University lands quick stats

• There are almost 3200 sections of UL lands.
  • 3,654 total square miles or 2,338,171 acres.
  • 1,709 blocks have Oil and Gas leases.

• The average block is 1.14 square miles or 732 acres.

• The average distance to a substation is 7 miles (many are less).
  • The higher the kVA rating, the better.

• You can build about 1 MW of solar capacity on 8-10 acres.
  • The average section could support a 70-90 MW array.
  • Multiple sections could be used for a bigger array.
University lands are not co-located with campuses

- Most campuses are in Central, East, and South Texas.
- University lands are in West Texas.
- Location is not critical to business model.
- Most campuses purchase power through General Land Office.
University lands can potentially explore development in all three interconnects

- Assets do not have to physically be in an interconnect to sell to it.
- Multiple options toward getting the maximum return.
The two most important variables for good solar sites are 1) solar radiation

- Most of University lands are in excellent solar resources.
- The further west, the better.
- Lately installations are reporting better than modeled results for capacity factor: First Solar Barilla: 30%
And 2) available transmission infrastructure

- Closeness to transmission line substations is preferred.
- Lines become more sparse further west.
  - A single 345 kVA circuit can carry about 850 MW
  - A single 138kVA circuit can carry about 175 MW
  - A single 69kVA circuit can carry about 75 MW
Summary of our University land grades

• We summarize the University lands attractiveness for solar development as follows:

  • **Very Good**
    • > 25% solar capacity factor, < 10 miles to a substation, and < 2 degree average slope of land, no Oil & Gas lease

  • **Good**
    • > 22% solar capacity factor, < 25 miles to a substation, and < 5 degree average slope of land, no Oil & Gas lease

  • **Fair**
    • < 25 miles to a substation, and < 5 degree average slope of land, no Oil & Gas lease

  • **Poor**
    • > 25 miles to a substation, > 5 degree average slope, Oil & Gas lease
All University lands are less than 30 miles from a substation

Histogram of distance from all University lands to nearest substation

Miles to nearest substation

Frequency

- 62: 345 kVA sub
- 846: 138 kVA sub
- 454: 115 kVA sub
- 1832: 69 kVA sub
Most University lands are in areas with good solar resources

Histogram of average capacity factors of all University lands

Capacity factor of University lands

Frequency
Each region of University land has different attributes

- El Paso and Hudspeth County
- Culberson County
- Loving, Ward, and Winkler County
- Pecos County
- Terrell County
- Crockett, Reagan, Schleicher, and Upton County
- Crane and Ector County
- Andrews, Gaines, and Martin County
El Paso and Hudspeth County

- Total acres: 577,109
- Total sections: 732
  - Very good: 90
  - Good: 593
  - Fair: 0
  - Poor: 49
- Closest to 69 and 115 kVA transformers
- Mostly in WECC
  - El Paso Electric
- Oil & Gas activity: No
Culberson County

- Total acres: 52,502
- Total sections: 72
  - Very good: 7
  - Good: 62
  - Fair: 0
  - Poor: 3
- Closest to 69 and 138 kVA transformers
- Mostly in ERCOT
  - El Paso Electric (WECC)
  - TXU Energy
- Oil & Gas: No
Loving, Ward, and Winkler County

- Total acres: 173,433
- Total sections: 245
  - Very good: 0
  - Good: 23
  - Fair: 0
  - Poor: 222
- Closest to 69 and 138 kVA transformers
- ERCOT
  - TXU Energy
  - TNP Enterprises
- Oil & Gas: Yes
Pecos County

- Total acres: 209,173
- Total sections: 295
  - Very good: 0
  - Good: 274
  - Fair: 0
  - Poor: 21
- Closest to 69 and 138 kVA transformers
- ERCOT
  - TNP Enterprises
  - AEP Texas North
- Oil & Gas: No
Terrell County

- Total acres: 68,381
- Total sections: 96
  - Very good: 0
  - Good: 54
  - Fair: 0
  - Poor: 42
- Closest to 69, 138, and 345 kVA transformers
- ERCOT
  - AEP North
  - ETT
  - TNP
- Oil & Gas: No
Crockett, Reagan, Schleicher, and Upton County

- Total acres: 806,395
- Total sections: 1,118
  - Very good: 0
  - Good: 122
  - Fair: 73
  - Poor: 923
- Closest to 69, 138, and 345 kVA transformers
- ERCOT
  - LCRA, TXU, Oncor, Cap Rock, AEP, ETT
- Oil & Gas: Yes
Crane and Ector County

- Total acres: 77,573
- Total sections: 111
  - Very good: 0
  - Good: 5
  - Fair: 0
  - Poor: 106
- Closest to 69 and 138 kVA transformers
- ERCOT
  - TXU, AEP North
- Oil & Gas: Yes
Andrews, Gaines, and Martin County

- Total acres: 345,900
- Total sections: 486
  - Very good: 0
  - Good: 0
  - Fair: 0
  - Poor: 486
- Closest to 69 and 138 kVA transformers
- Mostly ERCOT, but possible to Eastern Interconnect (SPP)
  - TXU
- Oil & Gas: Yes
There might be some leased land w/o much oil & gas activity we could consider

- Ward County
- < 1 mile to multiple 138 kVA substations
- Even highly-developed sections could have room for development.
- Imagery from Google Maps
Some are close to CREZ (red) lines

- Reagan County - Big Lake, TX
- Not much activity on leased land
- Few miles to CREZ lines
  - Competitive Renewable Energy Zones
  - Higher capacity lines (345 kVA)
Spatial pricing will also need to be taken into account for revenue projections.

- Power plants are compensated based on the price at their location at a given time.
  - Power Purchase Agreements (PPAs) can create price floors and/or ceilings.
- Future congestion studies of potential sites will be needed.
There are many factors that go into considering siting solar:

1. There are multiple sites that offer placements rated very good and good.
2. The price of electricity paid by each campus is decoupled from prices for selling to the grid.
3. Recent costs to generate solar power are 3.8-5.5 cents/kWh.
4. Revenue is a function of local grid prices, driven by congestion. Locations further east likely will have less congestion.
5. Solar can produce multiple revenue streams, bulk power, trading Renewable Energy Certificates (RECS), and the Investment Tax Credit.
6. Financing will require a site study to predict local hub prices for 5 years or more.
7. UL might want to first pursue a land lease with a solar developer to learn how the project works.
8. If UL wants to own capital, partnering with a taxable entity for at least the first 6 years will be necessary to take advantage of the Investment Tax Credit (ITC).
9. Rice and SMU have recently entered into agreements for acquiring solar power.