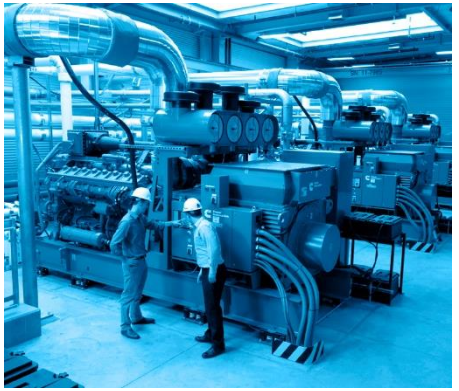
February 2021

Master Planning for Cost-Effective Energy Management



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AGENDA

1. FSSD Introduction
2. Biogas alternatives
3. NPV results and general themes
4. Relating prices in New England

Fairfield-Suisun Sewer District

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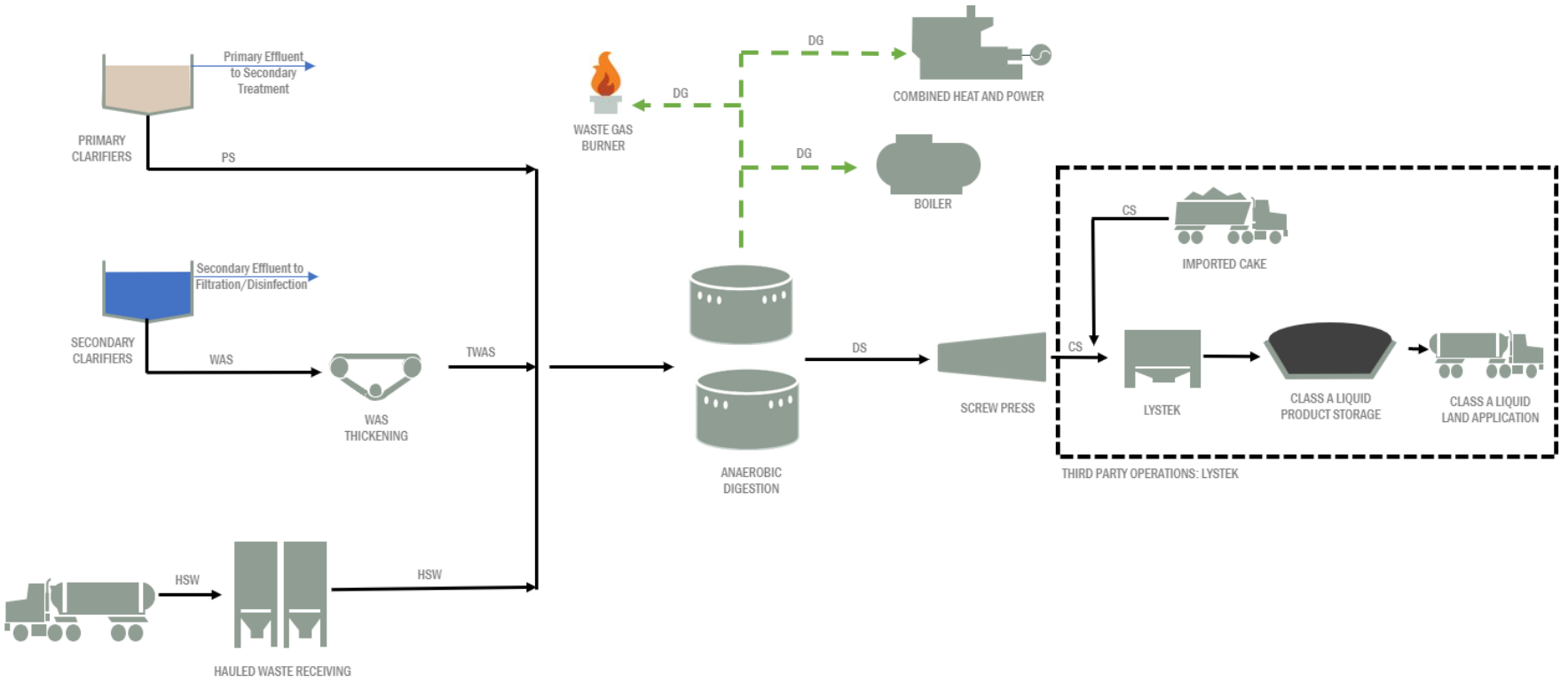


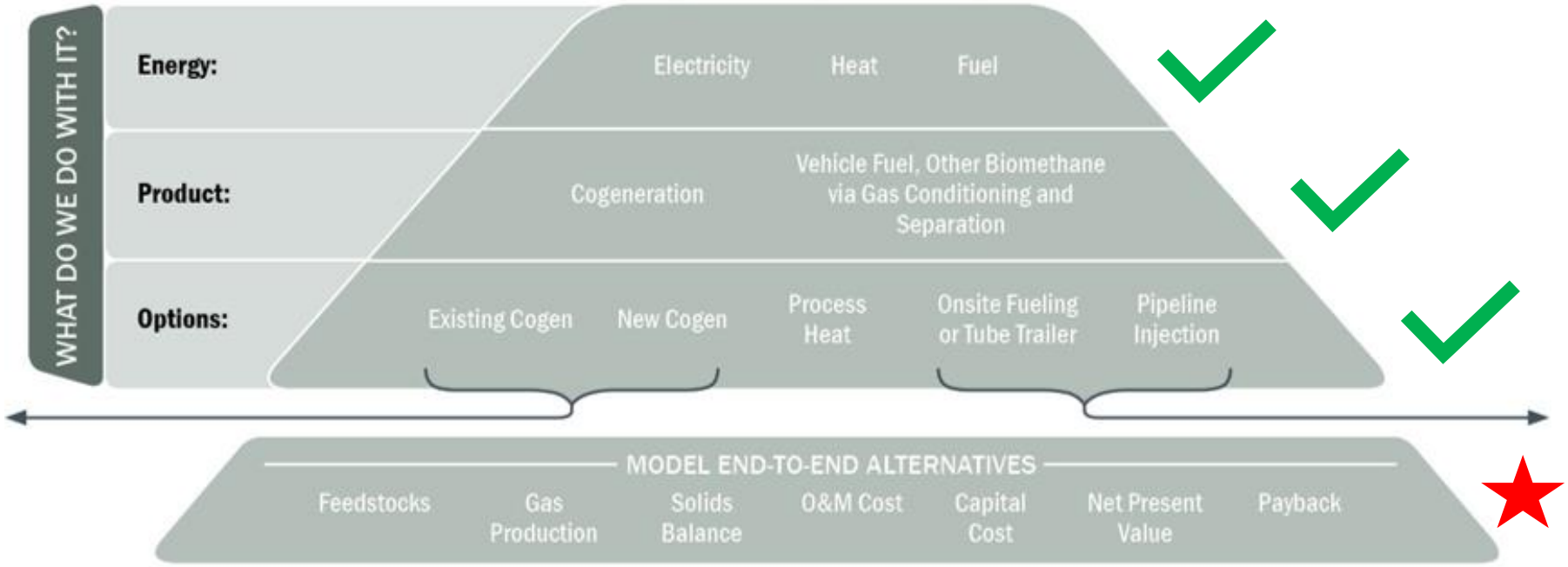
Average Electricity Demand 1290 kW

Existing Electricity Production

25 kW

1MW Peak Capacity
180 kW

900 kW



GOALS:

1. Determine utilization options that have positive NPV compared to status quo
2. Establish alternatives to be carried through into the Master Plan phase

Biogas Utilization Alternatives

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Biogas Utilization Alternatives

0. “Status Quo” @ 200 scfm
1. New Engines
2. Microturbines
3. Rehab Existing Engine
4. Biomethane Pipeline Injection
5. Onsite Vehicle Fuel (CNG) + Existing Engine
6. Onsite Vehicle Fuel + Existing Engine Rehab
7. Onsite Vehicle Fuel + Microturbines

Gas Production:
A - LOW
B - MEDIUM
C - HIGH

Feedstock/Process Evaluation: How much gas?

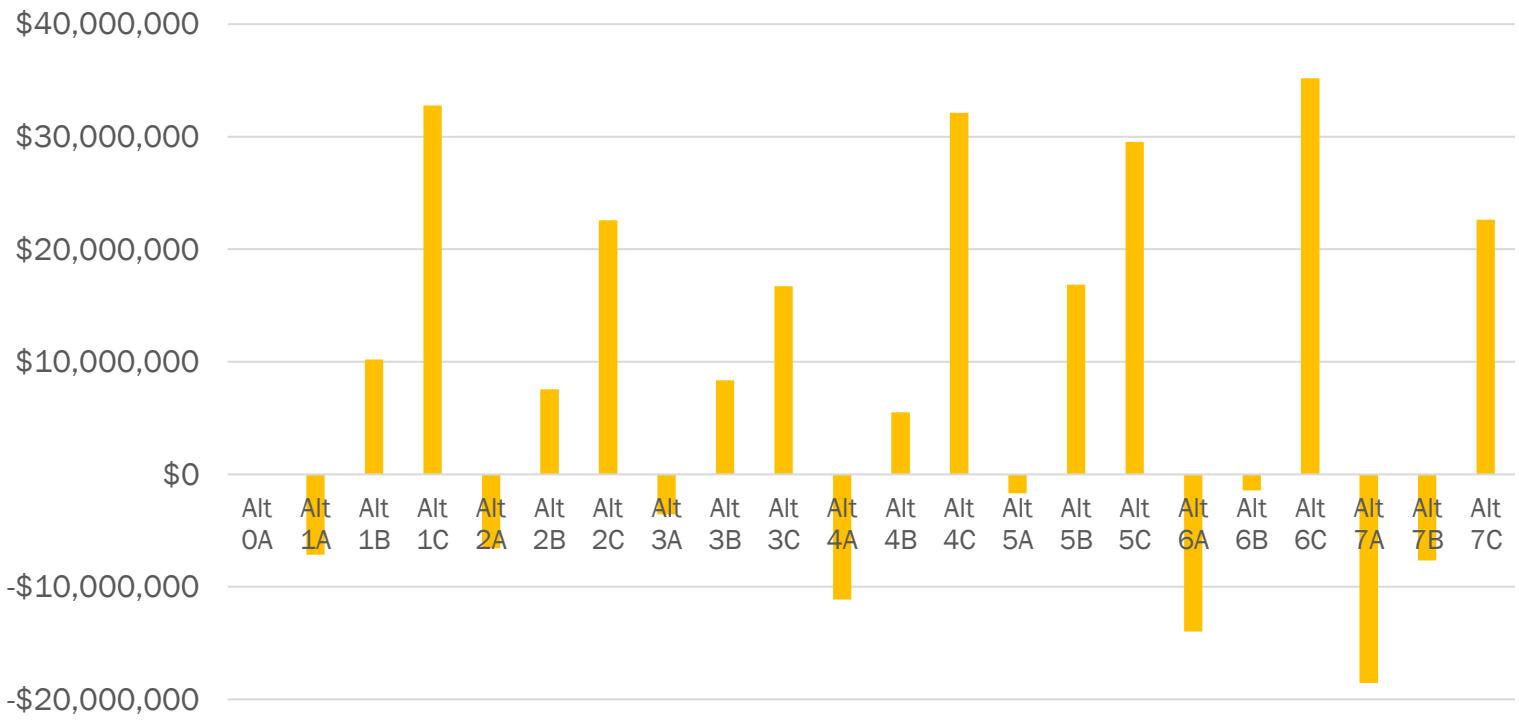
	Low	Medium	High
Value:	200 scfm	350 scfm	550 scfm
Works with:	• Status quo +10% for growth or small HSW • Works within existing systems and thresholds	• Meso digestion w/ recuperative or co-thickening • Sub-15-day Meso • Up to 25,000 gpd HSW • New flare optional/recommended • New HSW receiving facility	• 2 digesters in service • Sub-13-day thermo • TWAS Bypass • 25,000+ gpd HSW • New flare required • New HSW receiving facility

Net Present Value Results

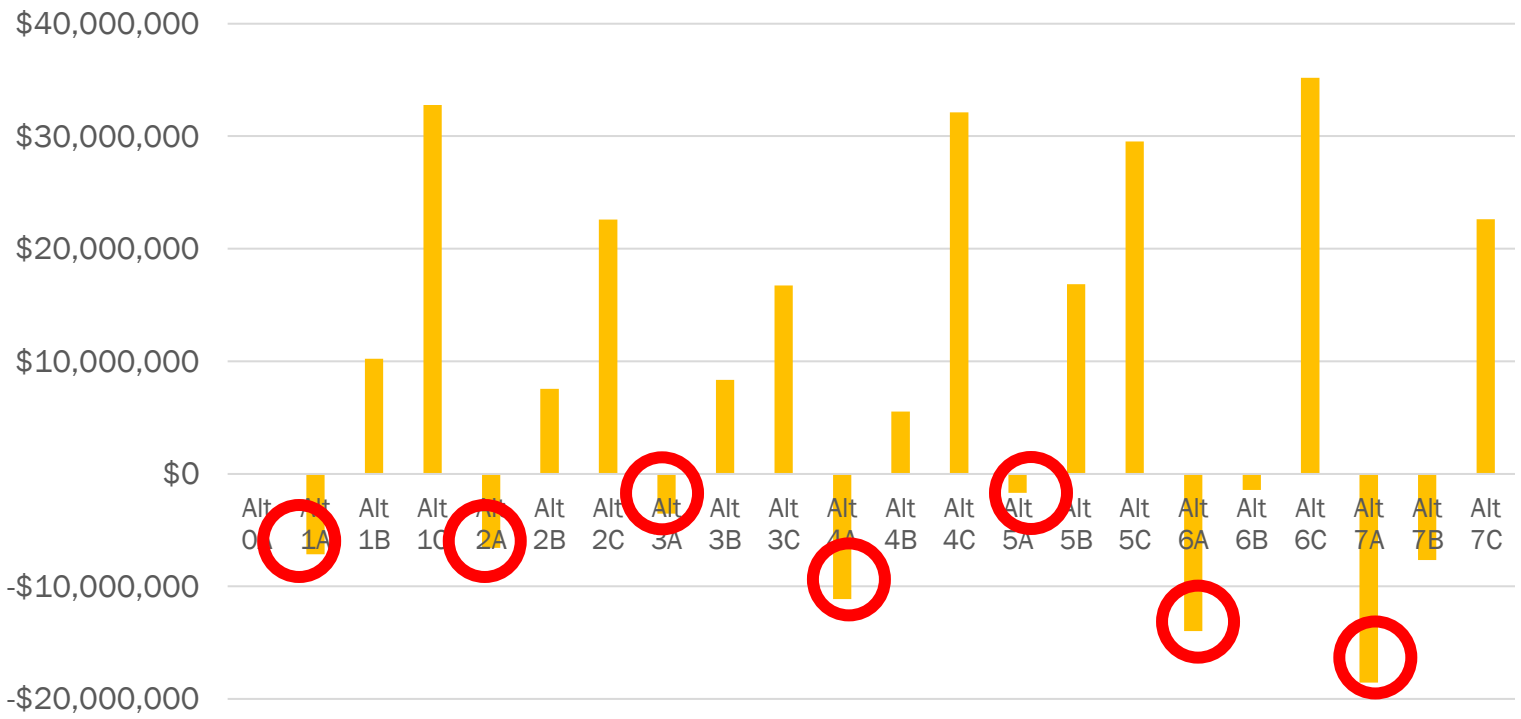
Assumptions

- NPV period of 20 years
- Value of electricity only scaled by inflation (3%)
- Discount rate of 4%
- Current RINs and LCFS credit values used
  - Renewable Identification Numbers (RINs) – Available Nationwide
  - Low Carbon Fuel Standard – California Only
    - Designated to reduce greenhouse gas emissions for fuels used for transportation

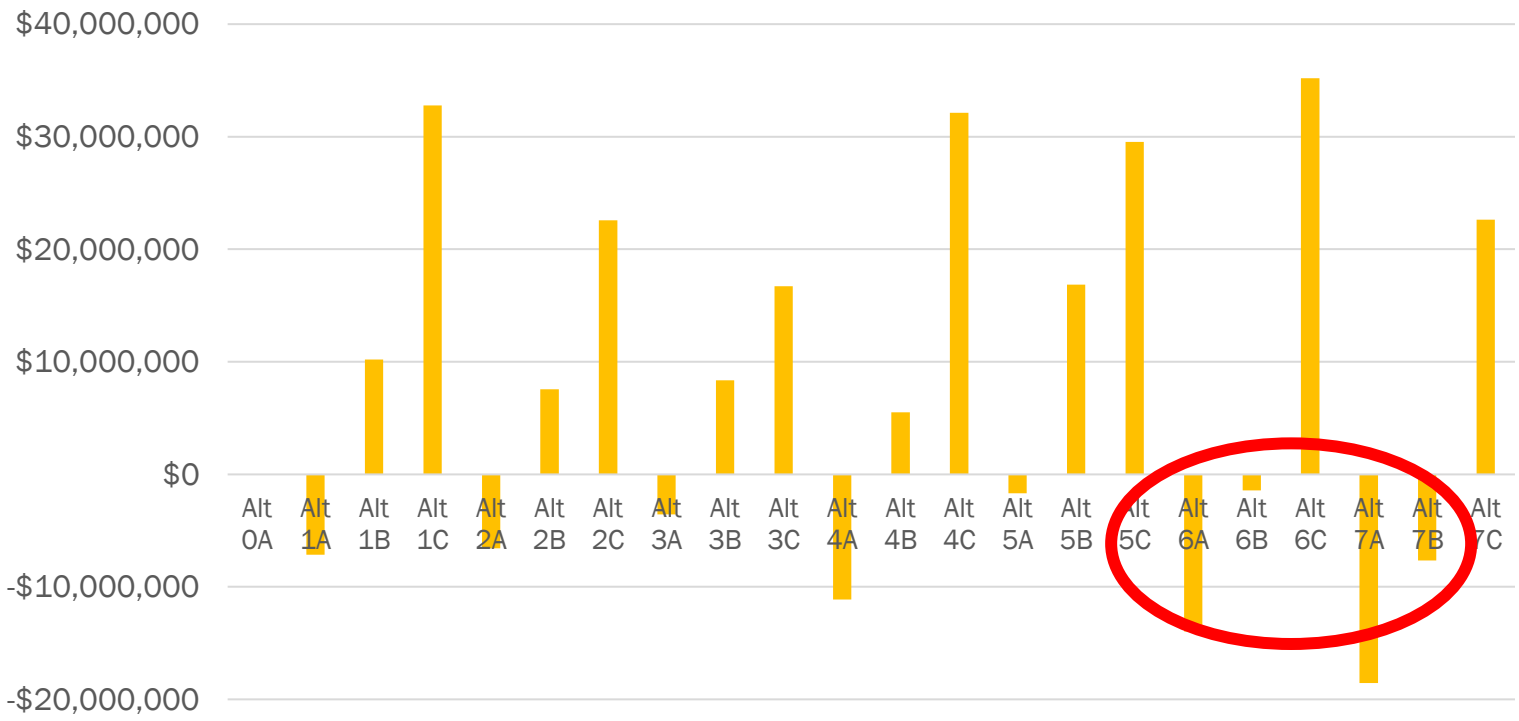
NPV Results for all Alternatives with respect to status quo



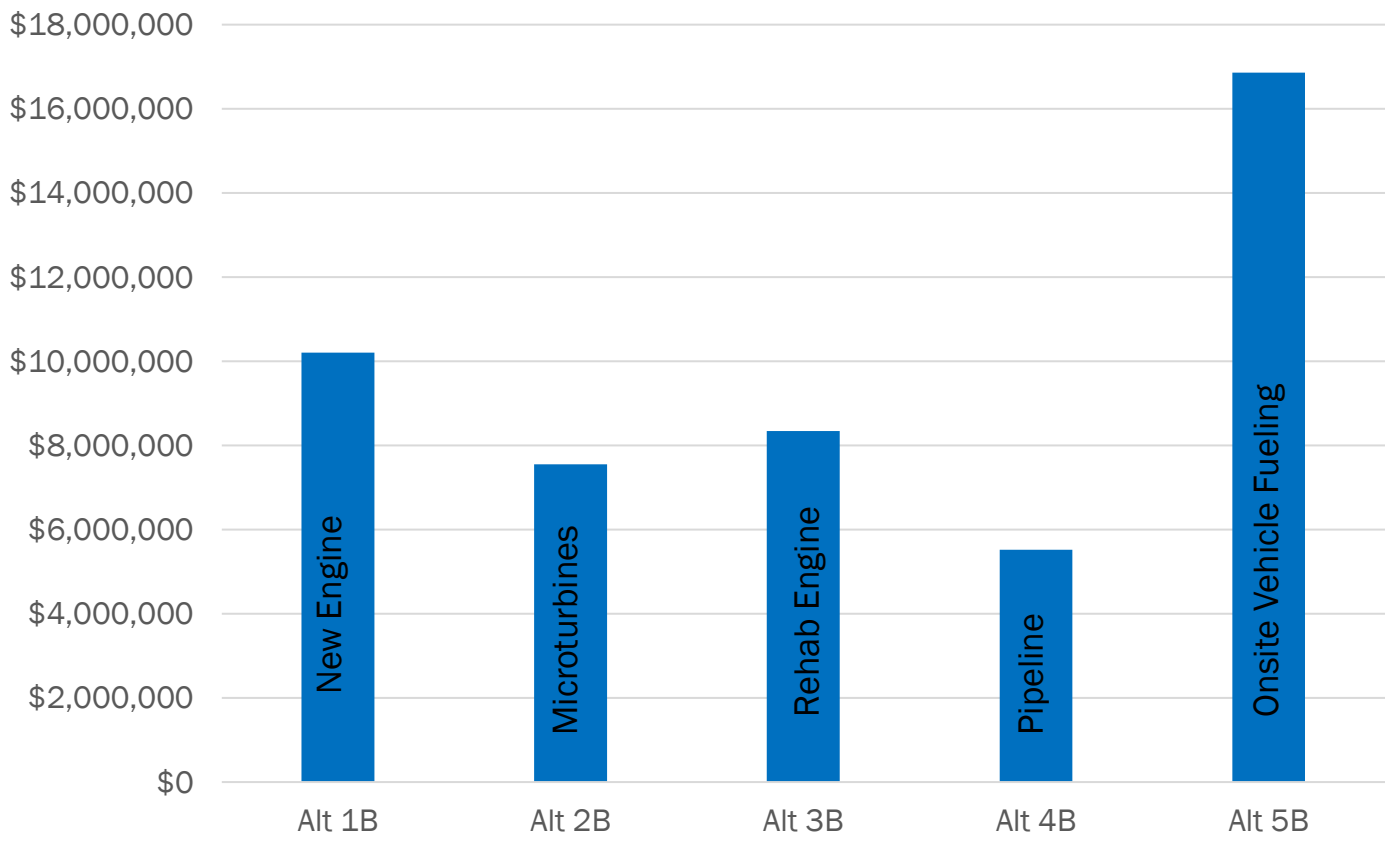
Theme 1: Low gas production alternatives (A) do not offer benefit



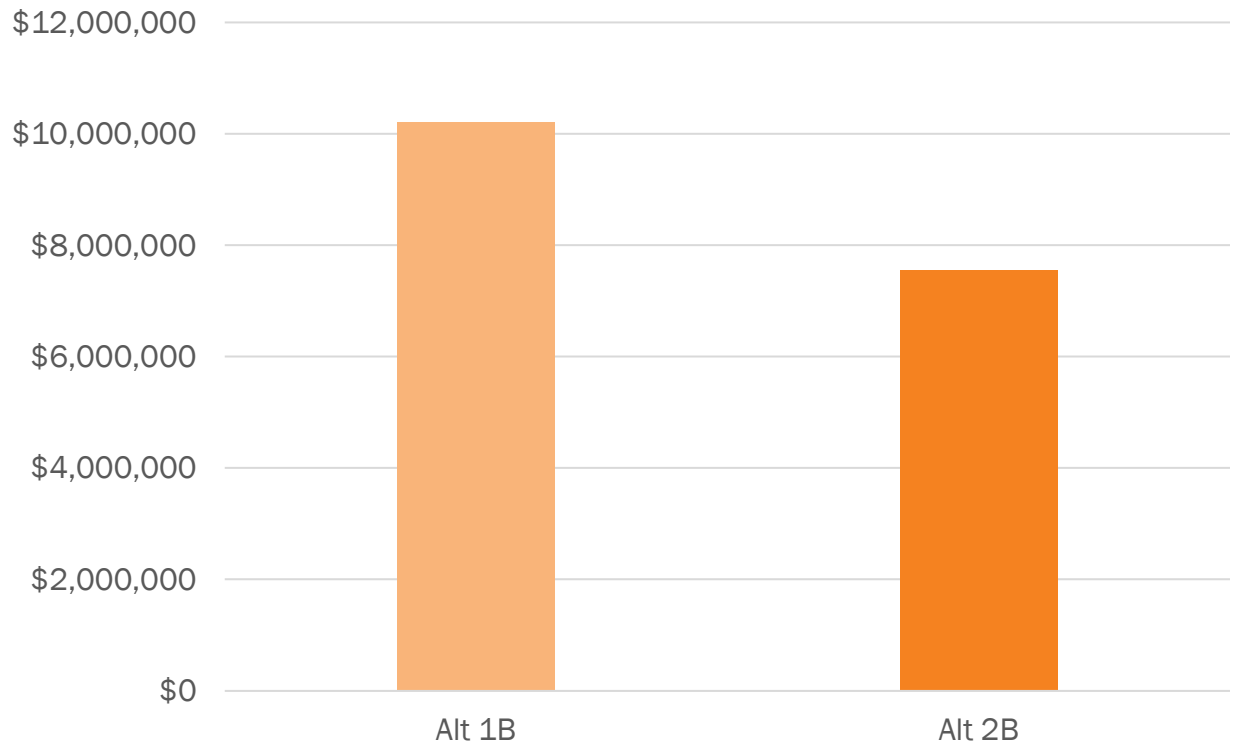
Theme 2: “Hybrid” alternatives (6 and 7) do not offer benefit at (A) or (B) gas production



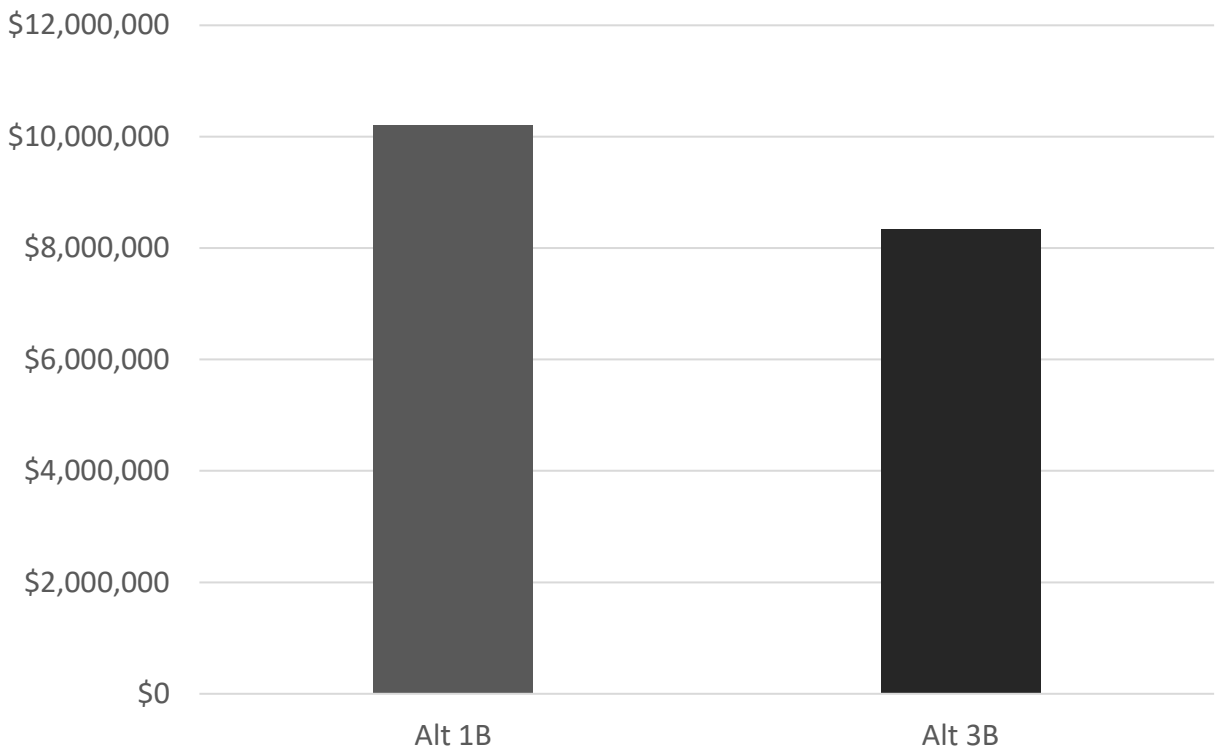
Clarity: Alternatives 1 thru 5 at (B) gas production



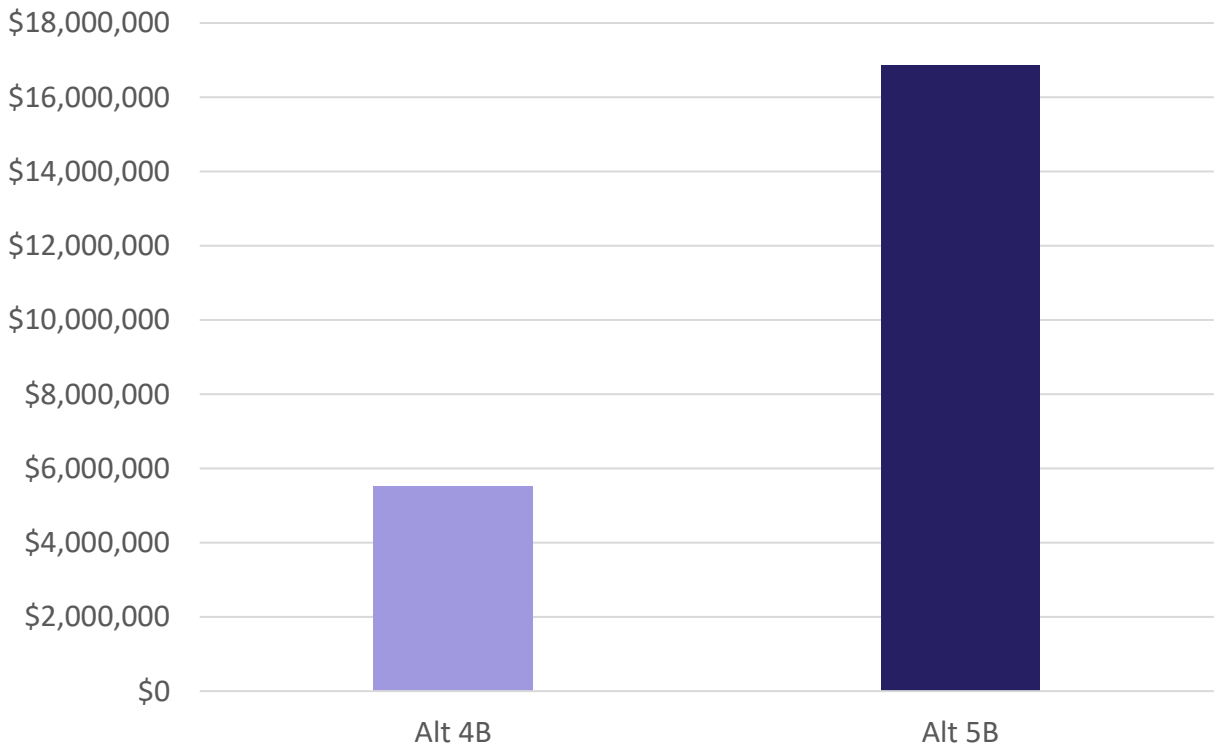
Pairwise: New Cogen [1B] vs Microturbines [2B] Conclusion – Engines are a better solution than Microturbines



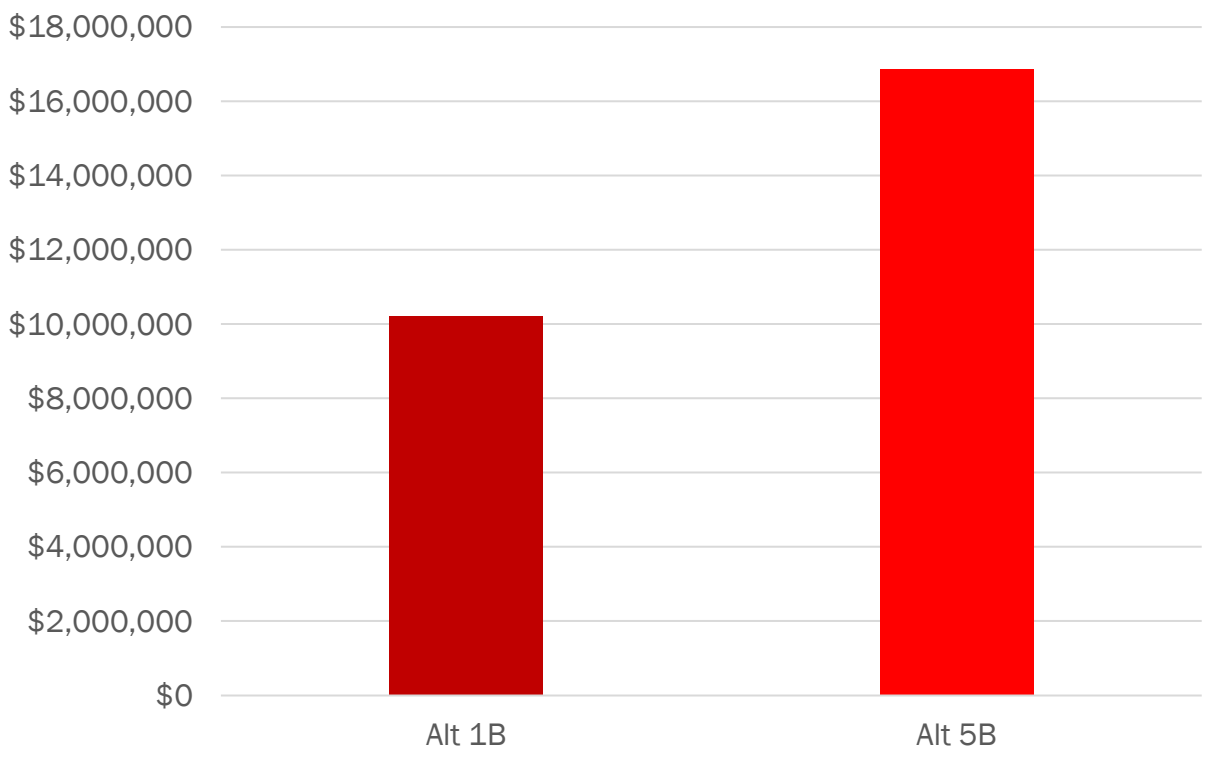
Pairwise: New Cogen [1B] vs Rehab Existing [3B]
Conclusion – New engine is a better solution than rehab



Pairwise: Pipeline Injection [4B] vs Onsite Vehicle Fuel [5B]
Conclusion – Onsite VF is a better solution than pipeline injection



Pairwise: New Cogen [1B] vs Onsite Vehicle Fuel [5B]
Conclusion – Onsite VF is a better solution than a new engine*



New Combined Heat and Power Engines |

Risks:

- Air permitting process
  - Schedule
  - Gas production limit
- Existing building
  - Space
  - Suitability
- Plant demand and coordination with solar and microgrid (value of electricity)

Opportunities:

- Grant funding
  - SGIP
  - CWSRF Green Project Reserve
- Natural gas blending
- Advanced microgrid
- BioMAT?
- Existing engine remains for standby and additional capacity

Onsite Vehicle Fueling

Risks:

- Vehicle fuel partnership
- RIN/LCFS value
- New Legislation
  - Gov. Newsom executive order to phase out gasoline-powered cars

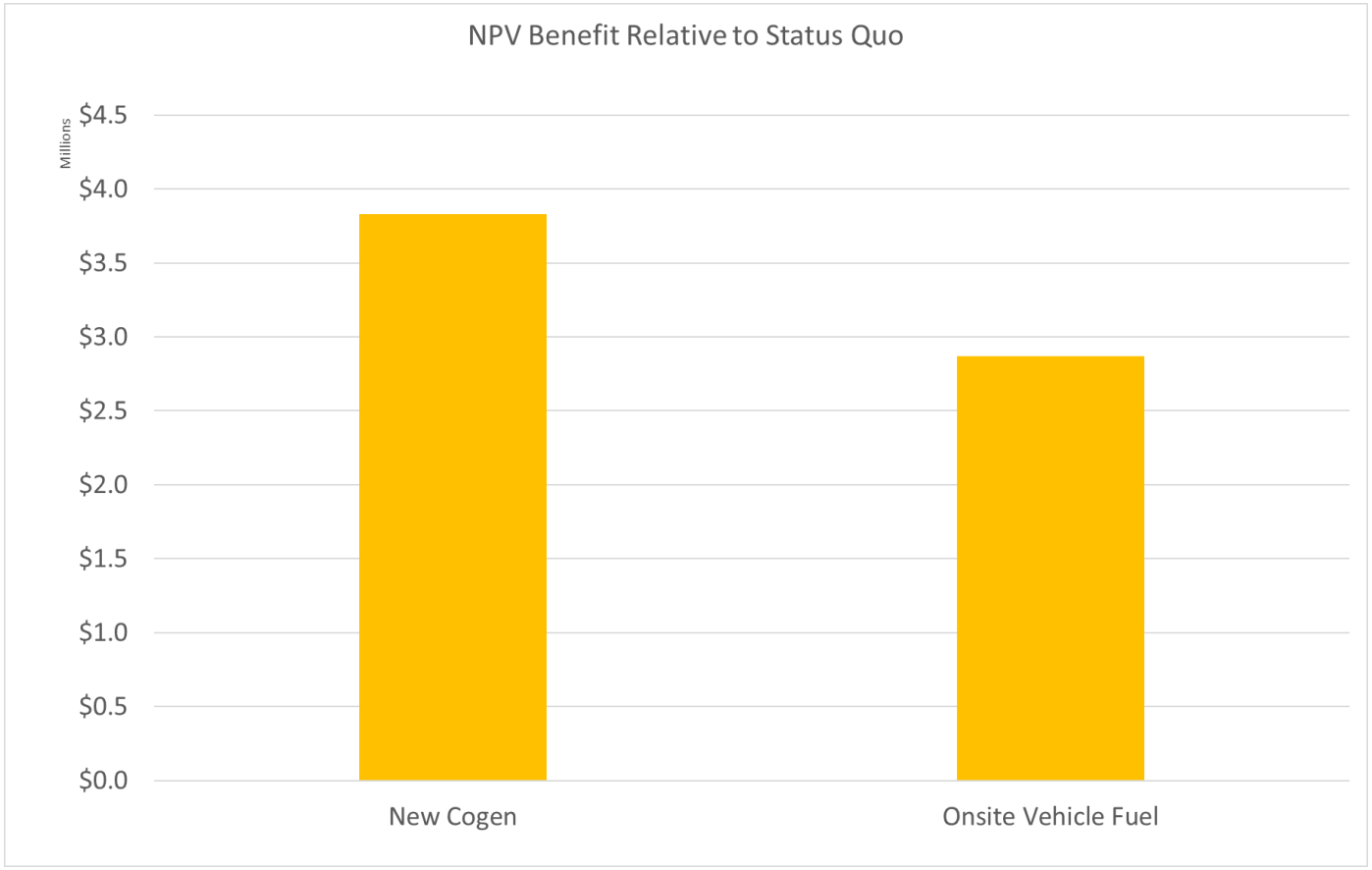
Opportunities:

- Grant funding
  - CEC, Air District

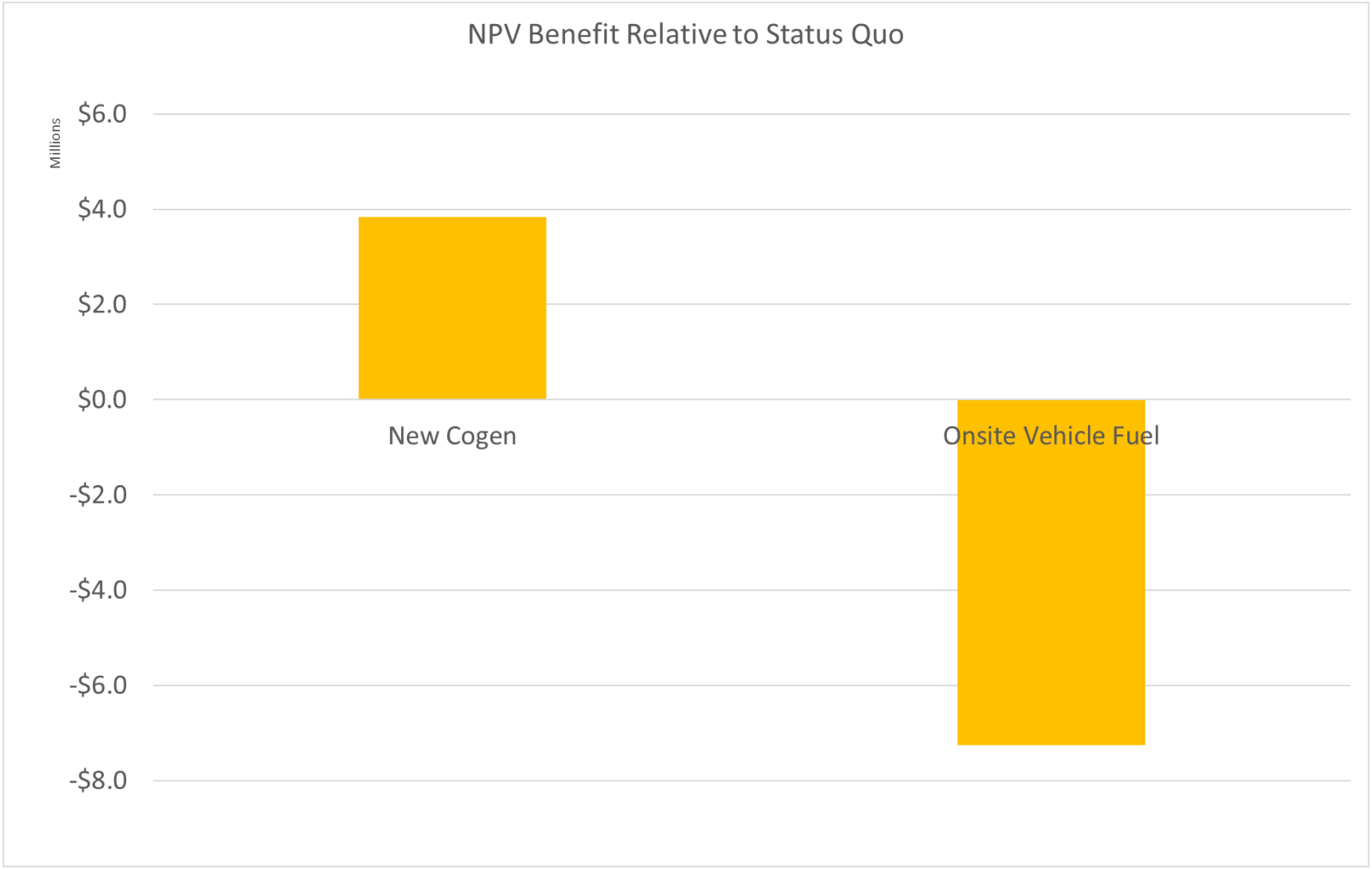
Other considerations

Discussions with Fleet Providers

Sale of fuel drops from
$2.50/gallon to $1.62/gallon



Impact of No RINs or LCFS

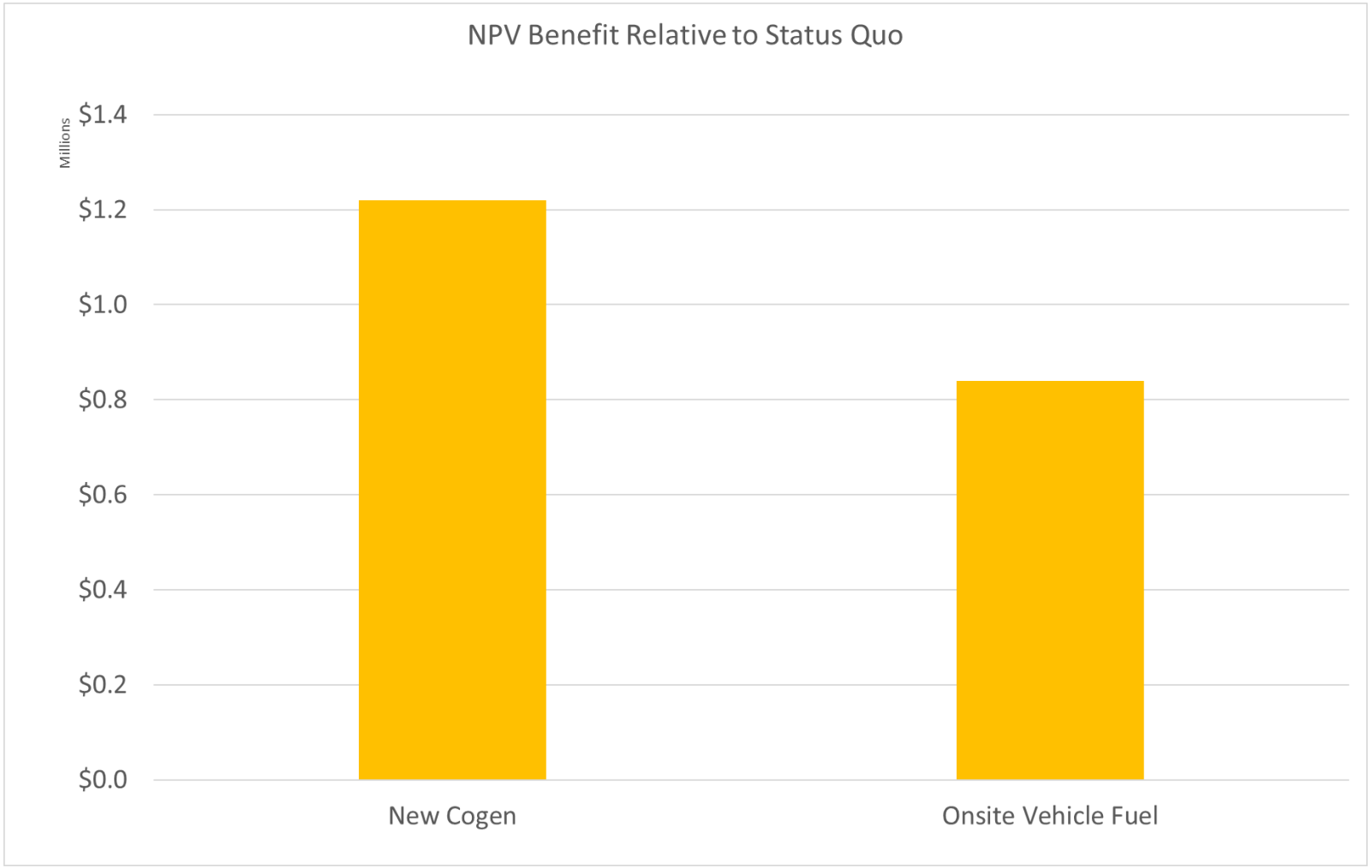


Cogen is the most cost-effective option!

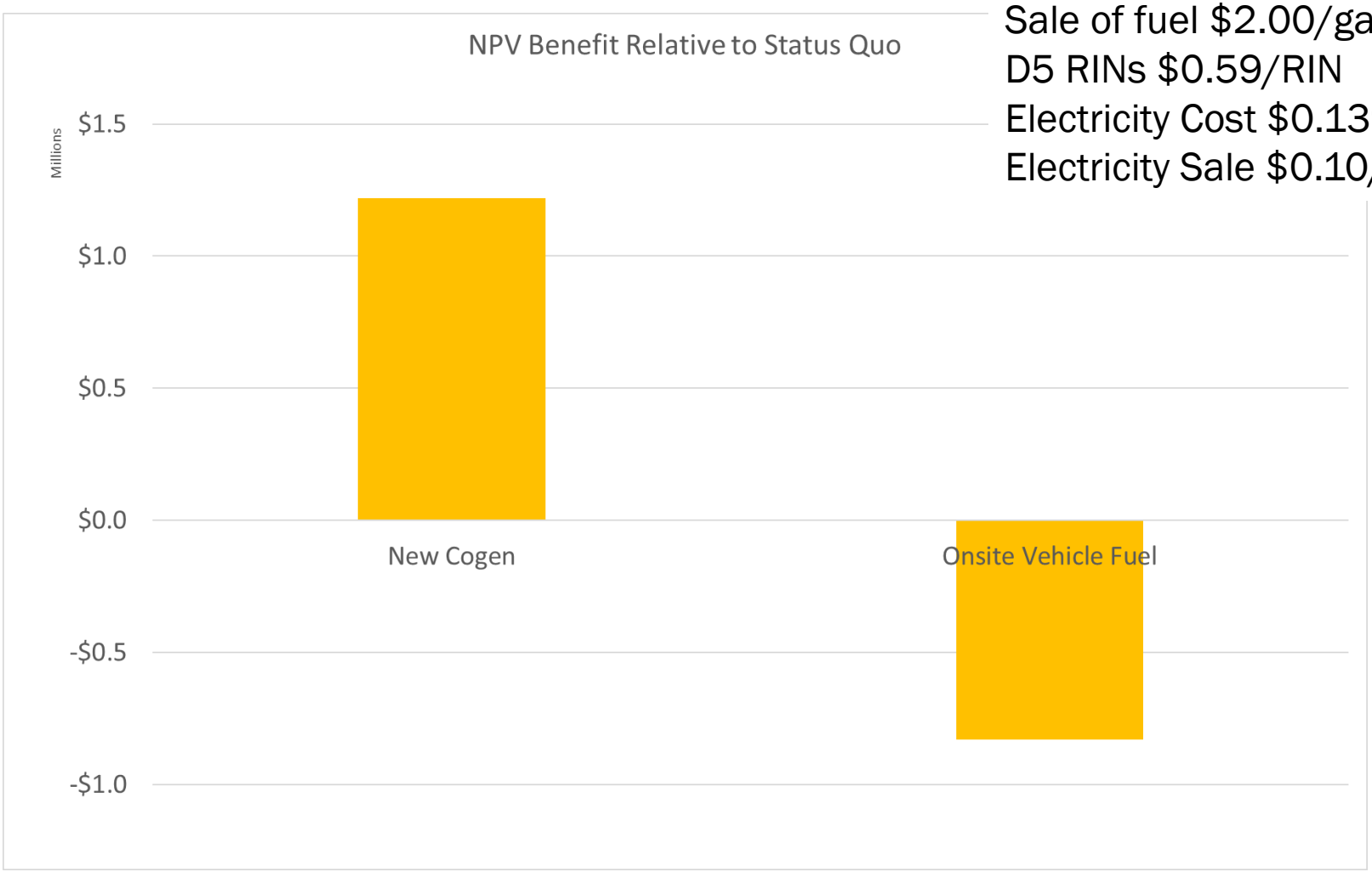
How Relates to New England

New England

Sale of fuel $2.20/gallon
D5 RINs $0.59/RIN
Electricity Cost $0.139/kW
Electricity Sale $0.10/kW



Small Changes can have large impacts



Sale of fuel $2.00/gallon
D5 RINs $0.59/RIN
Electricity Cost $0.139/kW
Electricity Sale $0.10/kW

Thank you.

Questions?

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