

# Caithness Long Island, LLC

Exhibit  
ds 4/6/22

## Briefing and Plant Tour

LIMBA  
April 1, 2022

# Caithness Energy, L.L.C.

---

- ❖ Privately held independent generating company
  - Specializes in power generation
  - Founded in 1964
- ❖ Successfully developed, operated and owned interests in over 50 operating power projects including:
  - Natural Gas                      5,954 MW
  - Wind                                1,191 MW
  - Geothermal                        496 MW
  - Solar                                 160 MW

# Caithness Long Island (“Caithness”)



- ❖ Located on approximately 20-acre parcel within 103-acre Caithness owned, industrially zoned site in Suffolk County
- ❖ 350 MW gas-fired combined cycle plant with ultra-low sulfur distillate back-up
- ❖ Commercial operations began Aug. 2009
- ❖ 20-year contract with LIPA for most of plant output
- ❖ Saved LIPA ratepayers more than \$426M in fuel and other costs since 2009 through 2021
- ❖ 450 construction jobs at peak
- ❖ 19 highly skilled full-time jobs
- ❖ Most efficient plant on Long Island: displaces generation from old, inefficient, polluting plants
- ❖ Reduces CO2 emissions by 440,000 tons/yr, 15 times more than the 32 MW solar plant located at Brookhaven National Labs
- ❖ Highly reliable operation
- ❖ Produces more than 21% of electricity generated on Long Island
- ❖ Excellent environmental record – operates well below strict permit limits
- ❖ Air-cooled condenser - very low water use (less than 20 gpm) - well below other power plants on Long Island
- ❖ Excellent safety record
  - No lost time accidents since COD
- ❖ PILOT payments in excess of \$112M since 2007
- ❖ Excellent corporate citizen and community outreach
  - Scholarship program at three local high schools; over \$400,000 in local scholarships awarded to 361 students
  - Support of local community organizations, such as Bellport Boys and Girls Club

# Caithness Site Environmental Characteristics



- ❖ Existing project on 20-acres within Caithness' 103-acre industrially zoned parcel
- ❖ 100' above MSL with excellent drainage
- ❖ No adverse water or wind impacts during Sandy and Irene
- ❖ Large buffer to residential areas
- ❖ Not in deep water recharge zone
- ❖ No wetlands
- ❖ Not near parks or rivers
- ❖ No threatened or endangered species
- ❖ Not in any other environmentally sensitive area
- ❖ Next to 138 KV LIPA transmission line
- ❖ Close to National Grid gas system

# The Long Island Base Case

---

- ❖ Two-thirds of installed capacity is legacy LILCO steam plants and old peakers built in '50s, '60s and '70s
- ❖ Nearly half of Long Island's electricity is generated off Island
- ❖ Old plants are expensive backup that frequently stand idle
  - High taxes
  - High operations and maintenance costs
  - Low capacity factor
- ❖ Only one modern, efficient generating plant – Caithness Long Island (350MW) - is located on Long Island and available to serve Long Island
  - Caithness is 6.5% of Locational Capacity Requirement for Long Island (Zone K)
  - Caithness provided 10.8% of On-Island Load in 2020
  - Caithness provided 21.5% of On-Island Generation in 2020

# Older Long Island Plants are Obsolete

- ❖ Compared to new power plants, the technology of the old Long Island plants is obsolete, inefficient and polluting
- ❖ Except for Northport, all of the National Grid steam plants were built to be coal-fired
  - Starting 1960s they burned heavy oil only
  - In 1990s, natural gas capability was added to most of the steam units
- ❖ Old steam plants take much longer to turn on and off and to increase and decrease output than new combined cycle plants. This inflexibility:
  - forces LIPA to use plants for many more hours of the year than economical
  - prevents the plants from helping integrate increased renewables into the grid

Plant	Age in 2018 (Years)	Age in 2028 (Years)
<b>Barrett 1, 2</b>	<b>55, 62</b>	<b>65, 72</b>
<b>Port Jefferson 3, 4</b>	<b>58, 60</b>	<b>68, 70</b>
<b>Northport 1 – 4</b>	<b>41-51</b>	<b>51-61</b>



*NatGrid Barrett plant (Island Park)  
Units completed 1956, 1963*



*NatGrid Port Jefferson plant, Units completed 1958, 1960*

# Regional Generation Includes Many Obsolete Plants

---

- ❖ LIPA's generating mix includes nearly 4000 MW of generation built by LILCO many decades ago
  - Over 1500 MW of steam units are over 50 years old of which nearly 400 MW are over 60 years old
  - Over 600 MW of combustion turbines are over 42 years old
- ❖ The integrated regional power system similarly includes many old steam and combustion turbine units
- ❖ These older units are ill-suited to a low carbon future; compared to new plants:
  - they burn 50% more fuel
  - they emit 50% more carbon dioxide
  - the steam units are inflexible and
  - they can't ramp up or down rapidly
- ❖ Plants like Caithness displace generation from these older units and will support intermittent renewable generation

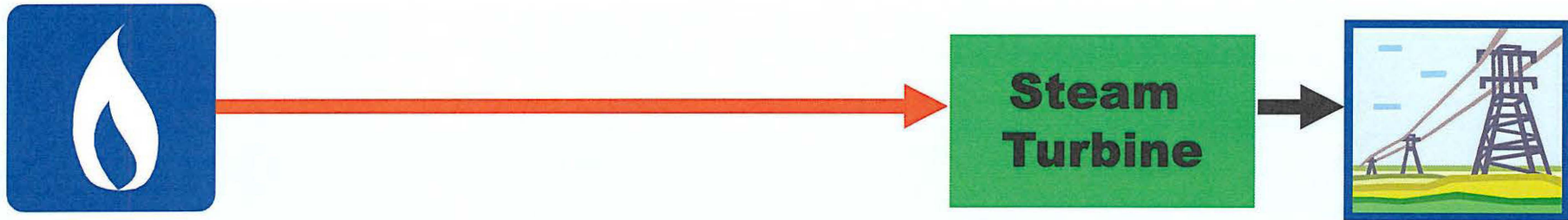


NatGrid Port Jefferson plant, Units completed 1958, 1960

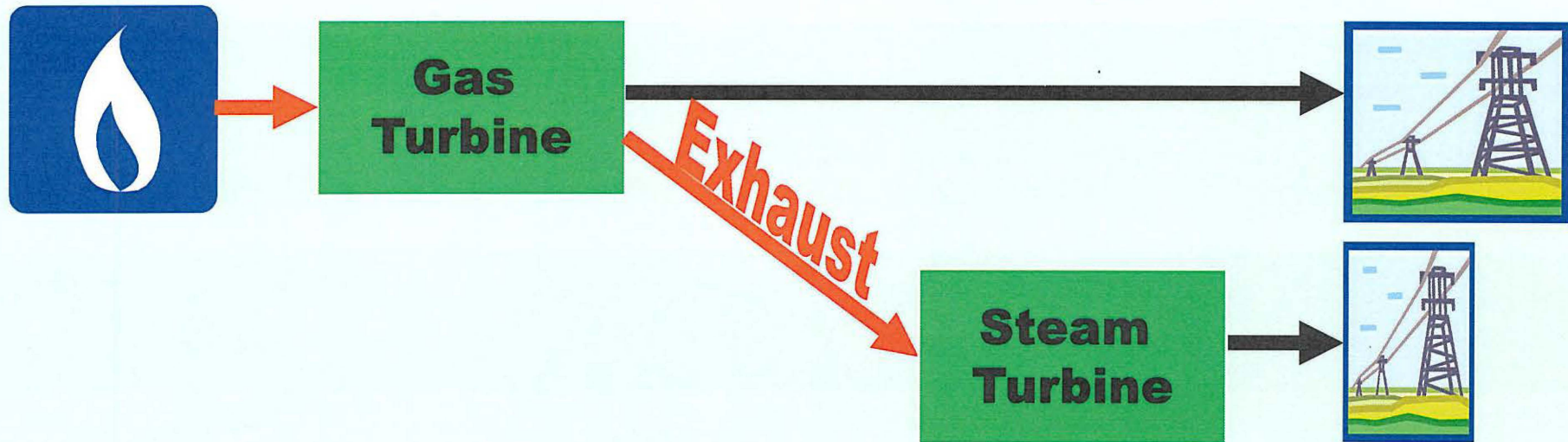
# What is Combined-Cycle?

---

## Pre-1980s—steam plants

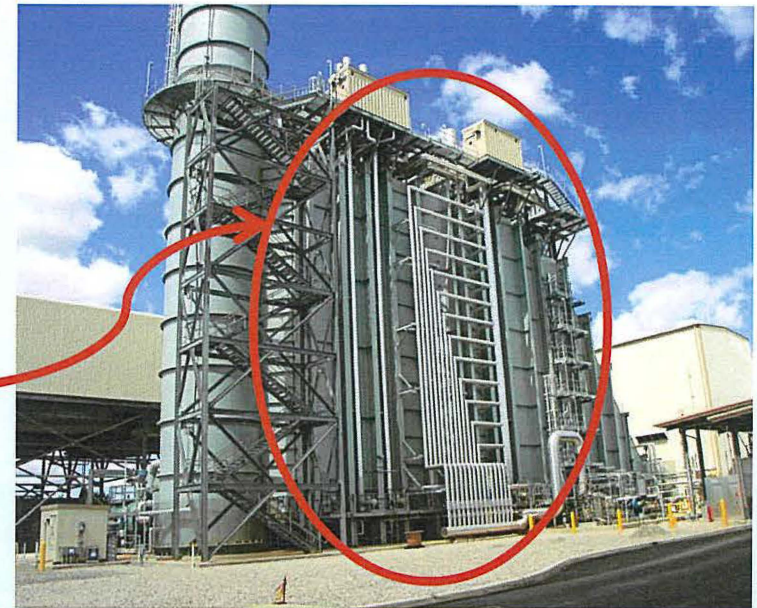
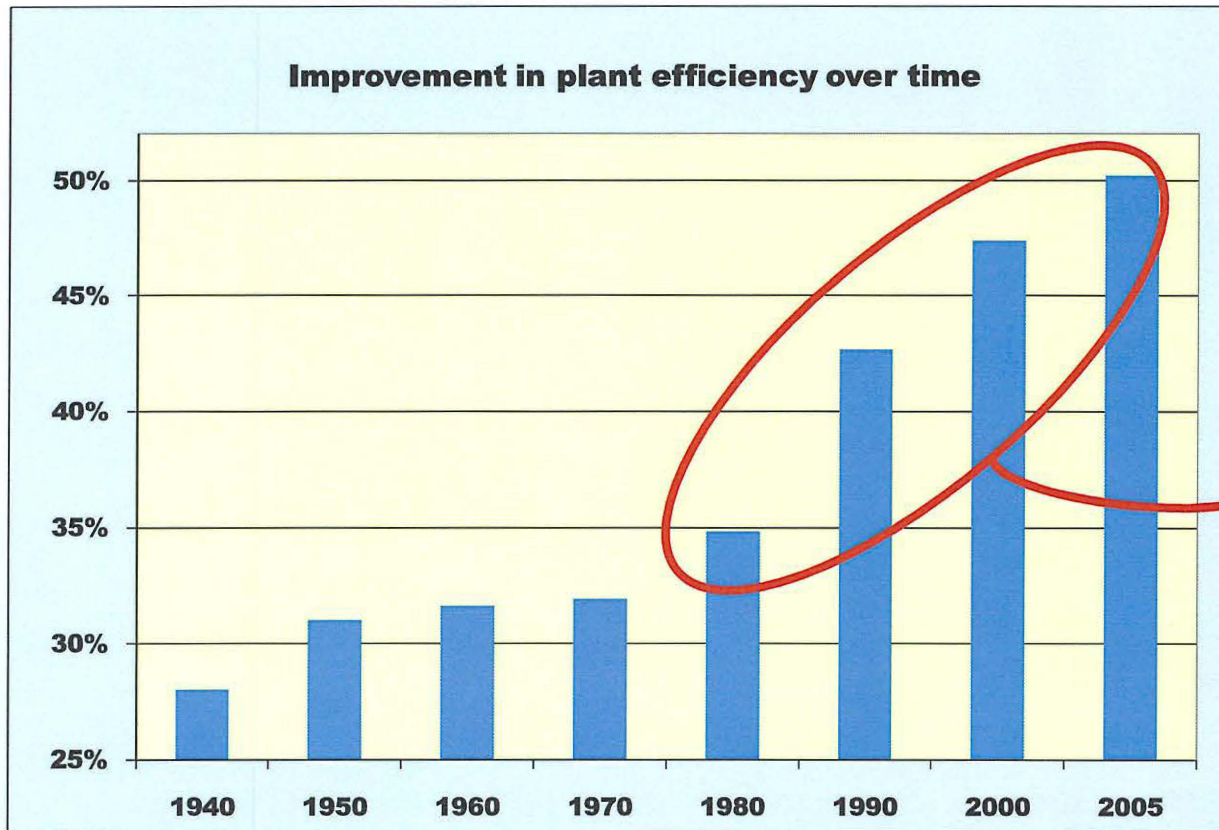


## Post 1980s--combined cycle





# New Plants Are More Efficient



- ❖ Older steam baseload units on Long Island have efficiencies of about 33%
- ❖ Introduction of combined cycle technology in 1980s led to substantial improvements in efficiency
- ❖ Today, plants like Caithness can achieve efficiencies above 60%, thereby substantially reducing fuel usage and CO2 emissions

# What has Caithness accomplished for Long Island?

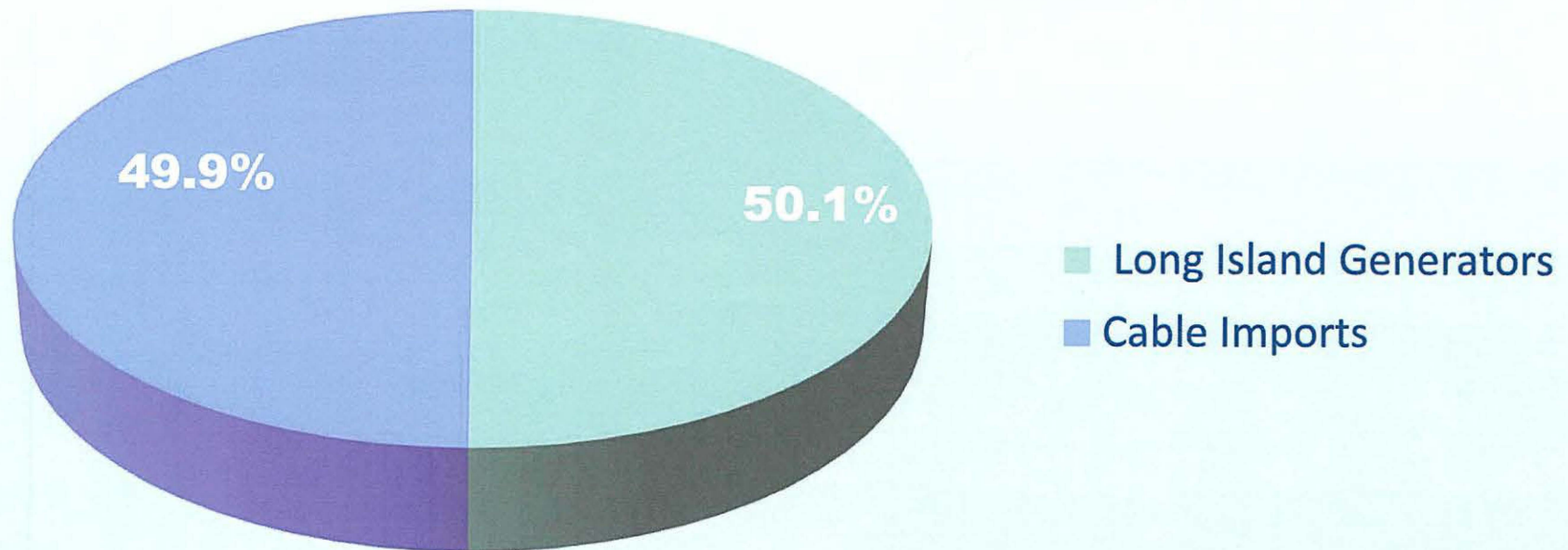
---

- ❖ Allowed for retirement of two obsolete plants
  - Far Rockaway (110 MW, built in 1953)
  - Glenwood Landing (233 MW, built in 1952/54)
- ❖ Reduced CO2 emissions by 440,000 tons/yr.
  - 15 times as much as the 32 MW solar plant at Brookhaven National Labs, built at about the same time
- ❖ Greatly reduced air emissions
  - NOX reduced substantially compared to generation at older plants whose generation was reduced
- ❖ Reduced aquatic impacts:
  - Fish kills
  - Larvae destruction
- ❖ **APPROXIMATELY 50% SAVINGS IN FUEL COSTS AND CO2 EMISSIONS WHEN CLI IS BEING OPERATED IN LIEU OF OLDER PLANTS**

# Where does Long Island's electricity come from?

---

## Actual Long Island Electricity By Source - 2020



Source – 2021 NYISO Gold Book

# Imported Power has Been Unreliable

MENU TODAY'S PAPER

Newsday

## Cross-Sound power cable out of order since summer



Power transmission lines run from the northern terminal of the Cross-Sound Cable, seen here in 2003, which has been out of commission since July. Credit: Bloomberg News / Steven E. Frischling

By Mark Harrington

mark.harrington@newsday.com [MHarringtonNews](#)

January 13, 2021



The Cross-Sound Cable, a 24-mile undersea power line from Long Island to Connecticut, has been out of commission since July, utility and cable officials acknowledged Tuesday.

MENU TODAY'S PAPER

Newsday

BUSINESS

## NYPA cable between LI, Westchester has been 'unreliable' for months, LIPA chief says



Ships preparing to anchor near underwater electric cables in Hempstead Harbor and Long Island Sound will receive alerts from a virtual smart-buoy system designed to prevent damage to the state-owned power lines. Credit: Barry Sloan

By Mark Harrington

mark.harrington@newsday.com [MHarringtonNews](#)

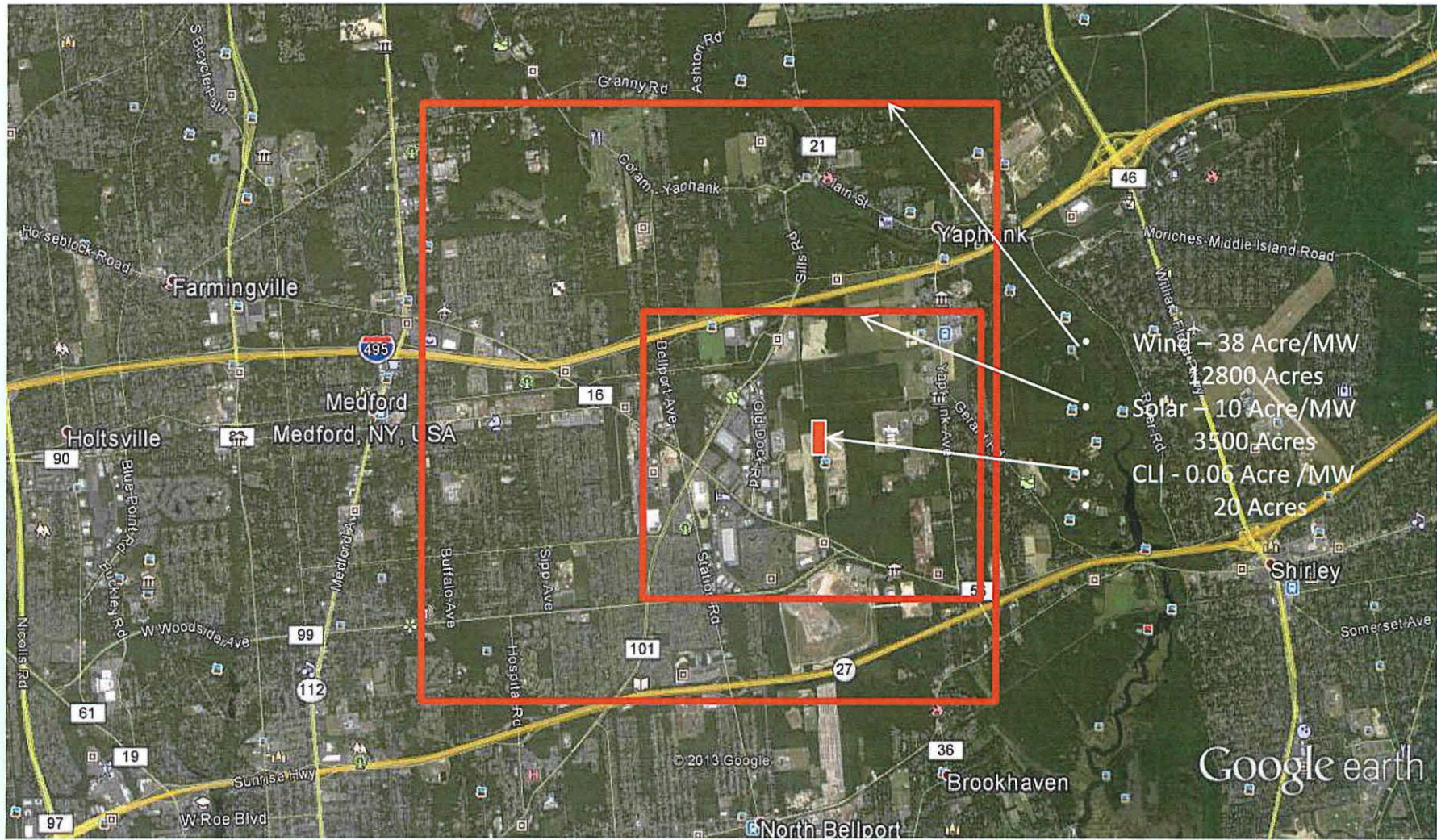
April 12, 2021



Another major power cable to Long Island has been experiencing problems for the past half year, but the problems could be fixed before month's end.

- ❖ Caithness estimates based on NYISO public data that the current forced outage rate for the five submarine cables is over 34%
- ❖ This equates to approximately 900 MW of the 2,640 MW cable capability being unavailable over the last two years

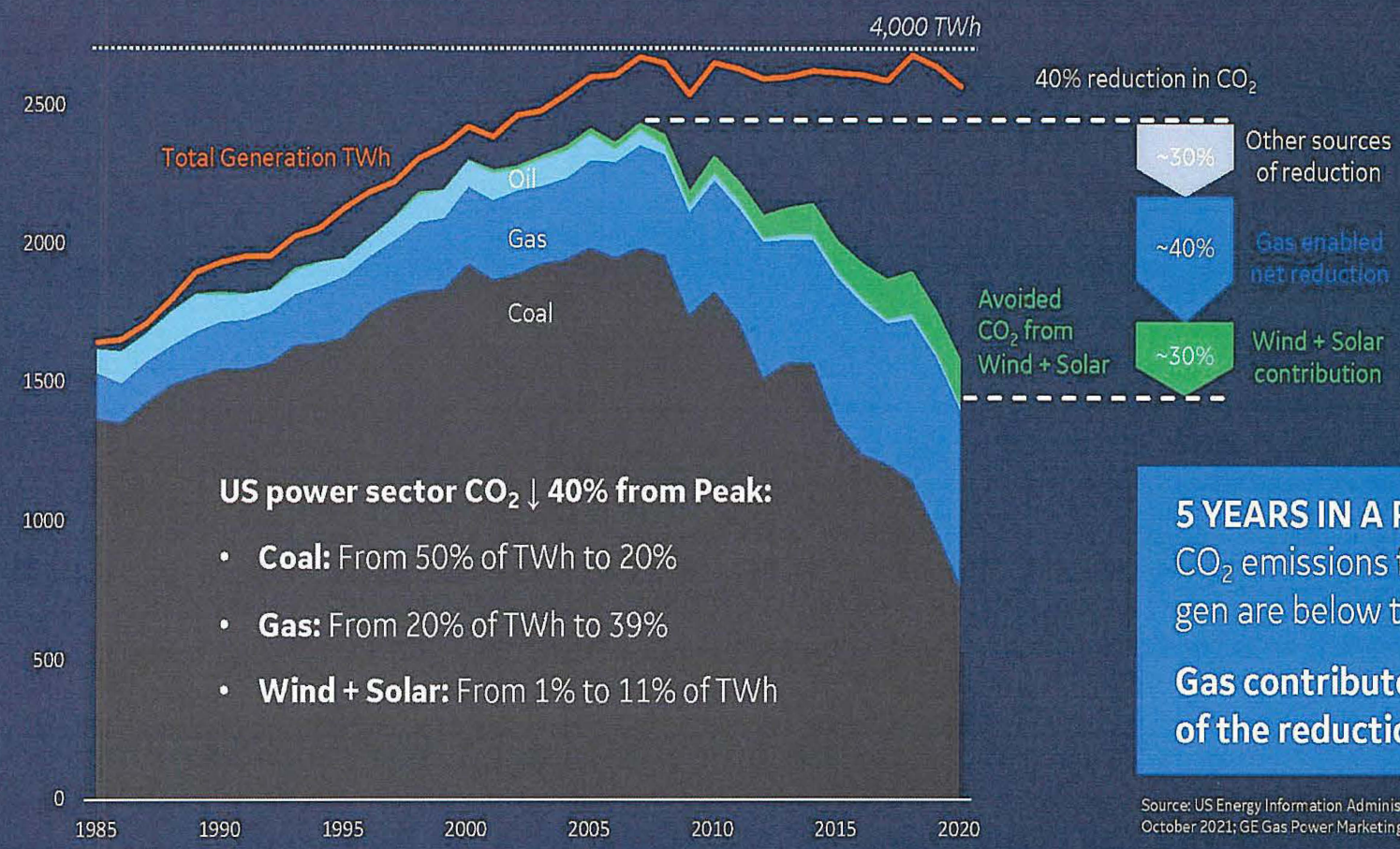
# Land Use – Renewable vs Combined Cycle



# Natural Gas contributes more to carbon reduction than any other fuel source or technology



US Power Sector CO<sub>2</sub> (Million metric tons)



**US power sector CO<sub>2</sub> ↓ 40% from Peak:**

- **Coal:** From 50% of TWh to 20%
- **Gas:** From 20% of TWh to 39%
- **Wind + Solar:** From 1% to 11% of TWh

**5 YEARS IN A ROW...**  
 CO<sub>2</sub> emissions from power gen are below transportation

**Gas contributed ~40% of the reduction.**

Source: US Energy Information Administration, Monthly Energy Review, October 2021; GE Gas Power Marketing Analysis

# Natural Gas contributes more to carbon reduction than any other fuel source or technology

## A Decade of Action

**GAS PLAYS A VITAL ROLE IN ACCELERATING THE TRANSITION TO A LOWER CARBON FUTURE**



**US Power sector  
CO<sub>2</sub> ↓40%**

GAS  
ENABLED ~40%

of net reduction  
since '07

**Flexible to  
complement  
renewables**

FAST START TIMES  
AND RAMP RATES,

low minimum  
turndown

**Reliable,  
dependable  
capacity**

WHENEVER  
NEEDED,

day or night,  
regardless of  
weather

**Abundant  
and affordable  
natural gas**

TRADED LNG  
TO INCREASE 80%

by 2050, leading to  
increased availability  
everywhere

**Less space  
required in  
urban areas**

HUNDREDS MORE  
MW/ACRE

than renewables  
+ storage

**Multiple  
pathways to  
decarbonize\* GTs**

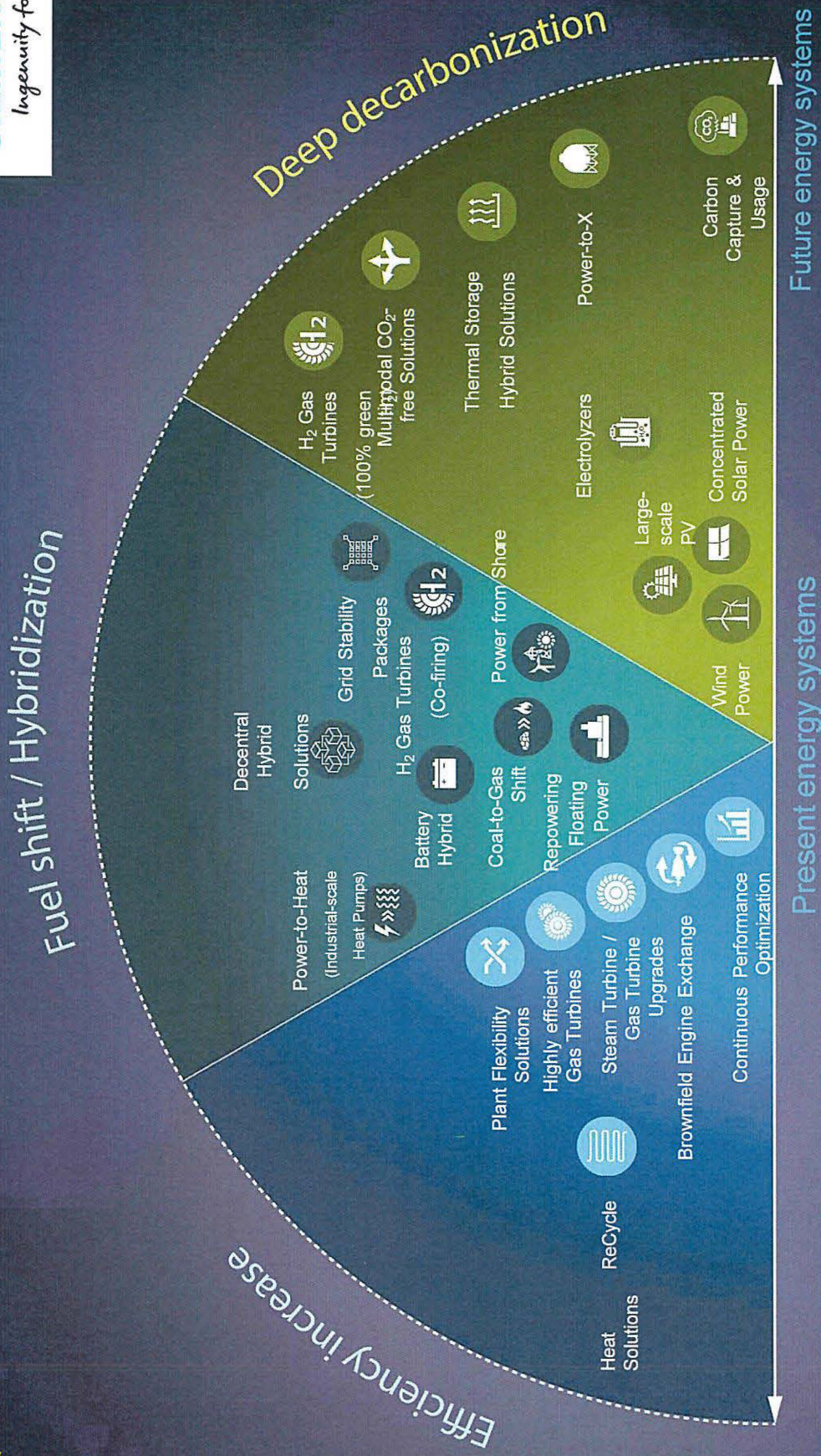
H<sub>2</sub> FUEL, CARBON  
CAPTURE, BIOFUEL

Avoid CO<sub>2</sub> lock-in  
or stranded assets

*Society is demanding aggressive  
action to address climate change ...*  
**NATURAL GAS WILL PLAY  
A CRUCIAL ROLE**

\* Decarbonization as used herein is intended to mean the reduction of carbon emissions on a kilogram per megawatt hour basis.  
Sources: US Energy Information Administration, *Monthly Energy Review*, June 2020; International Energy Agency World Energy Outlook 2020; Renewables and Battery Options, Portland General Electric, October 10, 2018

# Future Roadmap





# Summary

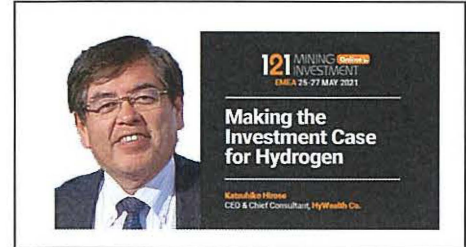
---

- ❖ Caithness has made a very significant contribution to Long Island's energy mix – fuel savings, reduced air and water impacts, local tax revenues and economic development
- ❖ Long Island needs modern gas-fired technology to replace old, dirty, inefficient fossil plants and peaking plants and to backup renewable power generation
- ❖ Caithness is an important resource to help integrate renewables and presents opportunities to further reduce CO2 emissions by incorporating hydrogen as a fuel source and utilizing carbon-capture technologies as they become commercially available

Exhibit  
de 4/14/22

Home / Latest News←

# Hydrogen Economy can create 30-Million jobs, Japanese professor calculates



JOHANNESBURG (miningweekly.com)

Thirty-million jobs can be created through the introduction of the hydrogen economy to decarbonise the world, HyWealth founder and CEO Professor **Katsuhiko Hirose** said on Wednesday.

While hydrogen is currently more expensive than fossil fuel, green hydrogen will be the cheapest solution by 2050, with blue hydrogen able to play a lower cost role in the interim, Hirose said during a webinar moderated by Nedbank CIB mining analyst **Arnold van Graan**. (Also watch attached Creamer Media video.)

An investment of \$100-billion was the 2018/19 estimate needed to transition to a hydrogen society, but in 2020, suddenly trillion dollar stimulus packages were announced that made the \$100-billion needed appear considerably more moderate, said Hirose, who worked on the Prius, the world's first commercial hybrid vehicle, and the Mirai, one of the most successful fuel cell passenger vehicles, during his career at Toyota.