Subcommittee and Staff Subcommittee on Nuclear Issues: New Opportunities for Nuclear Energy

This session will begin at 11:15 am
New Opportunities for Nuclear Energy

*Moderator:* Hon. Tim Echols, Georgia

*Panelists:* Brian Szews, ScottMadden  
Dr. Otgonbaatar, Constellation  
Jacob DeWitte, CEO and Co-Founder, Oklo Inc.
Value Propositions of hydrogen

NARUC Policy summit

July 2022
Constellation is the #1 zero-carbon energy provider in the U.S with 90% carbon-free output, backed by more than 32,000 MW of generating capacity.

Operates in 48 States & DC

215 TWh
1600 Bcf
Customer Load Served

Scalable national platform of approximately 2 million customers served, offering a diversity of innovative products and services, including 3/4 of Fortune 100 companies

<table>
<thead>
<tr>
<th>Power Supply Mix</th>
<th>TWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear</td>
<td>176</td>
</tr>
<tr>
<td>Conventional</td>
<td>20</td>
</tr>
<tr>
<td>Owned Renewable</td>
<td>7</td>
</tr>
<tr>
<td>Contracted Renewable</td>
<td>7</td>
</tr>
<tr>
<td>Purchased Power</td>
<td>73</td>
</tr>
</tbody>
</table>

13,000 Employees

Constellation is soon to be a Fortune 200 Company

C&I Market Share Ranking #1

Goal of providing 100% of business customers with custom GHG data by end of 2022
Constellation’s Nuclear fleet is within 100-mile range of ~14 MT H2

Source: Internal Hydrogen analysis

Constellation Clean Nuclear Power Sites
Nine Mile Point Hydrogen Pilot

- Constellation has been awarded a DOE grant in partnership with Nel Hydrogen and 3 National Laboratories to demonstrate an integrated hydrogen production strategy
- Nine Mile Point was selected as the site to install a Proton Exchange Membrane (PEM) electrolyzer
- Budget Period 1 concluded in August 2021
Cryptocurrency Mining with Nuclear Power

Securing carbon-free nuclear power through alternative revenue generation
Discussion Outline

A. INTRODUCTION TO CRYPTOCURRENCY
B. INTRODUCTION TO MINING
C. CHALLENGES AND OPPORTUNITIES
D. FINANCIAL METRICS
Introduction to Cryptocurrency and Blockchain Technology

A cryptocurrency transaction is initiated.

Details of the transaction are encrypted and entered on a digital ledger.

Multiple transactions are grouped into a ‘block’.

The encrypted block of transactions is broadcast to the bitcoin network.

Miners attempt to decrypt the block by guessing hashes.

The first miner to decrypt the block is awarded new Bitcoin.

Other miners verify the block then it is added to the chain.

The transaction is complete and becomes a ‘public’ record.

1. 75602FC10B602E0BDBBF15281BCA455FD2B6C326255173DB0EF7752CB54727
2. 27F020D7D514F4292F806C69C9D9F41B09180DC4330BE3604F7127B847A90267B6
3. 39DE0C64262C957BC590E269C731122059B8952628582E4644945948AA55
4. 764ED6D181F727D295542D0213F7891BC8894E15ED6E8D89610F98D
5. 38CB8B1A19F6A7F6A6F8E971318213F1223264E55F76877789CE10250B251A
6. 6F807D51B312D432B2321A2649B829F8F21F1991C1D6FC31916036D3191974CE
7. E4232A4C6263C6522545E6A4AFA0F2F8E2E0D3444F505D2516DE690A9
8. 84CC2448BF10728A4E8082D2F4407747BF529A5E1CEFA4351F7A
9. 4E2CBDF9972B2B23A5D5D3C6AF1E5174A2207F6F4FF3C16632160307
10. CE2F71E92C8C1021455A46123E24502D7A1406D139E5E585463C7122A241A4E61
11. 6B2D95B43A90789F89362C30A6B382C5819C1C2005853E8F26326F7A2B6E929
12. 1585BD28A3C10C62F3742F7C617A202382696572AFA227C761890130352217F
13. CD62F099C102119F9A82510319F8E91BE794824C2231A4F17FCDF985A584AF9
14. 277B6897EB3F16D590C66A26BF9C132585CD51A8F23B98916CF155C6E612B
Generate Revenue from Surplus Capacity

Components of a Cryptocurrency Mining Operation

1. Mining computers
2. Electrical infrastructure
3. Network infrastructure
4. Internet connection
5. HVAC temperature control (cool climate)
6. Housing space with racks and shelving
Cryptocurrency Mining and Nuclear Power Compatibility

**NUCLEAR Challenges**
- Operates as large volume baseload generation
- Difficult to maneuver in response to grid demand
- High production cost versus other sources
- Often located in remote areas

**MINING Solutions**
- Scalable operation in 2500W increments
- Cycle mining based on grid demand (15 minutes notice)
- Alternate source of revenue
- Cryptocurrency mining is location agnostic

**MINING Challenges**
- Electricity consumption a main component of O&M
- CO₂ intensive industry = ESG concerns
- China limiting domestic mining

**NUCLEAR Solutions**
- Generates safe and reliable electricity
- Zero carbon emissions
- Mining operations relocating to friendly jurisdictions

Combining nuclear power and cryptocurrency mining generates positive value propositions for both industries.
Current Events and Recent Announcements

**Talen Energy**
$400M Susquehanna JV with TeraWulf for 475MW mining mid 2022

**Energy Harbor**
Agreement with Standard Power using a direct connection & fixed price for 300+MW from Beaver Valley in 2023-24

**Mawson Infrastructure**
250MW of mining in Georgia using mainly nuclear and hydro power by Q3 2022
Financial Parameters of Cryptocurrency Mining

CAPEX is dominated by the cost of the mining computers, electrical infrastructure, and housing space.

O&M is dominated by the cost of electricity.

<table>
<thead>
<tr>
<th>NPV (6yr)</th>
<th>ROI</th>
<th>Break Even</th>
<th>Initial Investment</th>
<th>Power Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>.06/kWh</td>
<td>$1,285,000</td>
<td>172%</td>
<td>17 Months</td>
<td>$1.8M</td>
</tr>
<tr>
<td>.03/kWh</td>
<td>$2,700,000</td>
<td>251%</td>
<td>13 Months</td>
<td>$1.8M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bitcoin Price</th>
<th>Difficulty</th>
<th>Pool Fee</th>
<th>Recurring Cost</th>
<th>Block Reward</th>
<th>Difficulty Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,500</td>
<td>29.2T</td>
<td>2%</td>
<td>$5,000/month</td>
<td>6.25BTC</td>
<td>+2%/month</td>
</tr>
</tbody>
</table>

Features of the Case

Mining operators who pay the least for electricity make the most profit and are insulated from cryptocurrency price drops.
Thanks for attending. The next session begins at 2:00 pm.