

Electricity

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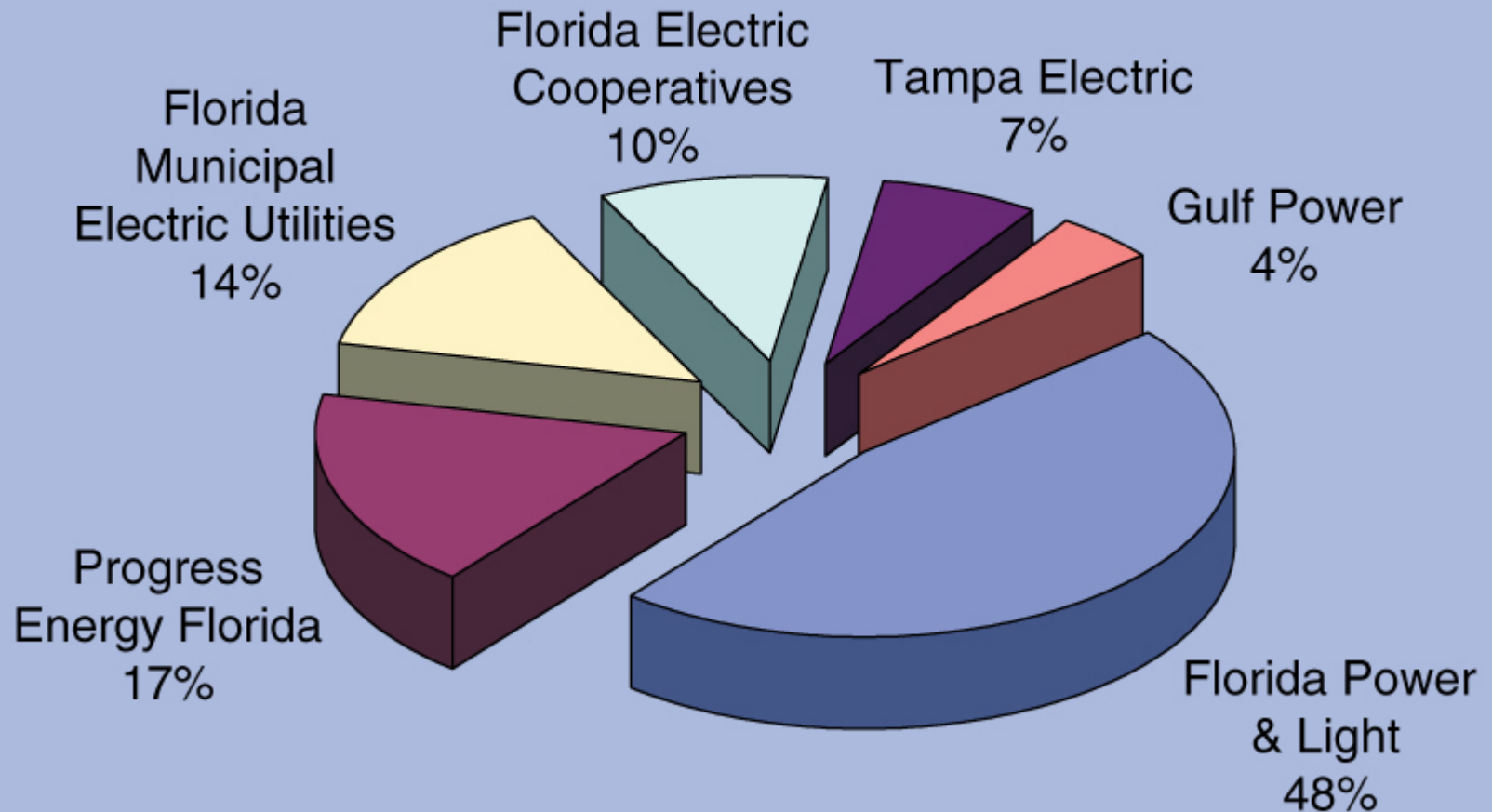
August 2012

Today

- ♦ **Effective Policy**
- ♦ **Generation options, pros & Cons**
- ♦ **Creating an effective policy**



Florida Utilities' Market Share



Florida's Public Power Utilities



Think Globally, Act Locally

- ♦ My Prius
- ♦ Averages 45 mpg



Think Globally, Act Locally

- ♦ My solar water heater



Think Globally, Act Locally

- ♦ My 5-kW solar photovoltaic system



You want the truth?

“You can’t handle the truth!”



Colonel Jessup,
delivered by Jack Nicholson
in *A Few Good Men*

Let's Not Waste Our Time

- ♦ If today's result is only “More Efficiency and Solar!”
 - It will be laughed at
 - It will be ignored
 - It will be worthless

Renewable Energy Supply Limited in Florida

- ♦ Florida has 50,000 MW* of power plants
- ♦ Biomass potential = 1,500 MW
 - Today we have 500 MW
- ♦ Solar PV potential = 5,000 MW
 - Depends heavily on cost and storage
 - Today we have 70 MW
- ♦ Renewables today = 1%
 - Potential = 13%

**1 MW = 400 homes*

Today's Result

Balance

Resources

♦ Coal

- Baseload, reasonable in price, domestic
- Environmental problems, maybe rising price, no new plants

♦ Gas

- Baseload or peaking, reasonable in price today, but has fluctuated
- Environmentally 2x better than coal, new resources discovered, domestic, most new plants gas, concern about dependency

Resources

♦ Nuclear

- Baseload, high in price initially, lower later, domestic, carbon neutral in operation
- Environmental waste problems, no new plants, but many proposed

♦ Biopower

- Baseload, higher in price today but stable long-term, local economic benefits
- Some emissions, carbon neutral, local resource, domestic

Resources

♦ Solar Photovoltaic

- High in price initially but no fuel cost, domestic, carbon neutral in operation
- Follows daylight, modest utility benefit, subsidized, massive land needed

♦ Wind

- Intermittent, higher in price today, free fuel, best resource offshore, local economic benefits
- Bird deaths, aesthetics

Resources

♦ Efficiency

- Excellent option to avoid or slow growth in energy needs, clean, can be low cost
- Reverse Robin Hood Syndrome – Take from the poor and give to the rich, IOU concerns about loss of growth, subsidized, slow growth can allow dirtier plants to operate longer

♦ Solar Hot Water

- No brainer - #1 recommendation

We Ought to Start Somewhere

Wagon Train



787



We Ought to Start Somewhere

IBM Mainframe



iPhone



**A journey of a thousand miles begins
with a single step.**

Lao-tzu

Chinese philosopher

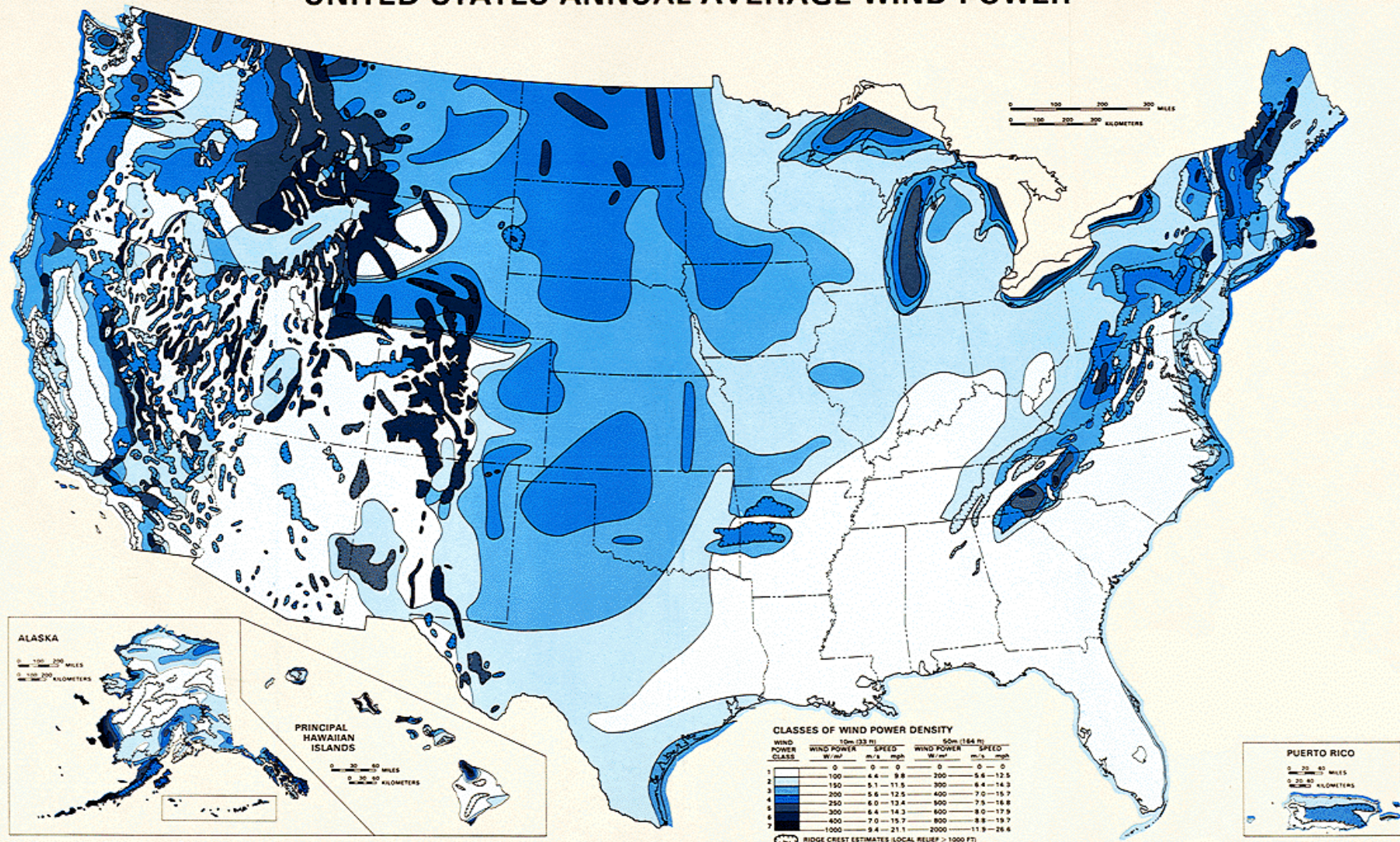


Let's Solve the Problem

- ♦ What is good public policy?
- ♦ Stop the hyperbole
- ♦ Stop whining
- ♦ Stop dreaming
- ♦ Be practical



UNITED STATES ANNUAL AVERAGE WIND POWER



Offshore Wind Resource Estimates

--- Offshore State Boundaries

Wind Power Classification

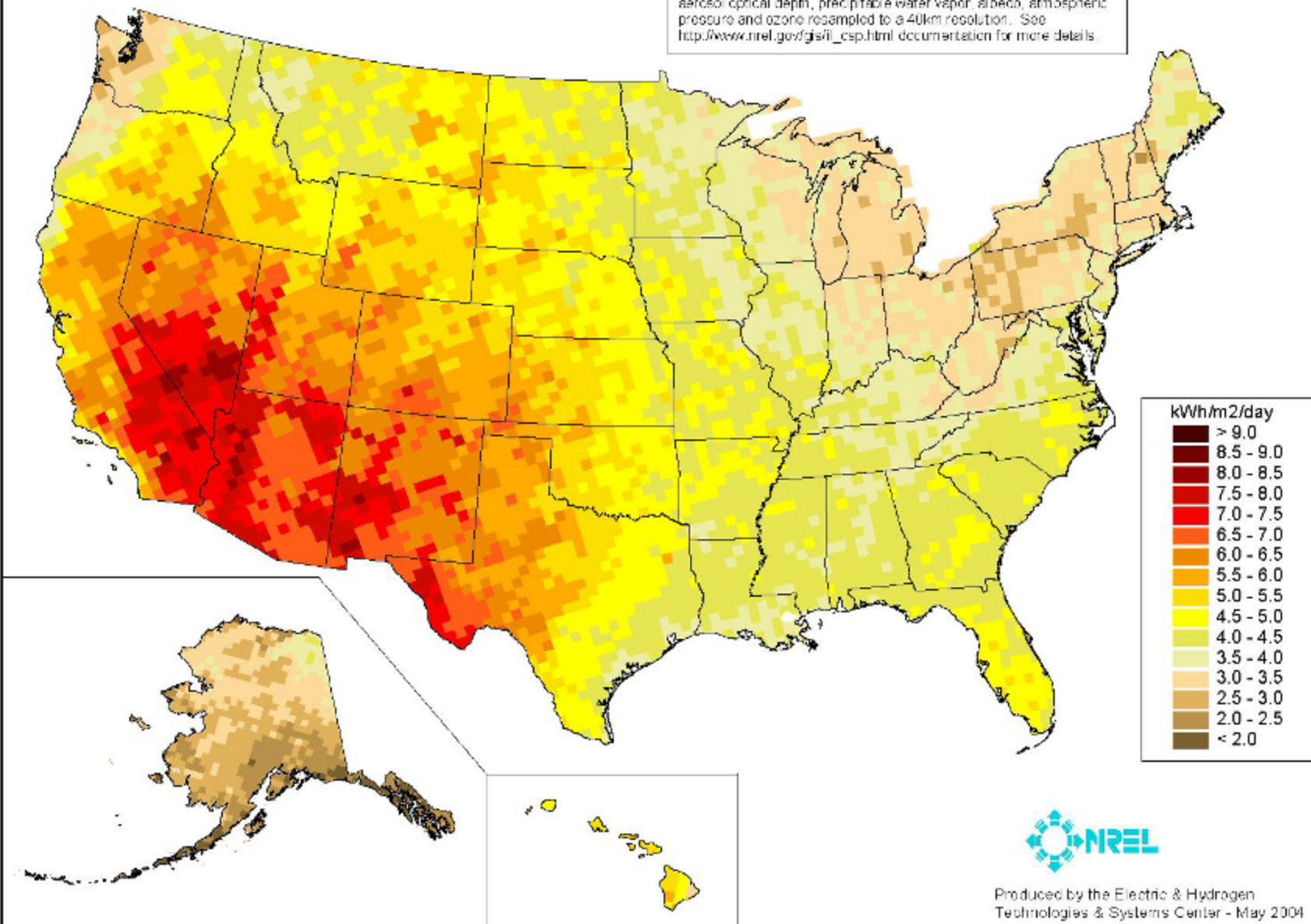
Wind Power Class	Wind Power Density at 50 m W/m^2	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
2	200 - 300	5.6 - 6.4	12.5 - 14.3
3	300 - 400	6.4 - 7.0	14.3 - 15.7
4	400 - 500	7.0 - 7.5	15.7 - 16.8
5	500 - 600	7.5 - 8.0	16.8 - 17.9
6	600 - 800	8.0 - 8.8	17.9 - 19.7
7	800 - 1600	8.8 - 11.1	19.7 - 24.8

^a Wind speeds are based on a Weibull k value of 2.0

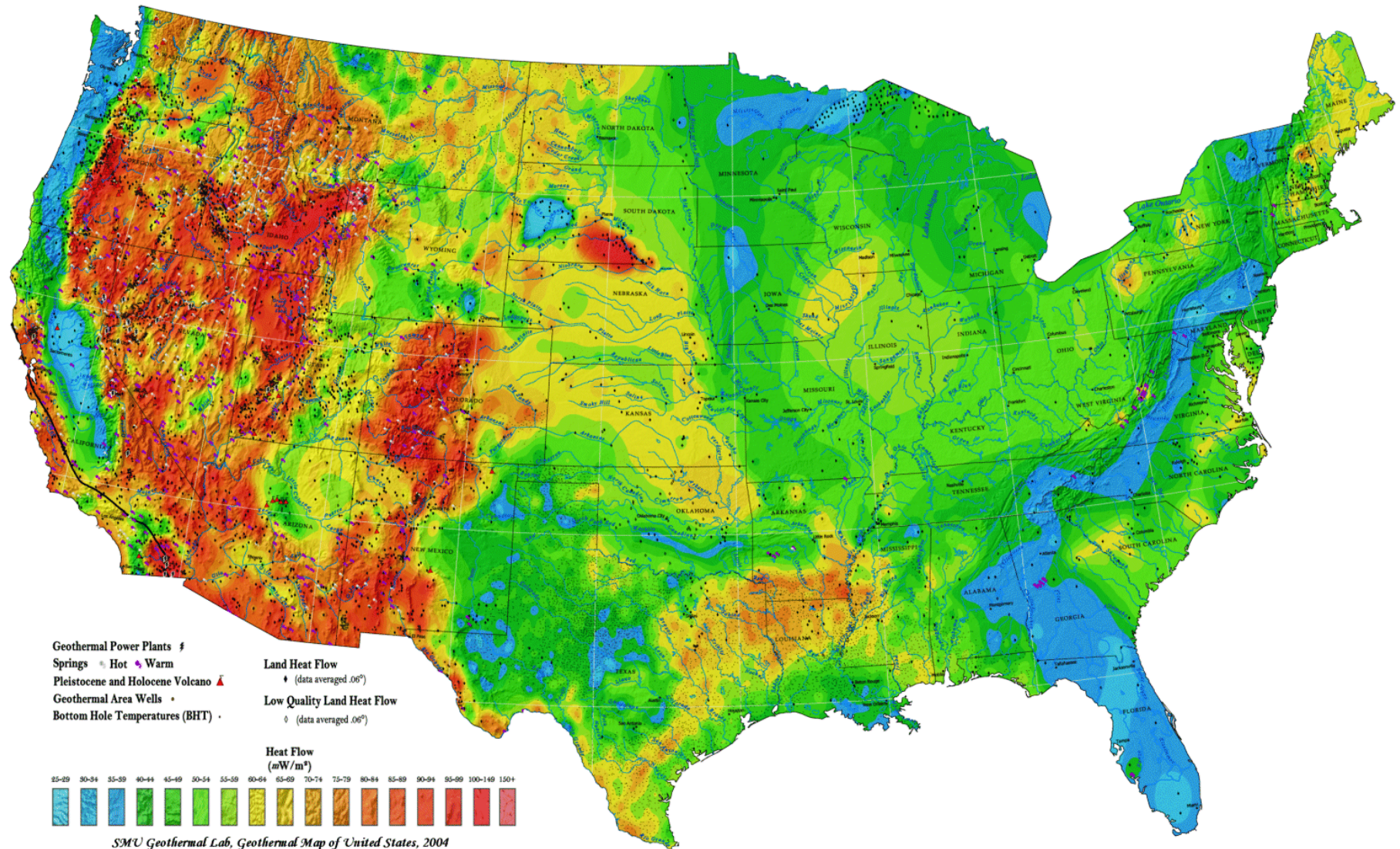
Direct Normal Solar Radiation (Two-Axis Tracking Concentrator)

Annual

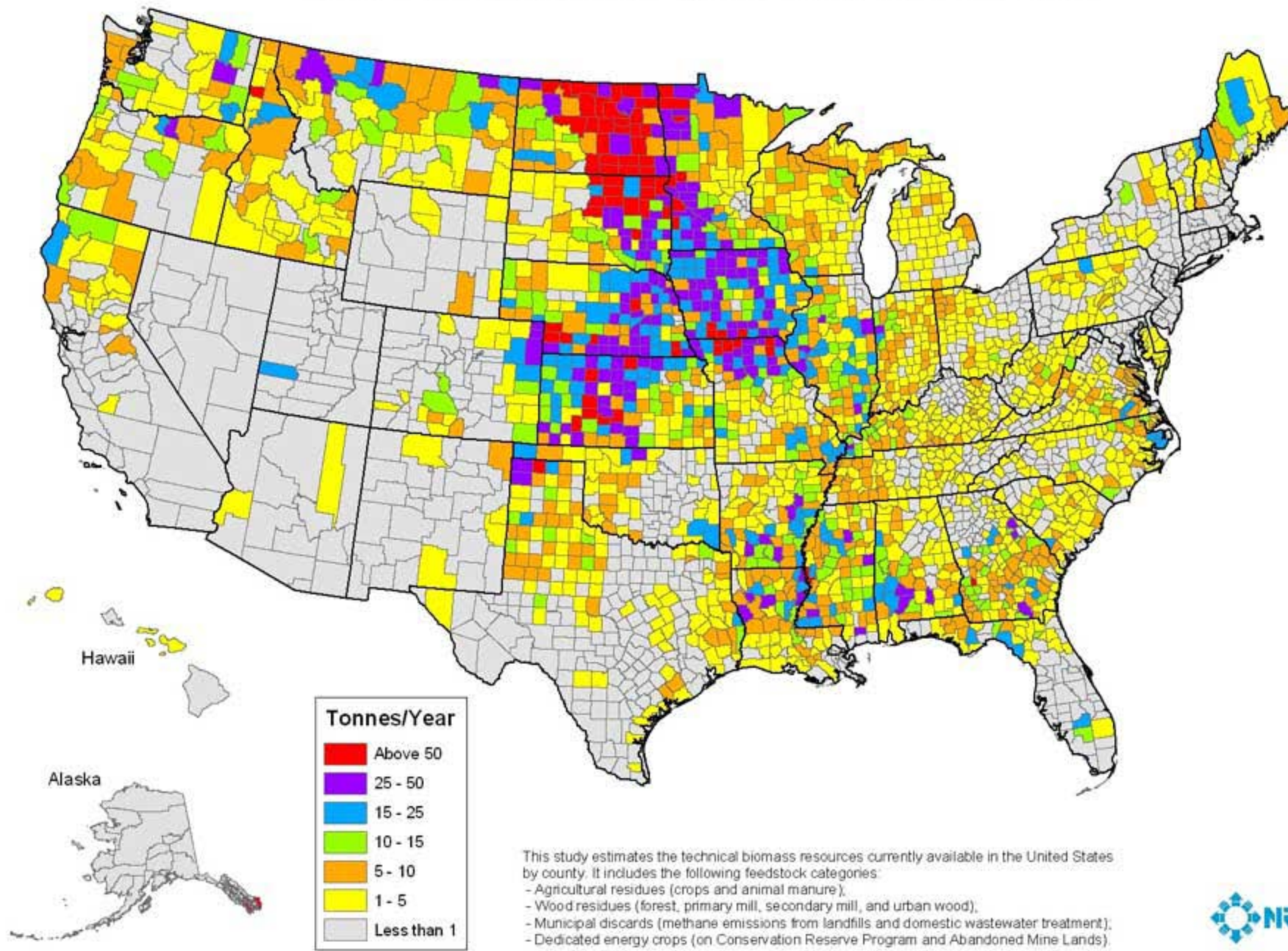
Model estimates of monthly average daily total radiation using inputs derived from satellite and/or surface observations of cloud cover, aerosol optical depth, precipitable water vapor, albedo, atmospheric pressure and ozone resampled to a 40km resolution. See http://www.nrel.gov/gis/til_csp.html documentation for more details.



Geothermal Resources



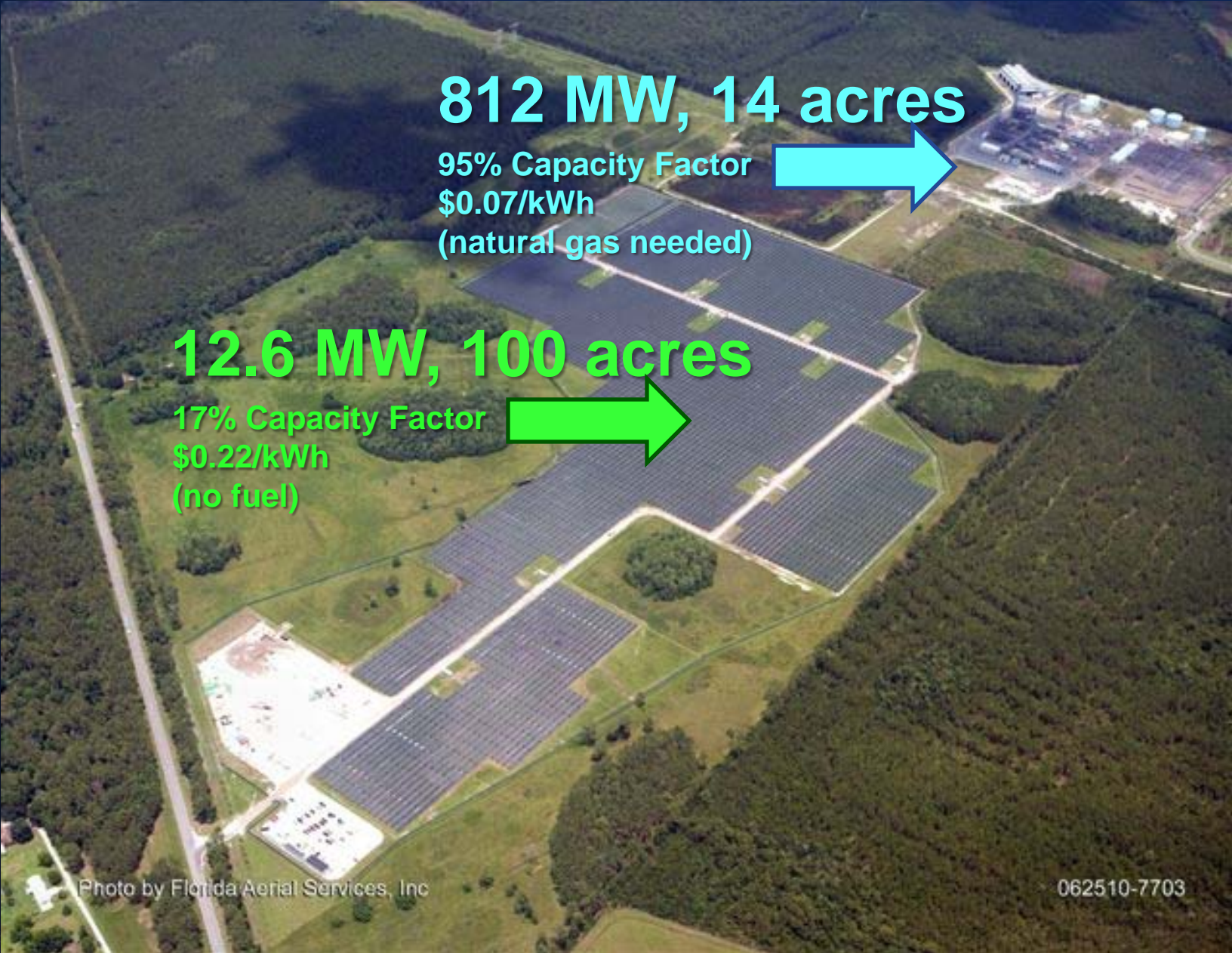
Biomass Resources Available per Person in the United States



JEA (Jacksonville) Photovoltaic Power

(15 MW DC, 12.6 AC)





812 MW, 14 acres

95% Capacity Factor
\$0.07/kWh
(natural gas needed)

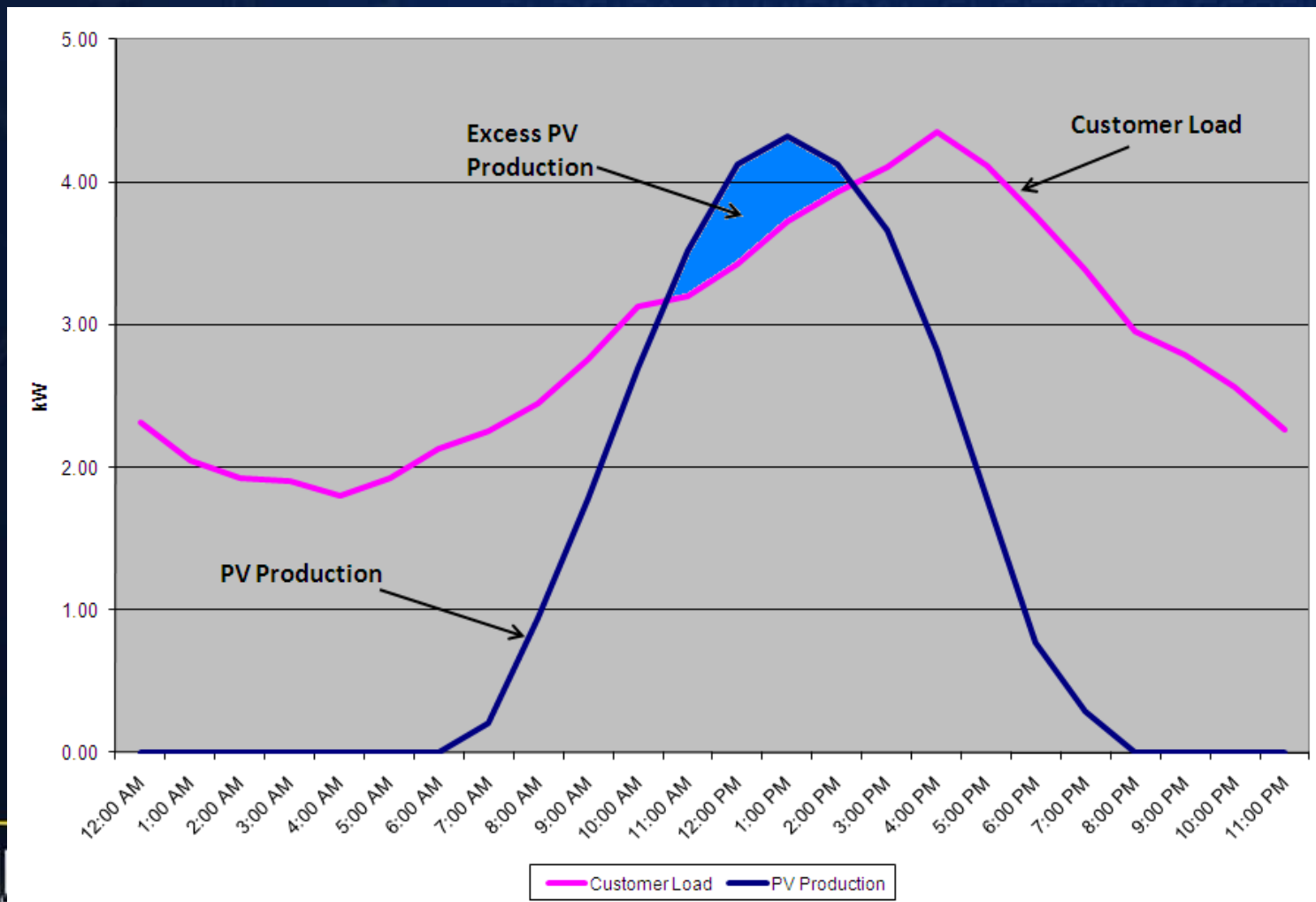
12.6 MW, 100 acres

17% Capacity Factor
\$0.22/kWh
(no fuel)

Photo by Florida Aerial Services, Inc

062510-7703

Daily PV Production (5 kW) vs Typical Customer Load Orlando – Summer



Daily PV Production (5 kW) vs Typical Customer Load Orlando – Winter

