VCE Community Advisory Committee Meeting
June 24, 2021 via video/teleconference

Item 7 – Renewable Technologies (front of the meter)

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Item 7 – Renewable Technology Discussion

- As staff, the CAC Carbon Neutral task group, and consultant move forward with a study in the second half of 2021, hearing views from the CAC of several of the primary front-of-the meter (FOM) utility scale resources would help inform the study[1]

- The technologies presented are those that are proven and primarily used today[2]

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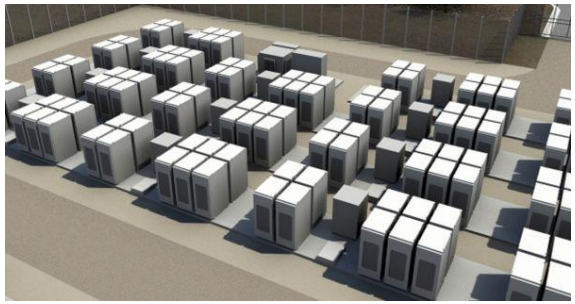
1) Behind the meter (BTM) resources will also play a role in the portfolio and will be discussed at a later date.
2) As other technologies mature, VCE will assess their fit in the portfolio.

Item 7 – Renewable Technology Discussion

- **Front of-the-meter (FOM) or utility-scale resources**



Examples of FOM installations:

- **Photovotaic (PV); pairing with battery energy storage system (BESS)**
- **Wind (excl. off-shore)**
- **Geothermal**
- **Biomass**
- **Energy storage**

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Item 7 – Renewable Technology Discussion

Photovoltaic

- High upfront investment but low on-going maintenance costs
- Intermittent resource, substantial land footprint
- Fixed systems are angled for optimum production, while single-axis tracking (SAT) systems rotate to follow the sun from east to west. SAT energy output is approximately 25% more than a fixed system.
    - SAT systems increase the value of the energy delivered, as a portion of that additional output is in the late-afternoon hours when load is at its peak
    - SAT price typically > Fixed systems (most of the time this additional cost is worth it because of the improved output)
- Contracts are typically “must-take” $/MWh

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Item 7 – Renewable Technology Discussion

Photovoltaic with storage (PVS)

- PV systems can be directly paired with energy storage systems such as batteries to increase dispatchability and dependable capacity to the grid.
- Greater efficiencies are possible with paired systems than with separate PV and storage systems.
- Charging the batteries exclusively with solar energy for the first five years enables them to receive the same Investment Tax Credit (ITC) as solar generation
- Typical systems are priced with an energy component ($/MWh) + a capacity payment ($/Kw-mo)

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Wind

- Like other renewable energy resources, the primary challenge of wind energy is its variable generation
- However, energy storage projects can allow this technology to integrate into the portfolio
- The typical profile of certain regions may align nicely with VCE's load shape and compliment the profile of the PV systems that VCE has contracted with
- High upfront investment but low operating costs
- May result in deaths of bats and birds[1]
- Contracts are typically "must-take" $/MWh

1) https://www.audubon.org/news/wind-power-and-birds

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Geothermal

- Geothermal energy provides carbon-free baseload power
- Reliable and predictable source of energy
- Small land footprint
- Nearby counties have existing geothermal resources
- New geothermal construction is very costly and tends to be more expensive than other renewable alternatives

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Biomass[1]

- Although biomass facilities utilize a combustion process that emits CO2, they are widely considered “carbon neutral”
- Biomass fuels are primarily wood or wood byproducts. However, they can include dried municipal solid wastes, feedlot and dairy manure, crop wastes and sewage digester sludge
- The majority of biomass electricity is generated today using a steam cycle where the biomass is burned in a boiler to produce steam
- Most biomass facilities are considered “baseload”
- Costs are greatly impacted by the transportation cost of the fuel to the facility

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1) Biofuel energy can consist of fuel sources such as ethanol, biodiesel, biomass, wood chips, municipal waste, among others.

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Energy storage

- Critical technology to completely achieving a clean energy future
- Increases the value of renewable resources while improving grid reliability and stability
- Small land footprint, and potential future investment tax credit (ITC) legislation
- Storage addresses the PV versus demand misalignment by harvesting the solar energy that is produced during midday hours and then dispatching it in the evening during peak customer demand
- Many types of energy storage that are at different stages of maturity, have different use cases, and significantly different cost projections:
  - Batteries (Lithium-ion, flow, molten salt, lead-acid, zinc-air)
  - Compressed-air energy storage (CAES)
  - Pumped Storage
  - Flywheels
  - Concrete gravitational potential energy storage

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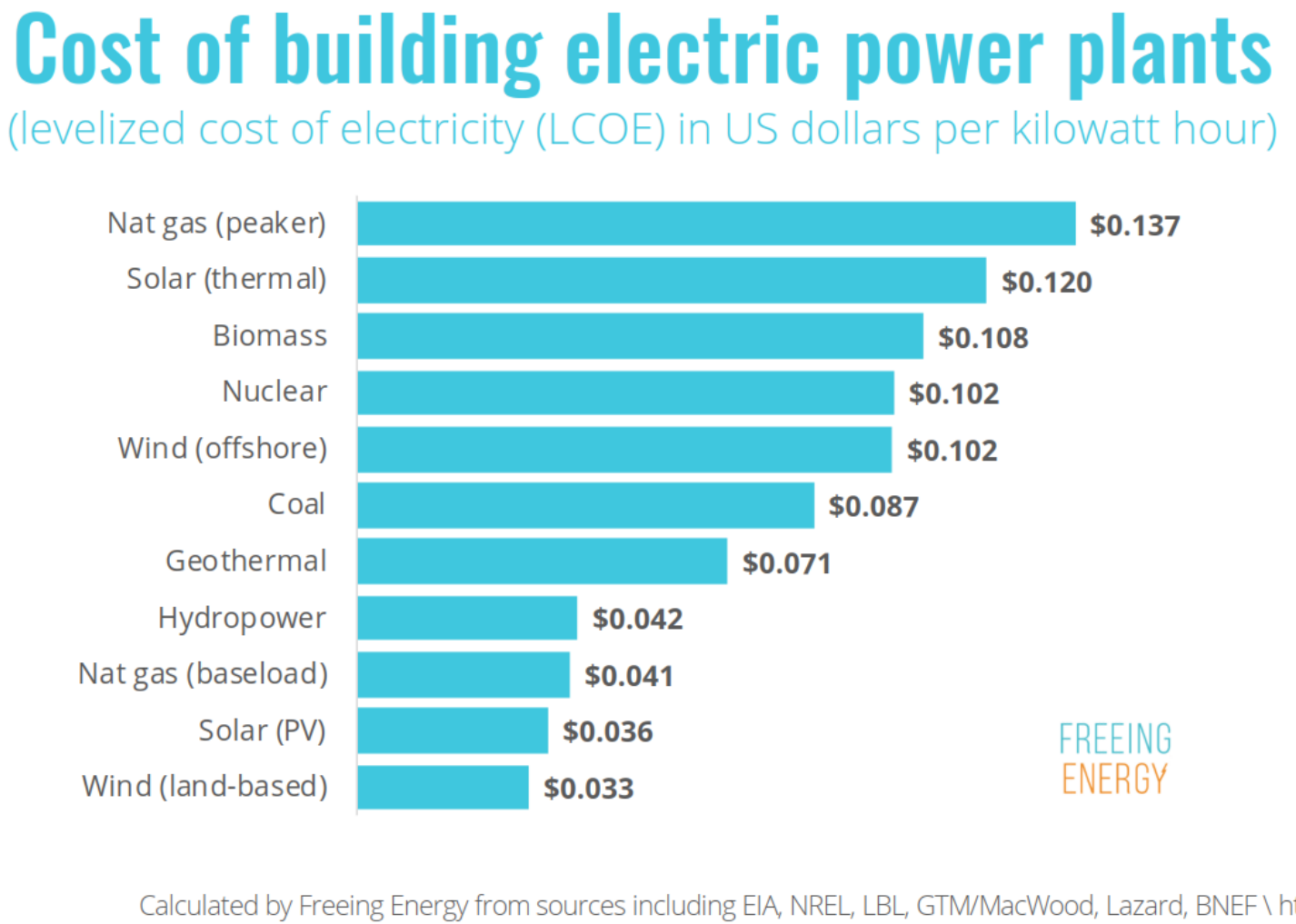

1) Data as of May 2020

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Item 8 – Update on Net Energy Metering (NEM) 3.0

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Item 8 – Update on Net Energy Metering (NEM) 3.0 Proceeding

Net Energy Metering (NEM) Basics

- Mostly solar systems, residential and non-residential
- NEM in California began in 1995
  - Several revisions since
- Currently most customers are NEM 2.0
  - Differences from NEM 1.0: TOU rates; NBCs paid

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Item 8 – Update on Net Energy Metering (NEM) 3.0 Proceeding

Net Energy Metering (NEM) Basics, continued

- Interconnection process through PG&E
- Different arrangements (buy vs. lease)
- SmartMeter measures difference between electricity generated and used every month; we see the “net” on the bill
- NEM billing is notoriously confusing – it has been improved over the years but is still not ideal for customers

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Item 8 – Update on Net Energy Metering (NEM) 3.0 Proceeding

Net Energy Metering (NEM) Proceeding at the California Public Utilities Commission (CPUC)

- NEM 3.0 Proceeding is in process
  - Expectation is a decision from CPUC by end of 2021; implementation early 2022
- Many stakeholders engaged in the proceeding
  - AB 1139 (bill is “dead”)
  - IOUs and Solar Advocates
  - Controversial issues at stake

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Item 8 – Update on Net Energy Metering (NEM) 3.0 Proceeding

Key issues to be considered by CPUC:

- Potential cost shift from NEM to non-NEM customers
- Compensation for surplus generation; how this affects solar's value proposition and solar industry
- Equitable access to RE for low-income customers

Additional Considerations to track (how these values are incorporated into NEM 3.0):

- Avoided grid costs from NEM customers
- GHG emissions reductions
- Contributions to RPS goals
- T&D efficiencies

Photo: Yvonne Hunter Photography https://www.yvonnehunterphotography.com/

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Next Steps:

Staff will continue to monitor progress and report back in Q4 2021

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