Navajo Nation

Navajo-Hopi Land Commission

Feasibility Study for 4,000 MW of Renewable Power at the Paragon-Bisti Ranch

DOE TEP Review, Golden, CO

March 25, 2014
THE NAVAJO-HOPI LAND SETTLEMENT ACT

- Required relocation of Navajo and Hopi families living on land partitioned to other tribe.
- Set aside certain lands for the benefit of relocatees.
Paragon-Bisti Ranch is one of the selected lands:
- Located in northwestern New Mexico.
- 22,000 acres of land
- Benefits Navajo families residing on the HPL per P.L. 93-305.
5-phase Program for Renewable Energy Development @ Paragon-Bisti

- Phase I – preliminary critical issues analysis *(COMPLETED)*
  - Four goals to implement
- Phase II – Feasibility Study *(IN PROCESS, today’s talk)*.
- Phase III – Preconstruction
- Phase IV – Construction
- Phase V – long-term Operations and Maintenance
Four Goals from Phase I

- Initiate development of large-scale (multi-gigawatt based on initial solar estimate) green power on PBR & environs
- Conduct education, outreach, and coordinate activities with Navajo & non-Navajo stakeholders
- Develop institutional capacity for Navajo Nation to conduct large-scale renewable development
- Develop Navajo Nation capacity to be a renewable energy development innovator.
1. Initiate development of large-scale renewable energy project.

- Maintain active communication w/solar & wind development firms.
- Develop and conduct site investigation plan (i.e. *PHASE II*).
- Identify and establish management strategies for essential infrastructure rights.
- Develop and distribute initial master plan for Bisti-Paragon site.
initial master plan (2010-2014)
<table>
<thead>
<tr>
<th>Site</th>
<th>Township and Section</th>
<th>Acres</th>
<th>Potential Power (MW)</th>
<th>Land Status</th>
<th>Miles to Road</th>
<th>Miles to 230 kV Bisti sub.</th>
<th>Miles to 230 kV Line Bl</th>
<th>Miles to 345 kV Line FW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sec 31, T24N R13W; Sec 6, T23N R13W</td>
<td>640</td>
<td>160</td>
<td>ALL Selected and Conveyed – surf and min</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>Sec 9-14, 23, 24, T23N R13W; Sec 6-9, 17, 20, 21, T23N R12W</td>
<td>4,000</td>
<td>1,030</td>
<td>ALL Selected and Conveyed – surf and min</td>
<td>0-3</td>
<td>6-9</td>
<td>3-7</td>
<td>11-14</td>
</tr>
<tr>
<td>3</td>
<td>Sec 2, 10-12, 14, T23N, R12W Sec 7, 18, 19, T23N, R11W</td>
<td>3,330</td>
<td>830</td>
<td>BOTH Tribal (1280) <em>and</em> Selected and Conveyed – surf &amp; min (2050)</td>
<td>0-3</td>
<td>13-15</td>
<td>10-13</td>
<td>10-11</td>
</tr>
<tr>
<td>4</td>
<td>Sec 27, 28, 33-35, T23N, R11W Sec 3-5, 8-10, T22N, R11W Sec 1, 12,13, T22N, R12W</td>
<td>6,560</td>
<td>1,640</td>
<td>BOTH Tribal (4960) <em>and</em> Selected and Conveyed – surf and min (1600)</td>
<td>0-1</td>
<td>18-22</td>
<td>15</td>
<td>12-14</td>
</tr>
<tr>
<td>5</td>
<td>Sec 13-15, 22, 23, 26, 27, T22N, R11W</td>
<td>1,960</td>
<td>490</td>
<td>ALL Tribal</td>
<td>1</td>
<td>25</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Sec 5, 8, T23N, R11W</td>
<td>870</td>
<td>220</td>
<td>ALL Tribal but landlocked</td>
<td>2</td>
<td>16</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>

**Totals** | **17,360** | **4,370** |
2. Conduct education, outreach, and coordinate activities with stakeholders.

- Identified and establish working relationship with Navajo Stakeholders.
- Identified and established working relationship with non-Navajo Nation Stakeholders (Federal, State of New Mexico, Local Government, Non-Governmental Organizations).
- Prepared presentations to support education and outreach efforts (MENTION “COSMOS” AGX DEMO)
3. Develop institutional capacity for Navajo Nation to conduct large-scale renewable energy development

4. Develop Navajo Nation’s capacity to be a renewable energy development innovator
IN PROCESS NOW: technical/economic evaluation of the all four major forms of RE (solar, wind, geothermal, biomass) at PBR, identification of funders/investors, power market and transmission studies.

- Conduct environmental site survey and subdivide 22,000 acre site into about five solar ranches.

- RUN “Cosmos” AGX demo

- Explore vocational-technical opportunities, socioeconomic development, and spinoffs for tribal members.

- Develop lifecycle cost model and analyze cost-benefits ratio, draft feasibility study for the tribe and present FS.
“Cosmos” view of AGX via separate laptop

forced perspective New Mexico grid & study area wrt Earth
screencap of AGX via separate laptop

zooming in on PNM grid & study area
screencap of AGX via separate laptop

zooming in on NW New Mexico grid, study area & Paragon Ranch
screencap of AGX via separate laptop

red=Selected & Conveyed w/Surface & Mineral rights

blue=Selected State lands, not Conveyed yet

green=Tribal Fee & Trust lands, inside & outside the Ranch boundary, already ID’ed in 2010 pre-feasibility study

zooming in on Paragon-Bisti Ranch
screencap of AGX via separate laptop

red=Selected & Conveyed w/Surface & Mineral rights

blue=Selected State lands, not Conveyed yet

green=Tribal Fee & Trust lands, inside & outside the Ranch boundary, already ID’ed in 2010 pre-feasibility study

swooping down to Chaco Canyon
screencap of AGX via separate laptop

wind resource layer visible

Class 1 (Weak, Poor) wind locations
screencap of AGX via separate laptop

moderate but deep dry geothermal distribution uniform across study area

deep hot spot to the northeast outside study area

gerothermal resource layer turned on
screencap of AGX via separate laptop

start flyover to Bisti substation up Chaco Canyon
screencap of AGX via separate laptop

fly over Tanner Lake & Coal Creek to De-Na-Zin Wash…
screencap of AGX via separate laptop

...to keystone Site #1: Bisti Substation, 230-kV line & Hwy 371 (data directory visible, slope layer turned on, >3% shown in red)
screencap of AGX via separate laptop

compressor station

substation

natural gas pipeline

IS Route #7290

~150-MW keystone Site #1: Bisti Substation, 230-kV line & Hwy 371
(data directory hidden, slope layer still on)
What’s Next: Preconstruction – Phase III

- Conduct all planning
- Define boundaries
- Basic infrastructure
- Environmental studies and permitting
- Draft and issue Requests for Information “RFI/Sources Sought”
- Draft and issue Request for Qualifications (RFQ)
- Develop financial model & lease agreement
- Independent capital cost estimate & an engineering economic analysis/investment-grade financial proforma
- Review qualifications
- Draft and issue Request for Proposal (RFP)
- Review bids and proposals and select best-value developer(s).
Construction – Phase IV

- Sign lease and partnering agreement.
- Partnering meetings between NHLCO, Navajo Nation, Developer and other Stakeholders
- Construction preparation
- Engineering designs
- Submission of plans
- Obtain environmental permits
- Transmission line studies
- Negotiation of PPA
- Mobilization
- Site preparation
- Infrastructure, improvements, construction and grid-tie
Long-term O&M – Phase V
Thank you. Questions?

Christina Lewis, PM/Contract Compliance Officer
Navajo-Hopi Land Commission Office,
Navajo Nation
P.O. Box 2549, Window Rock, AZ 86515
(928) 871-6441
chris_lewis12@yahoo.com