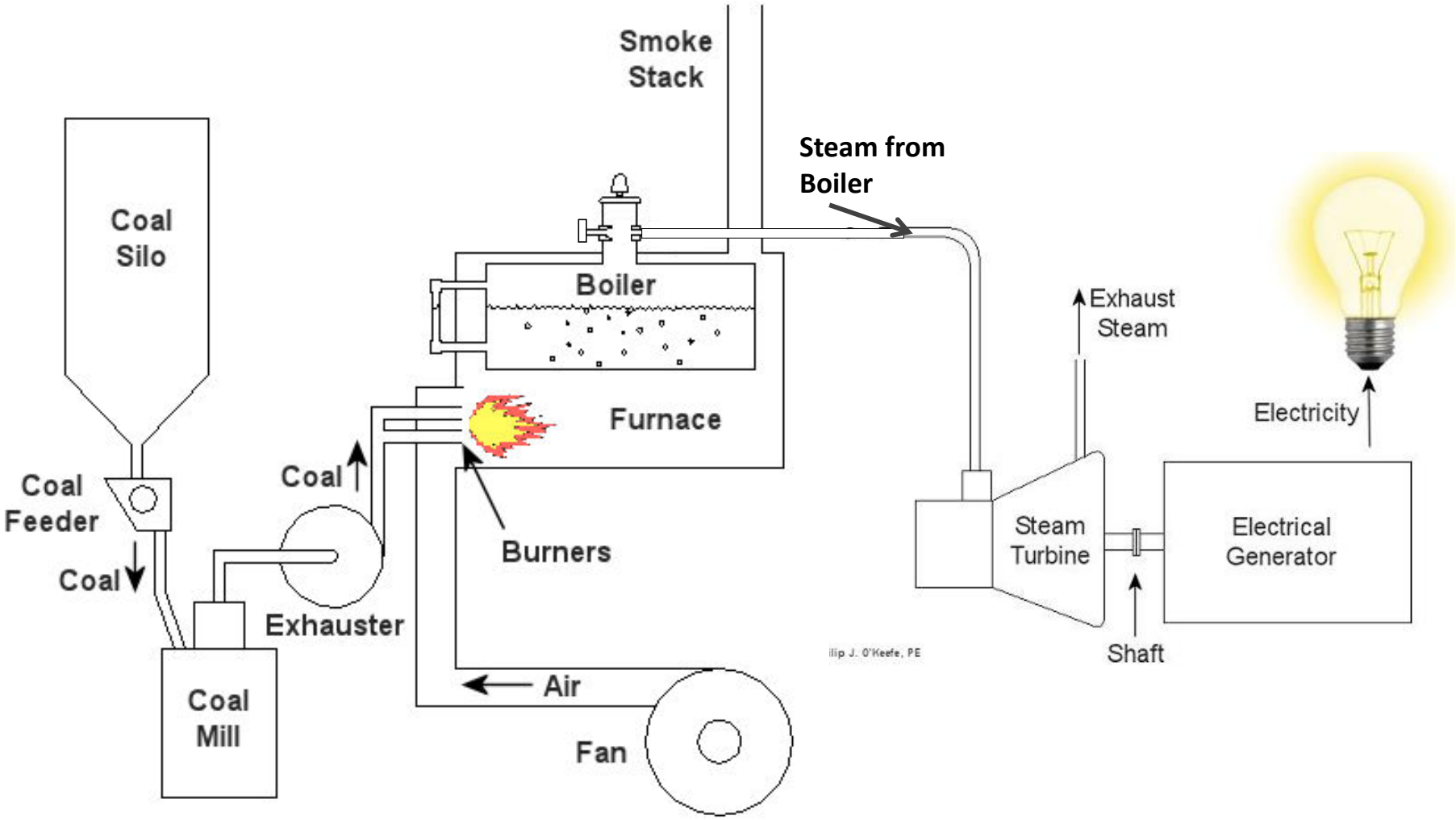


PQ Problem Type	Consumer Role	Utility Role	Generator Role	Remarks
Off-nominal frequency	None unless running on local generator disconnected from the grid	Avoid unnecessary islanding of load / generation	None	Results from major bulk power system disturbances, or on small islanded systems – eastern US interconnection keeps deviations in the millihertz region
Voltage regulation / unbalance	Low voltages could be due to loads on customer's premises	Follow planning and operations standards to minimize utility-side problems	Can provide voltage support in certain locations under specific operating conditions	Utility-installed shunt capacitor banks are a standard solution to sustained low voltage problems
Flicker	May have flicker-producing equipment onsite	May have a role in working w/customer to devise solution	None	Usually mitigated at the source of flicker – customer / utility both involved
Harmonics / interharmonic distortion	Usually due to specific onsite equipment	May have a role in working w/customer to devise solution	None	May involve both a customer and a utility solution
Voltage sags	Faults, motor starting within customer premises may be responsible	Limit transmission & distribution faults / good tree trimming practices	None	Principle causes are faults and motor starting
Transients	May be due to grounding/ switching issues onsite	Review line / capacitor bank switching practices	None	


A repowered Cayuga will provide clean, energy efficient power to the region.

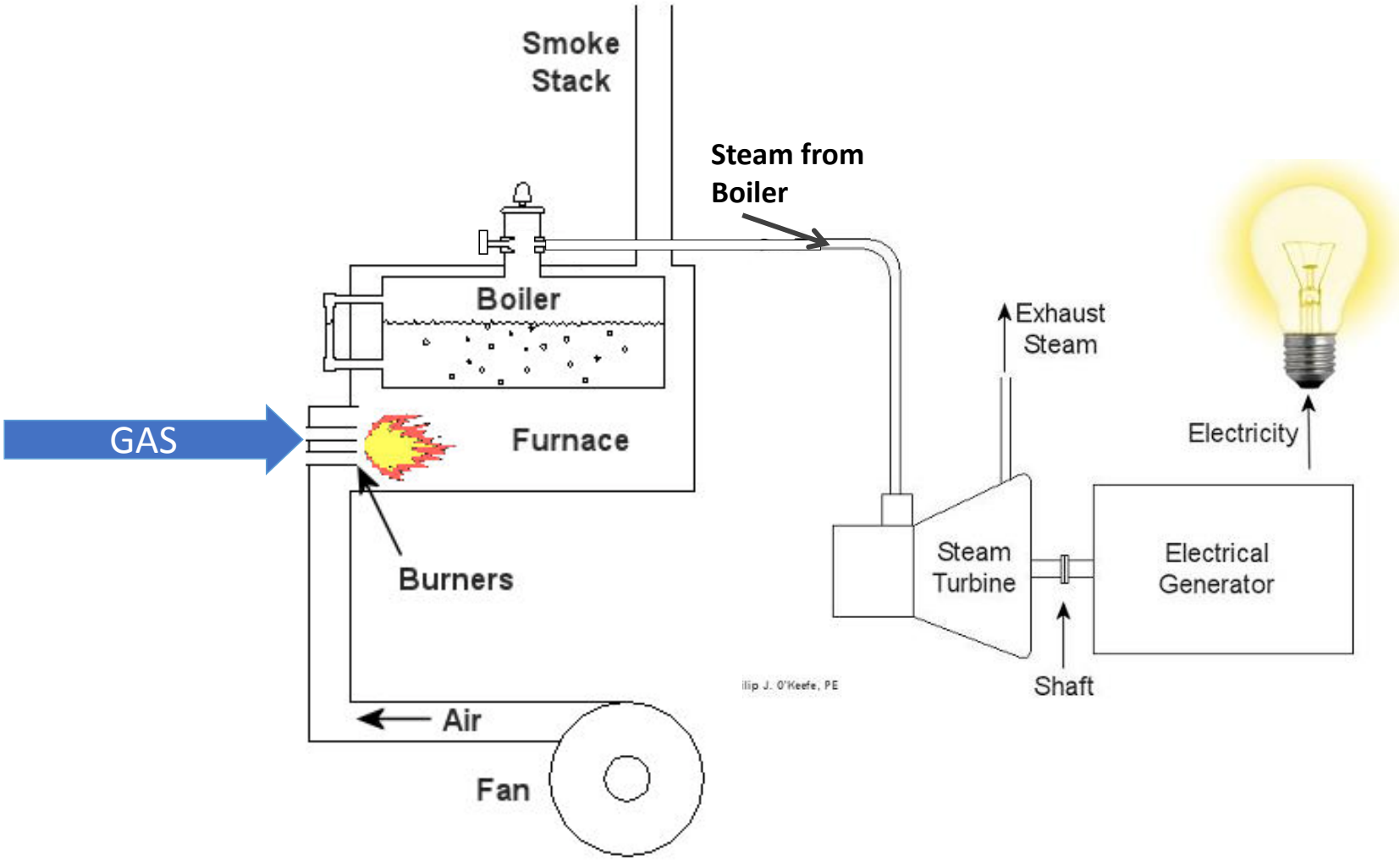
Existing System

COAL FURNACE – STEAM TURBINE



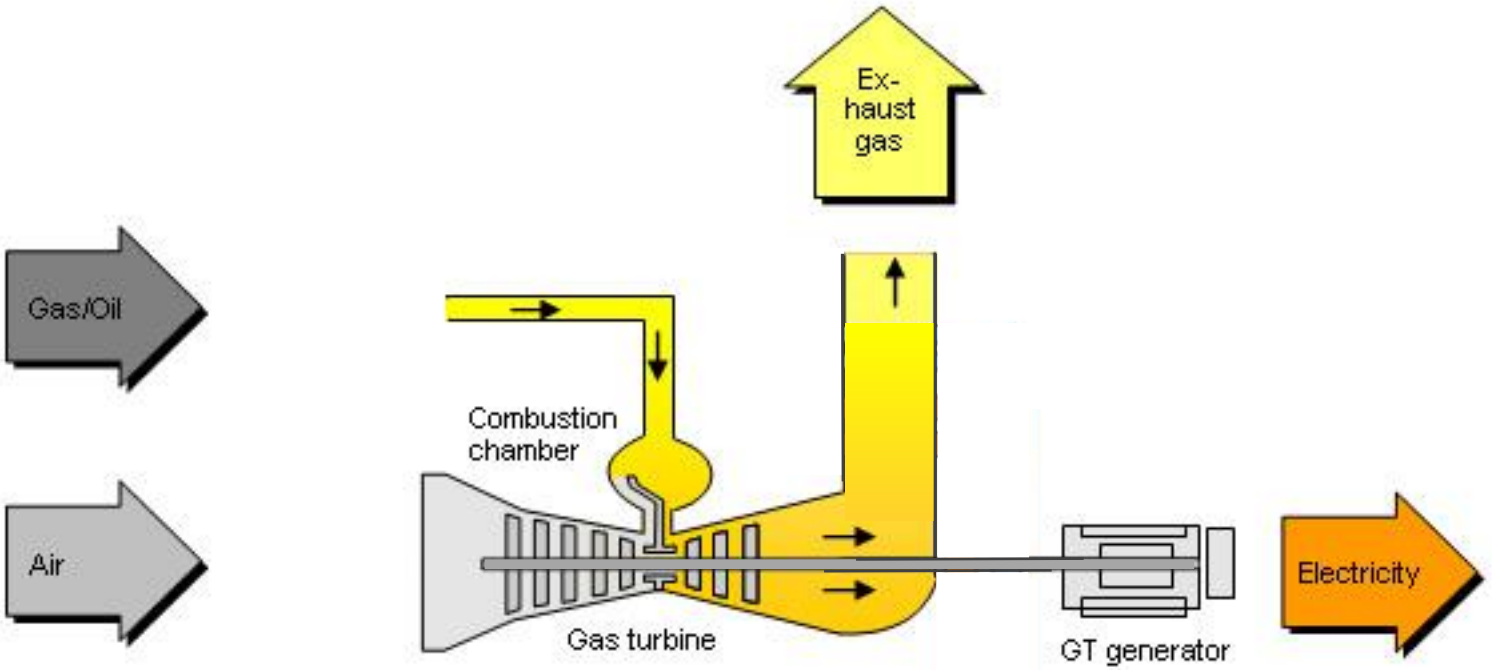
Option 1

GAS + COAL FURNACE – STEAM TURBINE



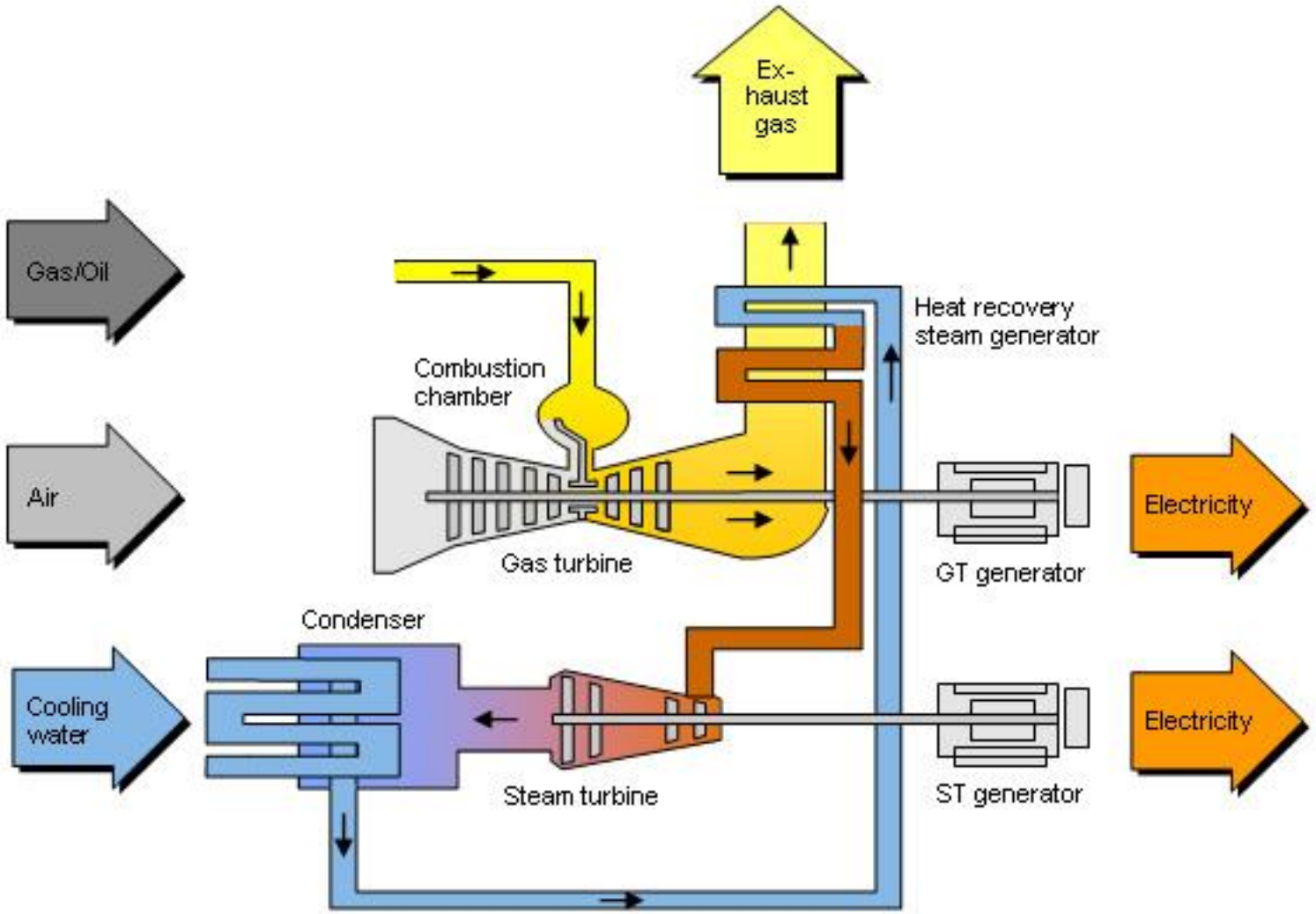
Option 2

Simple Cycle Gas Turbine



Option 4

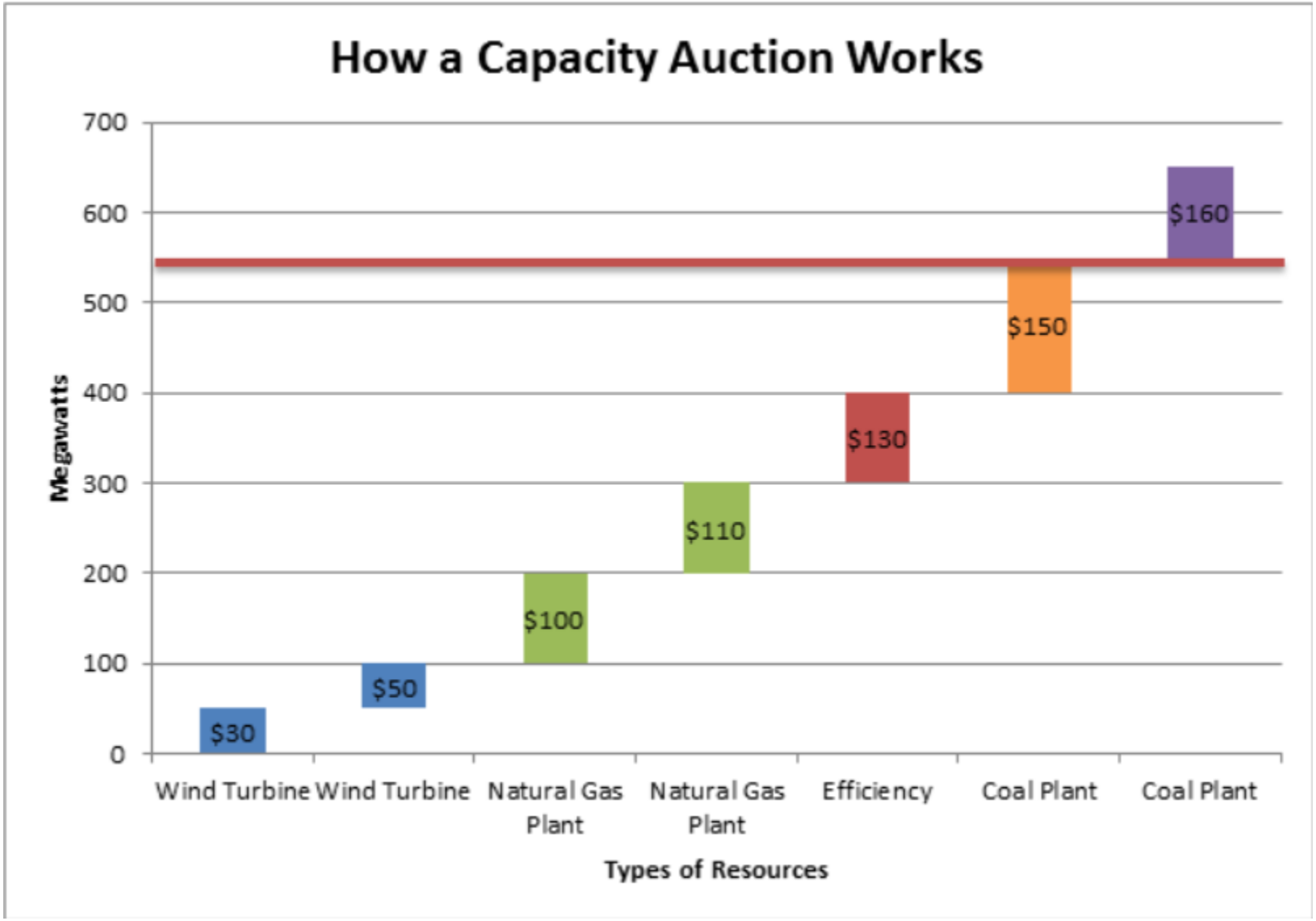
Combined Cycle Gas Turbine



Zone C Gas Generators

Location	Nameplate (MW)	Type	2013 Net Energy (GWh)	Capacity Rate %
Scriba	1,254.0	CCGT	5,290.0	63
Dewitt	122.6	CCGT	41.5	5
Syracuse	102.7	CCGT	25.3	3
Oswego	57.4	CCGT	46.8	10
Silver Springs	56.6	CCGT + CoGen	47.2	10
Auburn	7.4	GT	0.1	0.18


Retaining fuel diversity from coal will save money when gas prices spike during polar vortex.


How a Capacity Auction Works
700
600
500
400
300
200
100
0
Megawatts
$30
$50
$100
$110
$130
$150
$160
Wind Turbine
Wind Turbine
Natural Gas Plant
Natural Gas Plant
Efficiency
Coal Plant
Coal Plant
Types of Resources


COAL ASH
CONTAMINATION

Coal ash flowing into groundwater, Milliken Creek

Nick Reynolds, nreynolds@ithacajournal.com | @IJCityWatch 6:33 p.m. EDT September 17, 2015

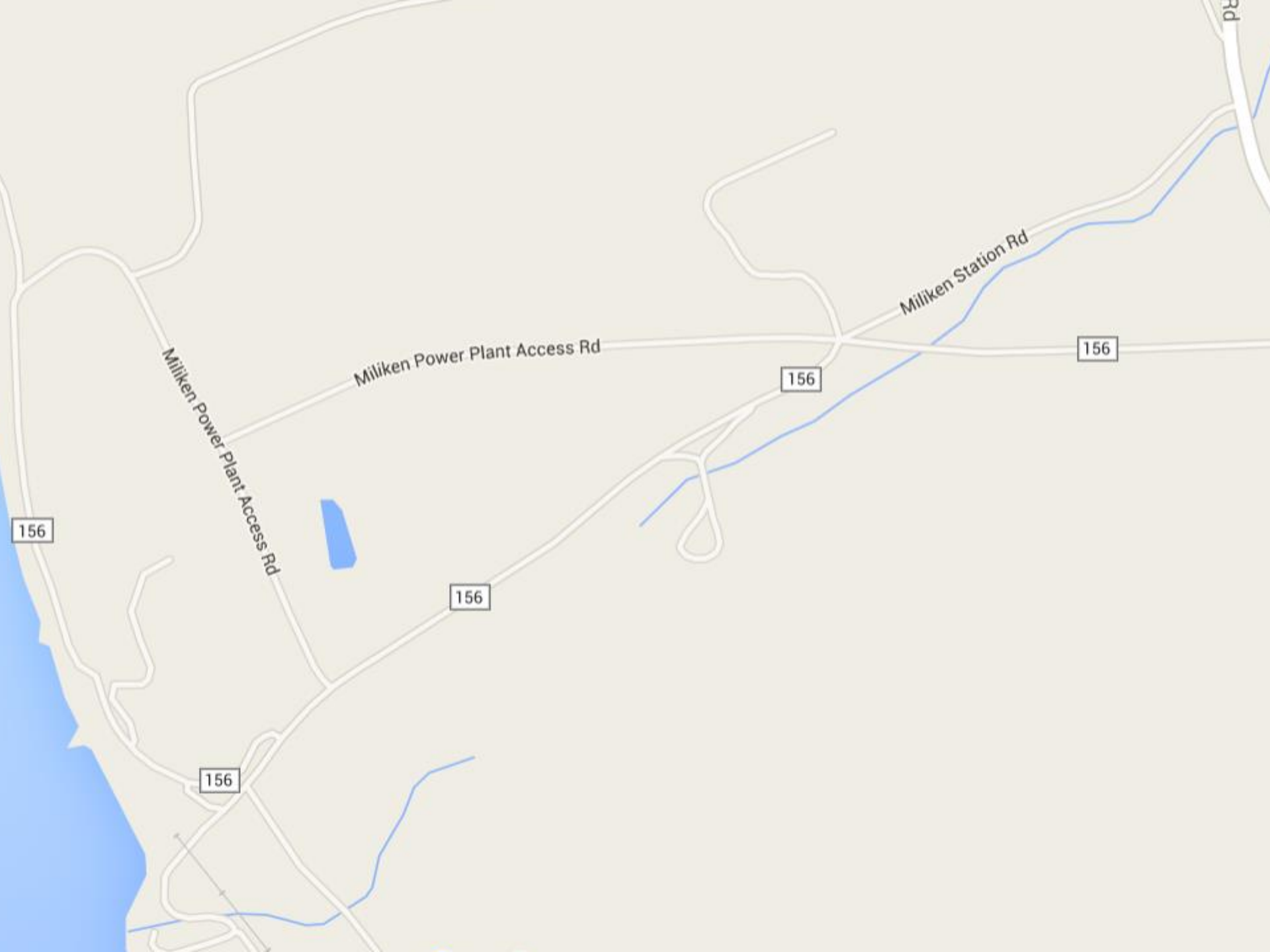
A geologist presented findings of lack of coal ash contamination oversight to Tompkins County officials, revealing an undefined risk to the local environment

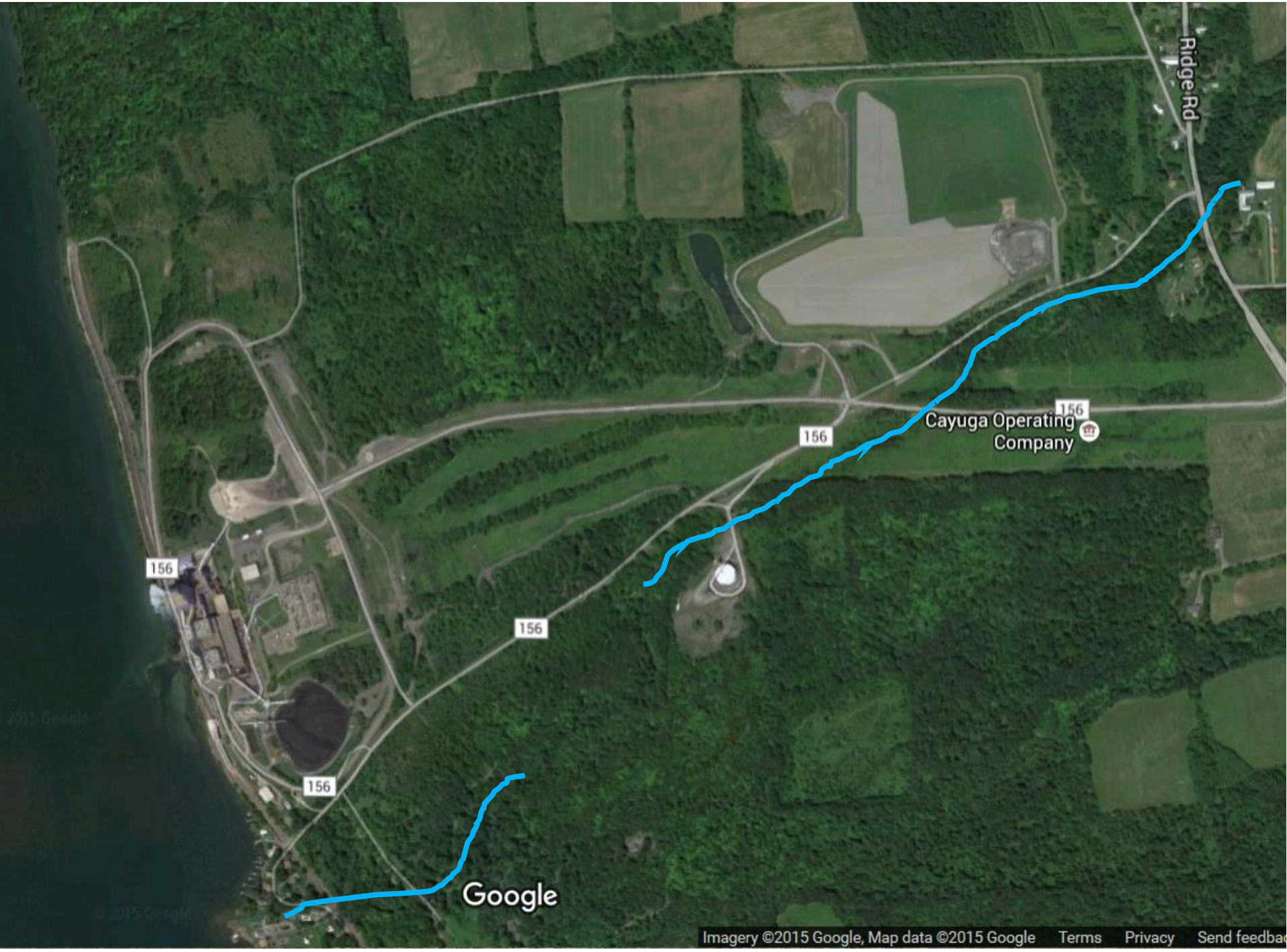
(Photo: SIMON WHEELER / Staff Photo)

Coal ash sitting dormant in an unlined portion of the landfill near the Cayuga Power Plant has been seeping into groundwater for nearly 30 years and has flowed into nearby Milliken Creek, potentially contaminating drinking water, a geologist said in a meeting with Tompkins County officials Wednesday afternoon.

Mark Quarles, owner and a senior consultant with Nashville, Tennessee-based geology firm Global Environmental, was brought in last fall to assist in the review of a proposed


Ridge Rd
156
Cayuga Operating Company
156
156
156
156
Google
Imagery ©2015 Google, Map data ©2015 Google
Terms
Privacy
Send feedbac


Milliken Station Rd
Milliken Power Plant Access Rd
Milliken Power Plant Access Rd
156
156
156
156
156


Ridge Rd
156
Cayuga Operating Company
156
156
156
156
Google
Imagery ©2015 Google, Map data ©2015 Google
Terms
Privacy
Send feedba