
IDEA2021
Powering the Future: District Energy/CHP/Microgrids
Sept. 27-29 | Austin Convention Center | Austin, Texas

Post-COVID Utility Master Planning for a Medical District (TECO)

THERMAL ENERGY CORPORATION

BURNS McDONNELL

Date: 09/29

INTERNATIONAL DISTRICT ENERGY ASSOCIATION

Who is TECO?

TWO PLANTS
(Central and South Main)

48 MW CHP, 60 MW Total Onsite Generation

Serving 50 Buildings, 23.7M Sq Ft

120,000
Tons of Chilled Water Capacity

900,000+
lbs/hr Steam Capacity

Patient Care and Medical Research

300M+
Ton-hrs./year

35 miles of Distribution Piping – 60" CHW Distribution Headers

Load Growth Forecasted and Under Construction

ECO Mission

Reliable

Resilient

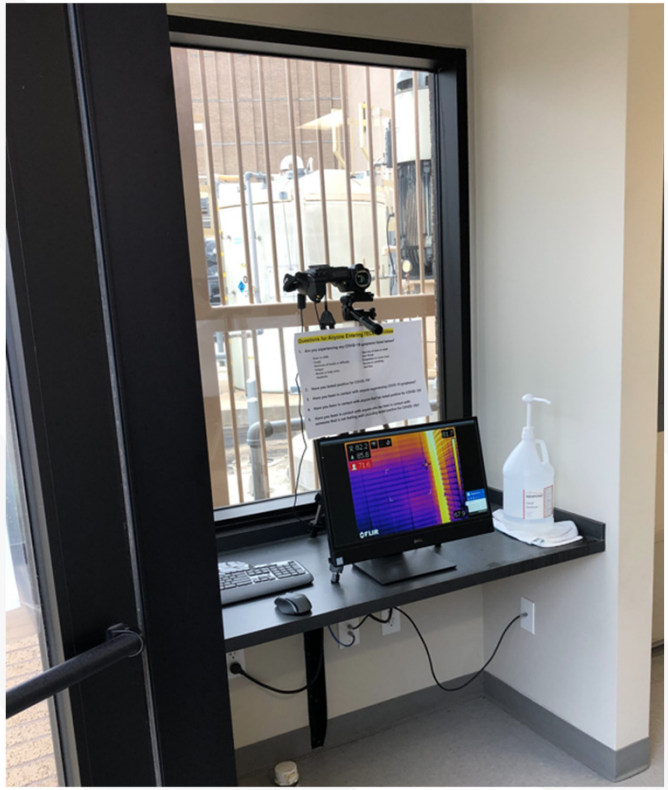
Energy Efficient

Environmentally Sound

100% of the load, 100% of the time

esiliency

Hurricane Harvey - 2017



COVID-19 (Ongoing)

Winter Storm – 2021

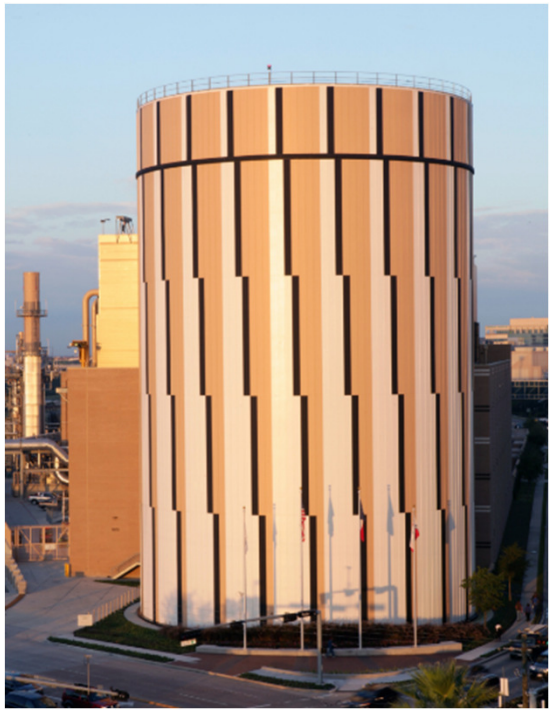
2006 Master Plan

006 Master Plan Objectives

- Further enhance reliability
- Improve efficiency of operations and fuel conversion
- Support ongoing operations
- Plan for load growth (medical center was undergoing largest construction boom in its more than 60-year history)

006 Master Plan Projects

48MW CHP

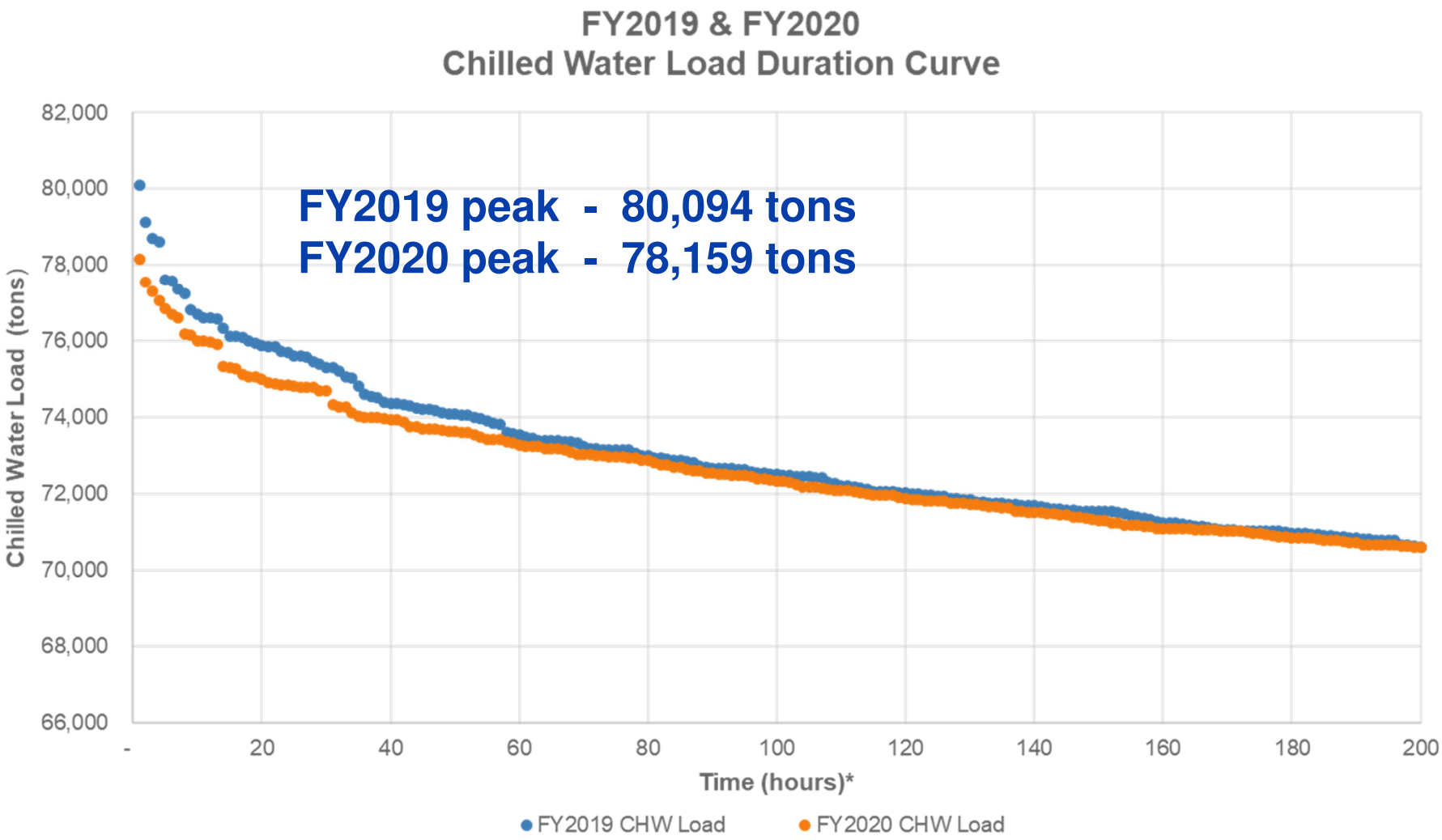


8.8 M gallon TES
16,000 gpm

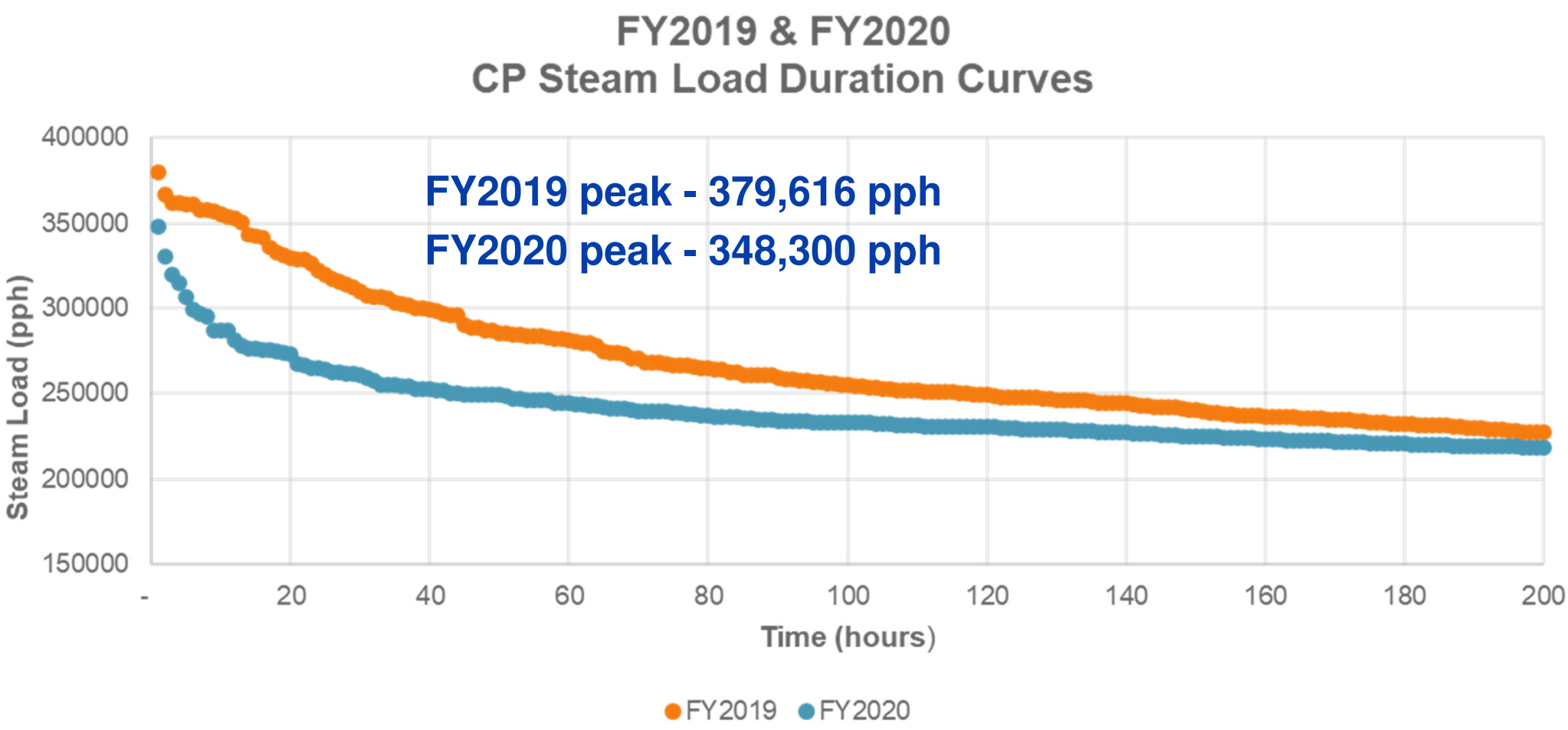
East Chiller Building
80,000 tons of capacity
32,000 tons installed

Current System Baseline

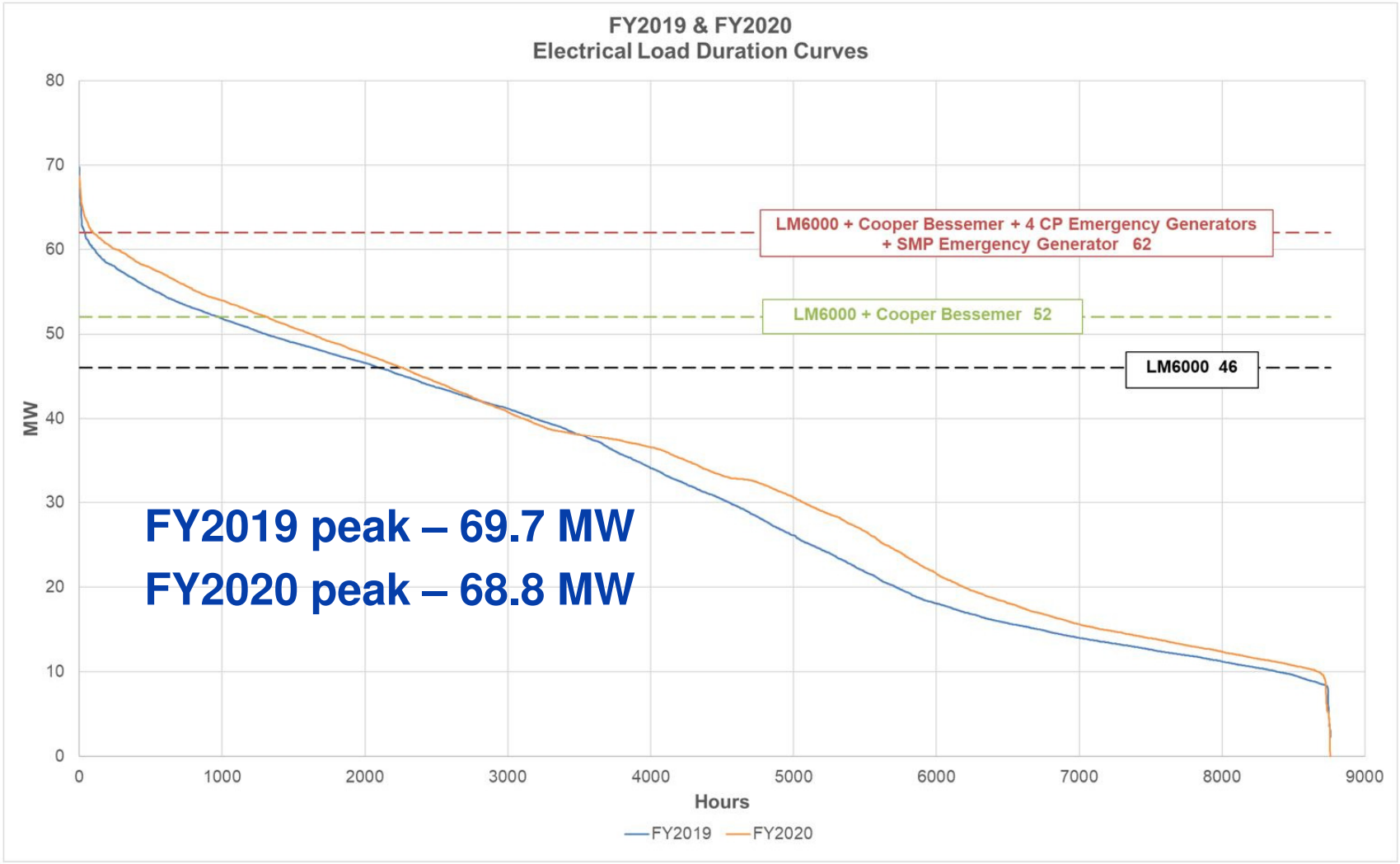
hilled Water Baseline



team Baseline



ower Generation Capacity



2020+ Master Plan

020+ Master Plan Objectives

- Develop 20-year Project Roadmap
- dentify needs for capacity expansion
- Maintain and Increase System Reliability
- Maintain and Increase System Resiliency

aster Plan Process

LTERNATIVES CHARETTE

- Data Request
- Current Equipment
- Current Loads
- Potential Technologies
- Pick 8 to Advance

SCREENING ANALYSIS

- Go/No Go
- High-Level
  - Energy
  - Economics
  - Physical Space
- Pick 3-4 to advance

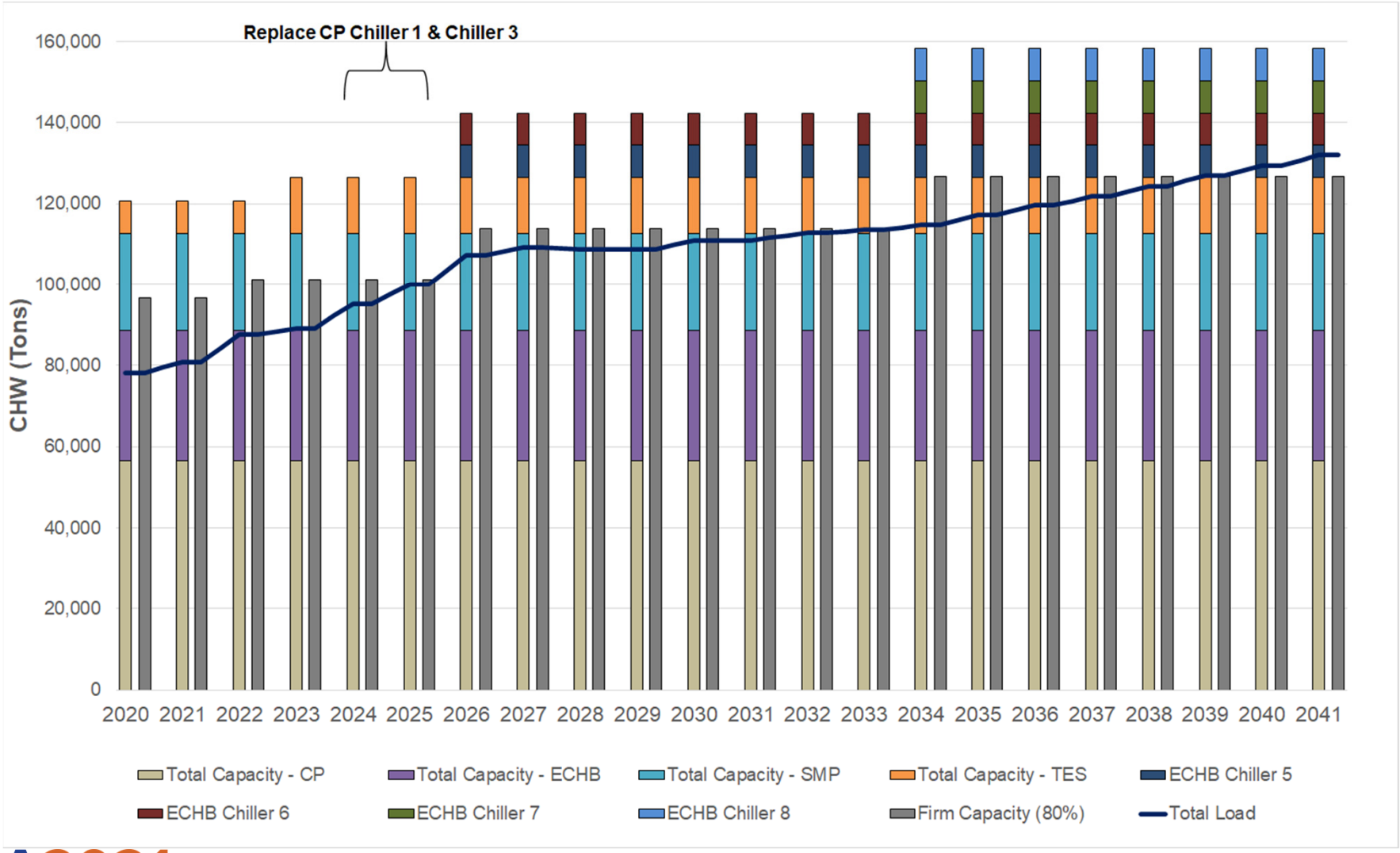
DETAILED EVALUATION

- Dispatch Model
- Lifecycle Cost
- Layouts

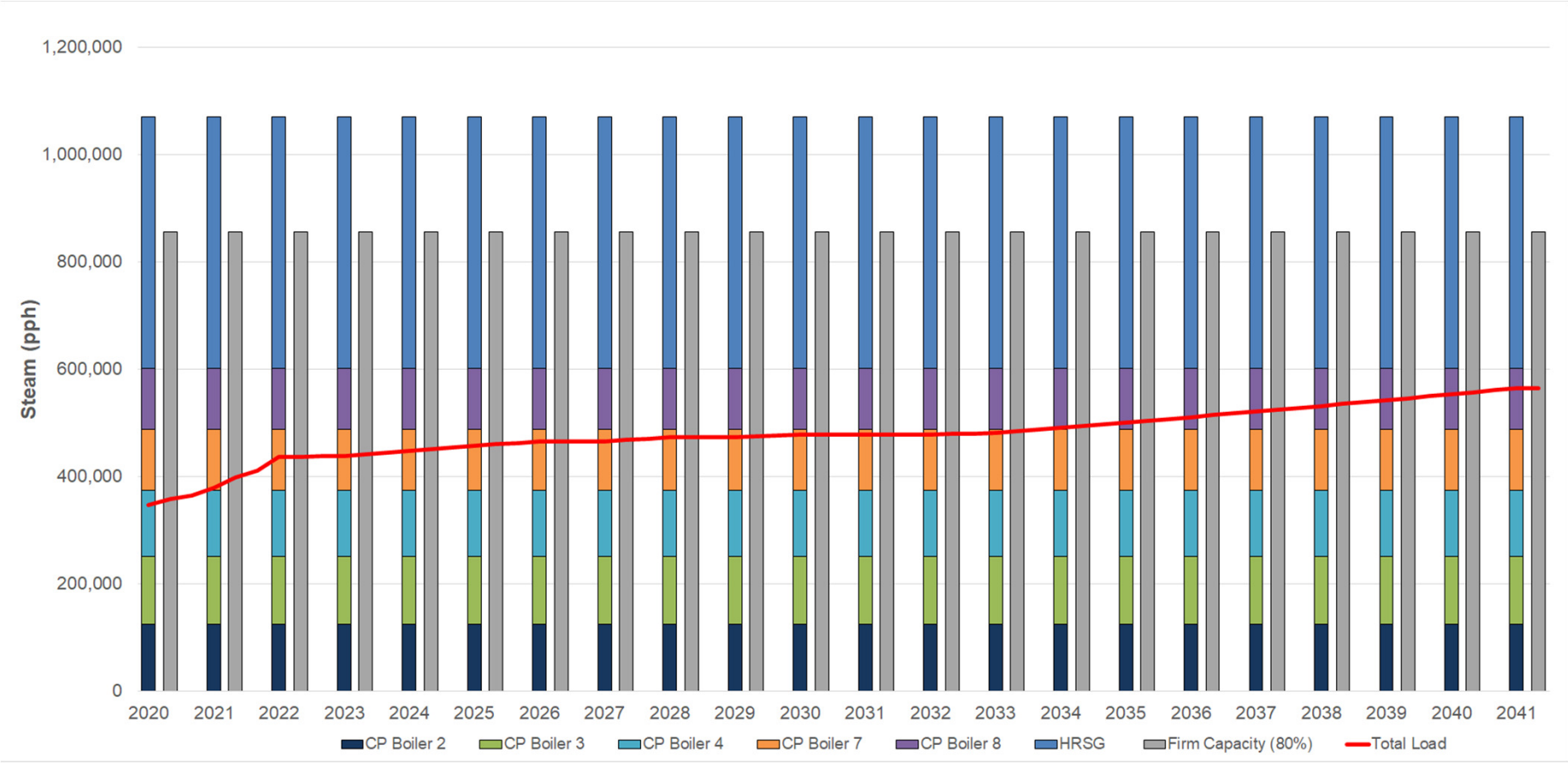
RESULTS

- Recommendati
- Cost Estimates
- Discrete Project

hilled Water Demand / Capacity Projectio



team Demand / Capacity Projections



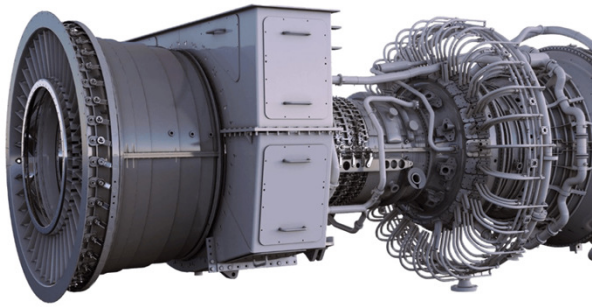
n-Site Generation

eening Options

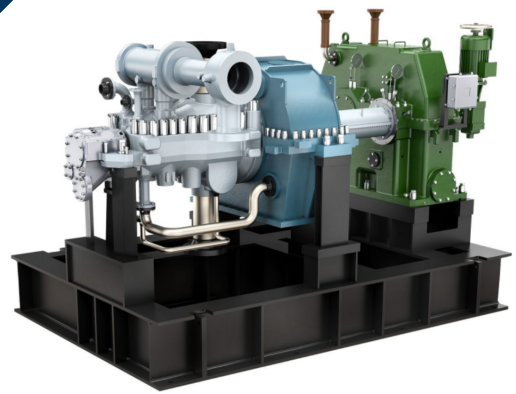
- dditional CHP
- as Turbine
- as Recip
- eam Turbine

Evaluation Factors

- Chilled Water Growth
- Resiliency
- Minimal Steam Physical Space
- Cost/Benefit

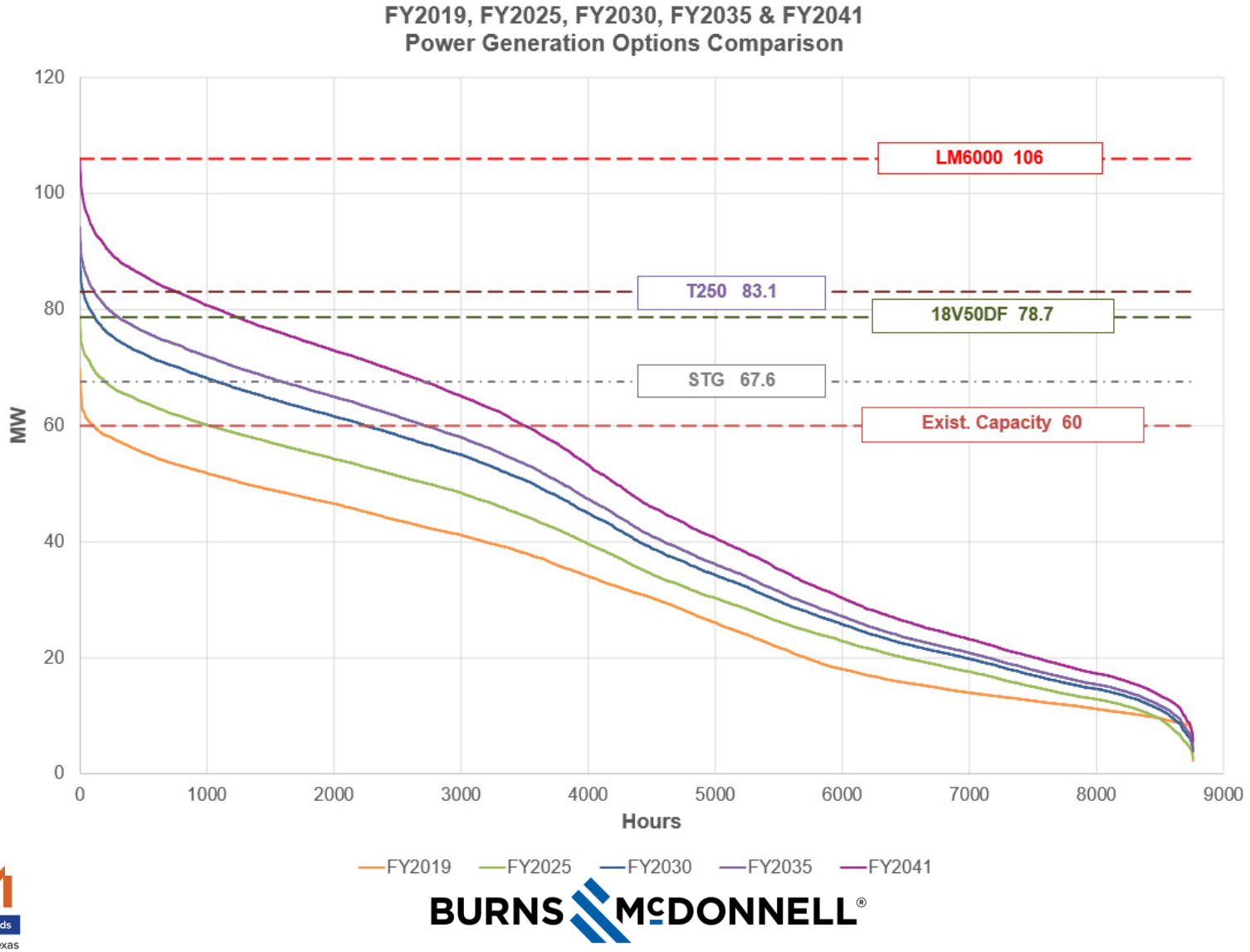


Add ~50MW Simple Cycle Ga Turbine



Add ~7.5MW Stea Turbine

n-site Generation Options



hermal Storage

reening tions

nd TES Tank

ump Modifications

ow Temp Additive

Evaluation Factors

- Cost/Benefit
- LEED Impact
- Physical Space

Modify piping and a pumps to reach des 27,500 gpm

aster Plan Update – Production

eening Options

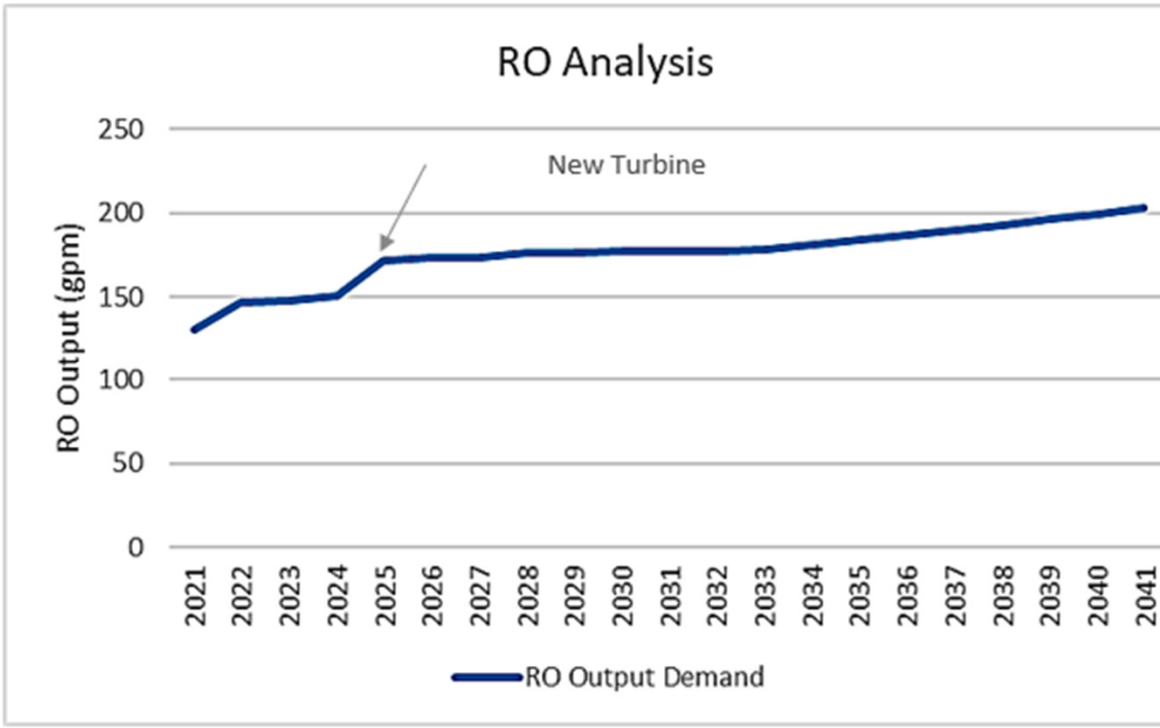
iciency Replacements
e Replacements
ntral vs. SMP
w Temp Additive

Evaluation Factors

- Chilled Water Demand
- Utility Rates
- Physical Space

**Add 8000-ton mac
to meet demand g
(with VFDs!)**

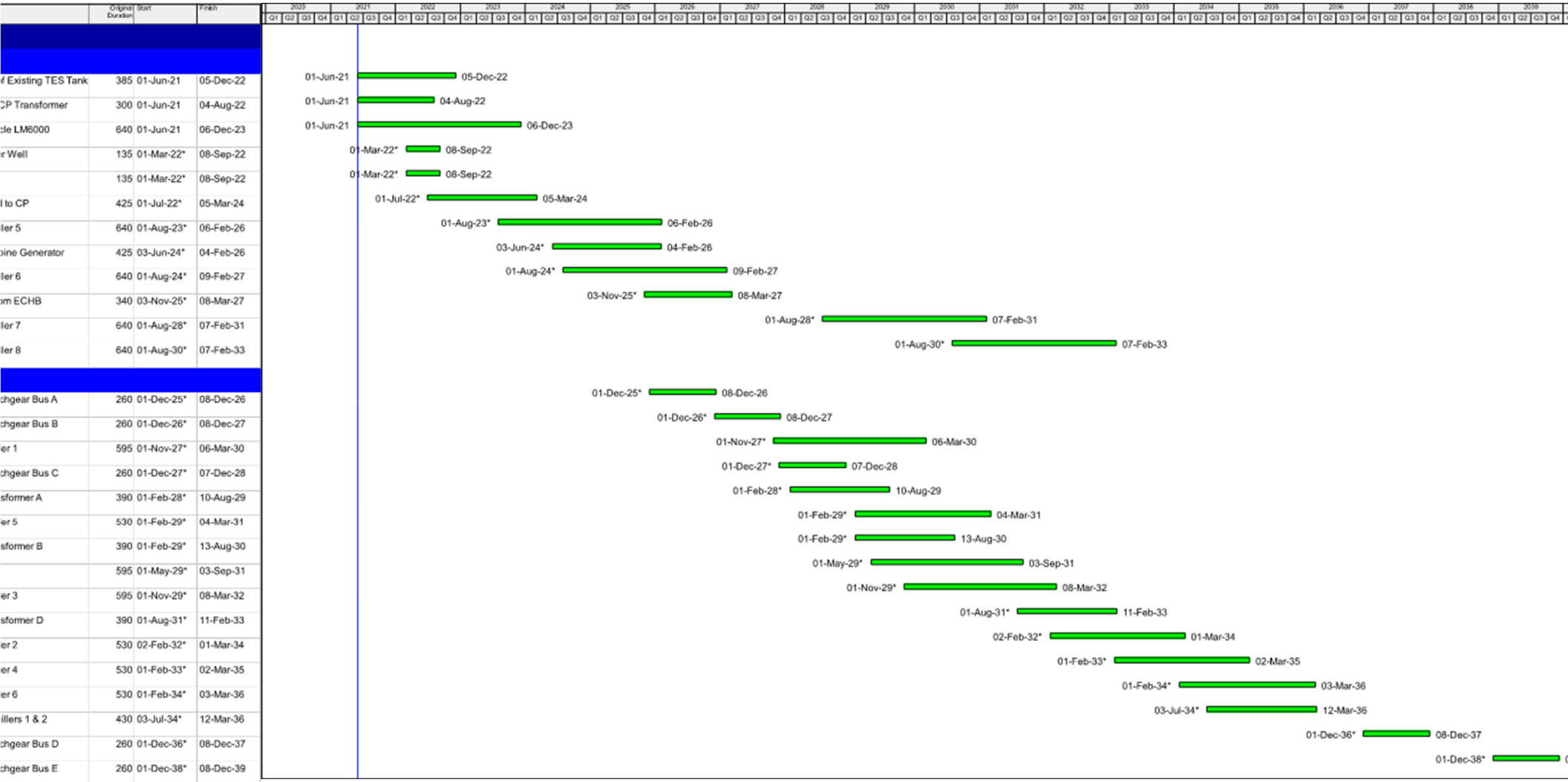
dditional Analysis



Current storage - 6.4 min
Expected 2041 storage - 4.2 min

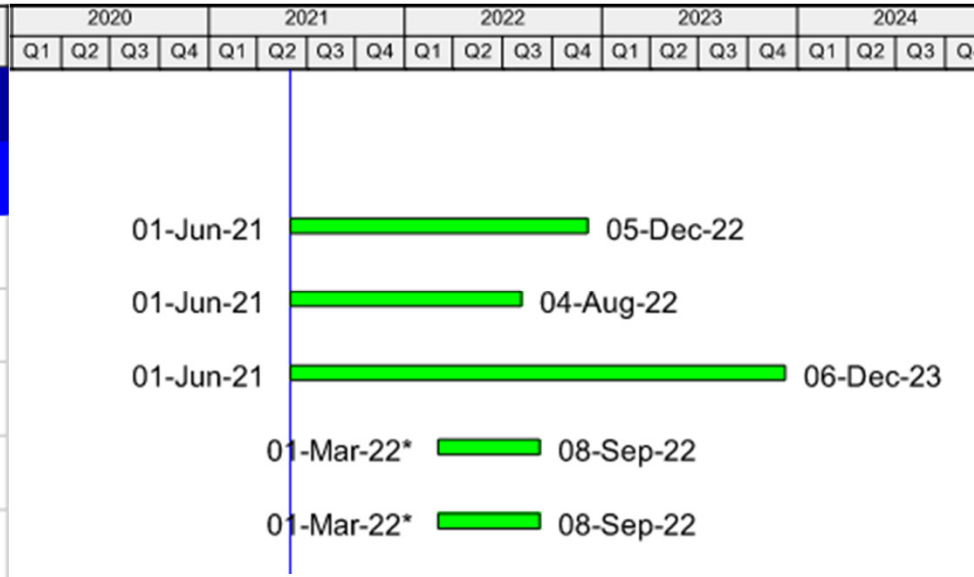
Current demand (130 gpm) exceeds N+ third RO recommended which should provide enough capacity through 2041

ject Roadmap – Overall Timing



ject Roadmap – Project Level

	Activity Name	Original Duration	Start	Finish
Road Map Schedule				
acity Projects				
AP-100	Increasing Flow of Existing TES Tank	385	01-Jun-21	05-Dec-22
AP-200	Purchase Spare CP Transformer	300	01-Jun-21	04-Aug-22
AP-600	Install Simple Cycle LM6000	640	01-Jun-21	06-Dec-23
AP-910	Install WCT Water Well	135	01-Mar-22*	08-Sep-22
AP-920	RO 3 Addition	135	01-Mar-22*	08-Sep-22



bservations

Planning must continue during COVID-19

- Helpful remote tools (video, file sharing, plant cameras)

Role of District Energy in the next 20 years

- Changing Role of Steam
- Chilled Water Growth

View of reliability and our underlying assumptions

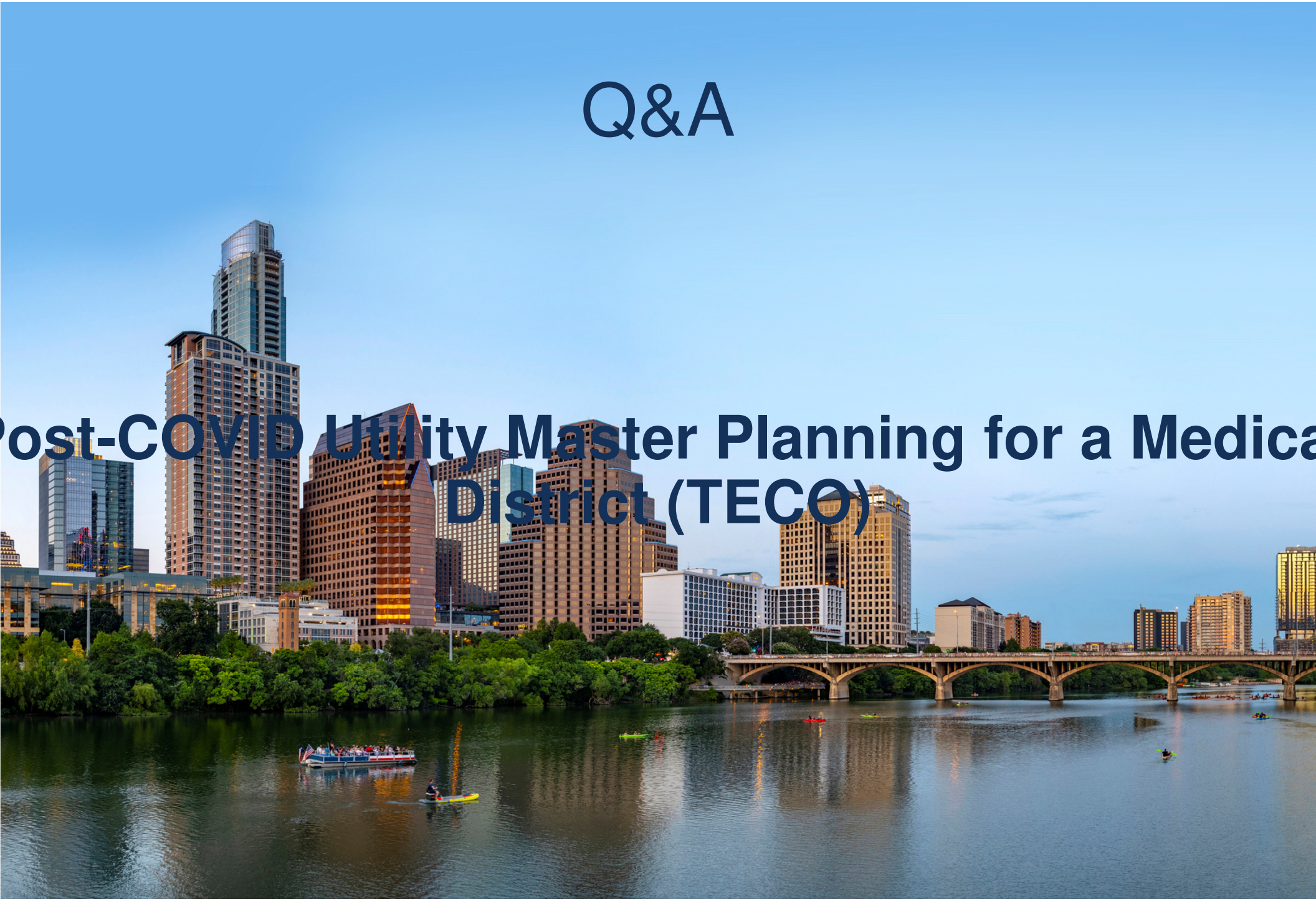
Always room to grow/improve and get an outside viewpoint

onclusions

"Plans are useless, but
planning is essential."

- Dwight D. Eisenhow

Q&A



Post-COVID Utility Master Planning for a Medica
District (TECO)

Thank You!

Bradley Shuffield

Michael Manoucheri