Diversifying University Lands’ Energy Portfolio – Spotlight on Renewables

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Agenda

- PUF Lands/UL Overview & Key Stats
- UL’s Focus on Emissions Reductions
- New Business Focus: Renewables
The PUF Lands & University Lands Organization

- Surface and mineral rights of 2.1 million acres of “PUF Lands”
- History of land dates back to 1838; first oil discovery in 1923
  - 20,000 wells drilled to-date
  - 9,000 wells currently producing
  - >20,000 identified locations
  - 4,000 leases, 250+ operators
- Surface leases:
  - Pipelines and power lines
  - Grazing and ranching
  - Renewables - wind and solar
  - Water sales & infrastructure
  - Environmental programs
- Primary revenue driver is mineral royalty revenue
- Revenue support UT & A&M System via the “PUF” and “AUF”
The Permanent University Fund
(“The PUF”)  

- Benefits 25 institutions across UT and A&M Systems

- ~$21 Billion Market Value
  - ~5% annual distribution
    - 2/3 to UT System
      - ~45% to UT Austin
    - 1/3 to A&M System

- Surface revenue goes into separate fund (AUF), which is immediately available to the schools that year
  - Wind, solar and water → AUF
Historical AUF and PUF Revenue vs. Oil Price

- PUF Revenue (Minerals)
- AUF Revenue (Surface)
- West Texas Intermediate ($/BBL)

Projected Revenue for FY19:
- PUF Revenue: $953 MM
- AUF Revenue: $92 MM

Historical Revenue:
- FY09: PUF $16 MM, AUF $340 MM
- FY10: PUF $14 MM, AUF $338 MM
- FY11: PUF $896 MM, AUF $954 MM
- FY12: PUF $24 MM, AUF $856 MM
- FY13: PUF $26 MM, AUF $1,130 MM
- FY14: PUF $30 MM, AUF $807 MM
- FY15: PUF $50 MM, AUF $44 MM
- FY16: PUF $59 MM, AUF $512 MM
- FY17: PUF $1,033 MM, AUF $689 MM
- FY18: PUF $88 MM, AUF $92 MM
- FY19: Projected PUF $953 MM, AUF $92 MM
PUF Lands Gross Monthly Production

- Record oil production of 5.3 million barrels in July 2018
- ~90% of current production is from wells drilled since 2011
- 2011-2017 production up 130%

~90% of current production is from wells drilled since 2011
Impact of Horizontal Drilling is Reducing Surface Footprint

![Impact of Horizontal Drilling](image)

**Avg. Lateral Length by Year**

- 2018
- 2017
- 2016
- 2015
- 2014

*2018 through Nov.*

**Wells & Lateral Footage Drilled**

- # of Wells
- Lateral Footage

- 2009: 0
- 2010: 500,000
- 2011: 1,000,000
- 2012: 1,500,000
- 2013: 2,000,000
- 2014: 2,500,000
- 2015: 3,000,000
- 2016: 3,500,000

- Wells: Drilled
- Total Perf’d Footage
“Texas holds embedded in its earth rocks and minerals which now lie idle because unknown, resources of incalculable industrial utility, of wealth and power. Smite the earth, smite the rocks with the rod of knowledge and fountains of unstinted wealth will gush forth.”

- Ashbel Smith, M.D., first U. T. Board of Regents Chairman at the dedication of the University of Texas, 1881

**Economic Impact Today:**

- 7,400 Full time equivalent “personnel” are at work on PUF Lands every day, with thousands more spending part of their day there

- Each year since 2012, commercial activity on PUF lands has generated:
  - ~$3.5 billion in gross product
  - ~33,000 indirect jobs across Texas
  - ~$176 million in state tax revenue
  - ~$40 million in local tax revenue
    - School districts containing PUF lands accrued ~$16 million, or ~$166 per student!

Source: The Perryman Group
University Lands:
Economic Development Opportunities

Effective Corporate Structure

Oil and Gas

Water Resources

Solar and Wind

Other Surface Activities

Excellent Environmental Stewardship

*note: not to scale
University Lands: 20 Year Vision

- Oil and gas will continue to be predominant revenue source
  - Drilling inventory of 30+ years at normalized rates
  - Production levels could increase 50-100% over time
  - Technology will improvements in all parts of operations, including environmental performance
  - Most demand forecasts indicate fossil fuels needed into long-term to support the developing world’s emergence into the middle class
    - Electricity will skew towards renewables in the shorter term, with transportation and industrial will take much longer to catch up

- Water resources will be a significant contributor to West Texas infrastructure improvement, development

- Solar and wind energy will be developed widely across PUF Lands
EMISSIONS
Emissions from U.S. Oil and Gas – Some Context

- U.S. Oil and Gas Industry – 1.4% of global methane emissions
- **Methane Emissions** are 10% of total U.S. greenhouse gas emissions
  - Natural gas and petroleum systems = approximately 1/3 of the 10%
Infrared Camera Emissions Detection

Infrared cameras are helpful, but they’re not quantitative.

Sometimes it’s steam.

Similar black smoke below at the gas pump. Landfills, cows/agriculture, and human flatulence look similar.
UL IR Camera Emissions Inspections
Sept. 2018 to present

<table>
<thead>
<tr>
<th>Site Visits by UL</th>
<th>Operating Companies</th>
<th>Emissions Events Observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>154</td>
<td>33</td>
<td>55</td>
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New Tank Battery Facility: Four (4) Vapor Recovery Towers (VRT), One (1) Vapor Recovery Unit (VRU) & SPCC i.e. Lined Spill Prevention Containment.
Emission Inspections

- Stock Tank Vapor Space Maintenance Regulator
- Redundant Safety Vent Valves
- Secure & Maintained Thief Hatch on Stock Tanks
- Redundant Vapor Recover Compressors
- Vapor Recovery Tower (VRT)
- Automated Flare Stack for GHG Destruction
- Automated Thermal Oxidizer for GHG Destruction
US and Permian Production & Emissions Performance

**U.S. vs Permian Oil Production**
- 2011-2017: US Production up 83% Permian up 190%

**U.S. vs Permian Gas Production**
- 2011-2017: US Production up 30% Permian up 118%

UL believes downward trend will continue due to:
1. Continued advances in technology
2. Continued regulation by regulators
3. Continued self-regulation by industry

United States and Permian Basin
Direct GHG Emissions of Methane Reported from Onshore Oil and Gas Production in Million Metric Tons of CO2e (2011-2017)

2011-2017
US Emissions Down 25%
Permian down 3.5%
PUF Lands’ Operators Methane Emissions

*Accounts for 15% of production on UL Lands without reported emissions, per EPA
Government Regulators & Self-Regulation Initiatives

- **2011**: OOOO - LDAR programs
- **2015**: OOOOa - pneumatic devices

*World's largest oil and gas companies' commitment to 20% reductions by 2025*

Tying emissions reductions to exec. compensation
UL Emissions Reductions Initiatives

- UL Oil & Gas Lease requires law, best practices & royalty paid on flared volumes
  Lessee will use highest degree of care, necessary safeguards ... to prevent contamination of any environmental medium including soil, surface water, subsurface strata, ambient air ... Lessee will clean up, remove, remedy soil and groundwater contamination and release of any Hazardous Material, minimize light pollution, capture and minimize air pollution and emissions ... Must meet Lessor satisfaction and meet or exceed EPA and State regulatory requirements ...“
- New emissions-focused Facilities Engineer
- New Infrared camera (~$100,000) used in lease inspections (~154 since September)
- Environmental Stewardship Incentive Cost-share Program targeting emissions
- 2018 Alignment with The Environmental Partnership
- Low production lease & marginal well abandonment initiative – new focus in 2018
- Satellite imagery to compare permits to existing flares
- Conversations with UT Austin emissions expert, Dr. David Allen
- Dialogue with oil and gas companies and industry associations (TXOGA, IPAA)
- Currently working on “emissions reductions best practices” to publish
- Future annual report that would include environmental performance
History / Process

- Two of the first wind farms in Texas built on PUF Lands in 2001
- Started getting approached by solar developers in 2015 – recent “land rush” kicked off
- In 2016, issued RFP inviting solar development onto UL
  - UT Austin Energy Institute conducted a solar resource assessment in advance of RFP to inform the process
- Since then, 4 solar leases; 3 wind leases have been executed
  - Two 2001 wind farms have been recharged/upgraded and the contracts aligned with current commercial terms
Two Key Factors in Solar: Irradiance and Transmission Availability

Legend
- University Lands
- Solar Capacity Factor Value
  - High: 0.265
  - Low: 0.181

Map showing solar capacity factor distribution across Texas with high values in the north and low values in the south.
UL’s Renewables Leasing Approach

- Sites are “best use” of land
- Good revenue and carbon offset potential
- Proprietary UL solar and wind lease forms
  - Very long-term contracts – 30, 40, 50+ years
  - Leases have a ~3 year “development period” in which the solar/wind company performs due diligence activities and decides if they actually will build the project
- Cohabitation with oil and gas development required in lease
  - Solar contract is surface + 500 feet down, which allows for future Hz drilling below panels. Space can also be left between panels to allow for drilling
  - Wind infrastructure is spread out, which allows for drilling between
- 70,000 acres of wind and solar energy leases for a total of 1,000 megawatts of power (~700,000 homes)
- 150 megawatts expected to power City of Austin
The Goal: Coexistence

Photo left: Lorne Matalon, Marfa Public Radio

Photo right: victoriaevclub.com, Imaginea Energy
Revenue from Renewables

- Revenue *insignificant* compared to oil and gas but *significant* compared to grazing revenue (30x for solar)

- One acre of solar lease has a PV of $\sim$6,000
  - Solar panels very concentrated, per acre rent is higher

- One acre of wind lease has PV of $\sim$300/acre
  - Wind lease infrastructure is sparse; per acre rent is lower

- Existing 9 leases expected to generate $250\text{MM}$ over life of leases (PV of $75\text{MM}$)
Renewables Outlook & Final Thoughts

Special projects/focus at UL:
- UT El Paso initiative
- Comptroller’s Office / Texas Energy Aggregation renewables initiative for state agency power

What’s next?
- Recent “land rush” stymied by current lack of transmission access and capacity, with many waiting on ERCOT expansions for growth
- What happens when the tax subsidies expire?
- If public demand continues, growth will continue
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THANK YOU! ANY QUESTIONS?