

# Turning Biomass into Energy since 2011

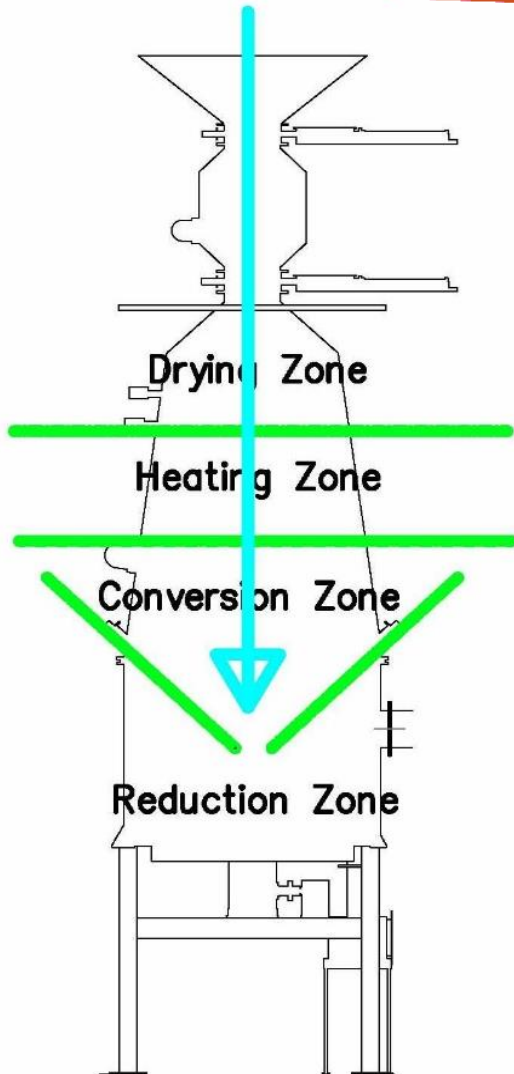


# Who we are

- Phoenix Energy is “private label” power
- We are local<sup>3</sup>
- Building plants since 2011
- Turnkey plants cost around \$6-7/W
- We believe modularity & continuous processing to keep quality up & costs low
- And we are no longer just an energy company...

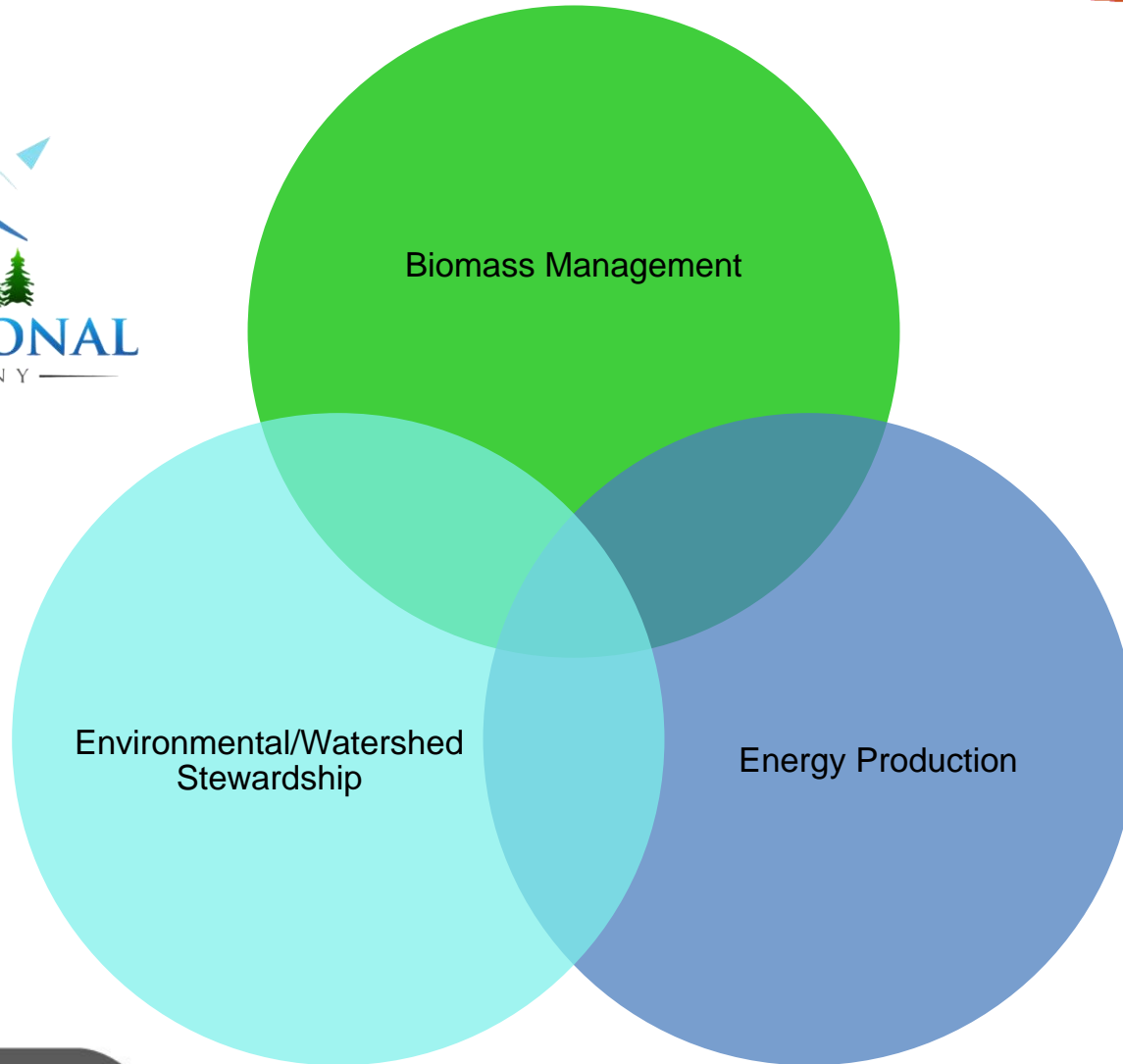


# What (on Earth) is gasification



- Thermochemical conversion
- We bake it – don't burn it
- Without oxygen we given off  $H_2 + CO$  instead of combustion
- Because we don't burn - our by product is solid carbon (biochar) not ash (79¢/lb!)
- We generate about 70-80% of the power you'd get running nat gas

# Biomass Energy Nexus



# The biochar opportunity

- Carbon sequestration without government grants
- Increases water holding capacity of soil
- Hotel for microorganisms
- Soil remediation and carbon filtration
- At current prices, accounts for significant revenue



# Current Market Situation



SF Chronicle, May 2016

# 2017 – What a year

- BioMAT launch! (...again)
- Collapse of big biomass creates massive opportunity
- Governor's emergency declaration
- CA Carbon credits became real
- Community Choice became real
- Sacramento loves you, SF does not!



# Powerful demand drivers

- Perfect policy storm
  - Organics diversion mandates
  - Even aged, old, expensive biomass plants
  - 5¢ solar
  - Disaster declaration
- Really, really high elec prices from really, really cheap NG
- Air Quality regulations tough and getting tougher
- Potential of carbon

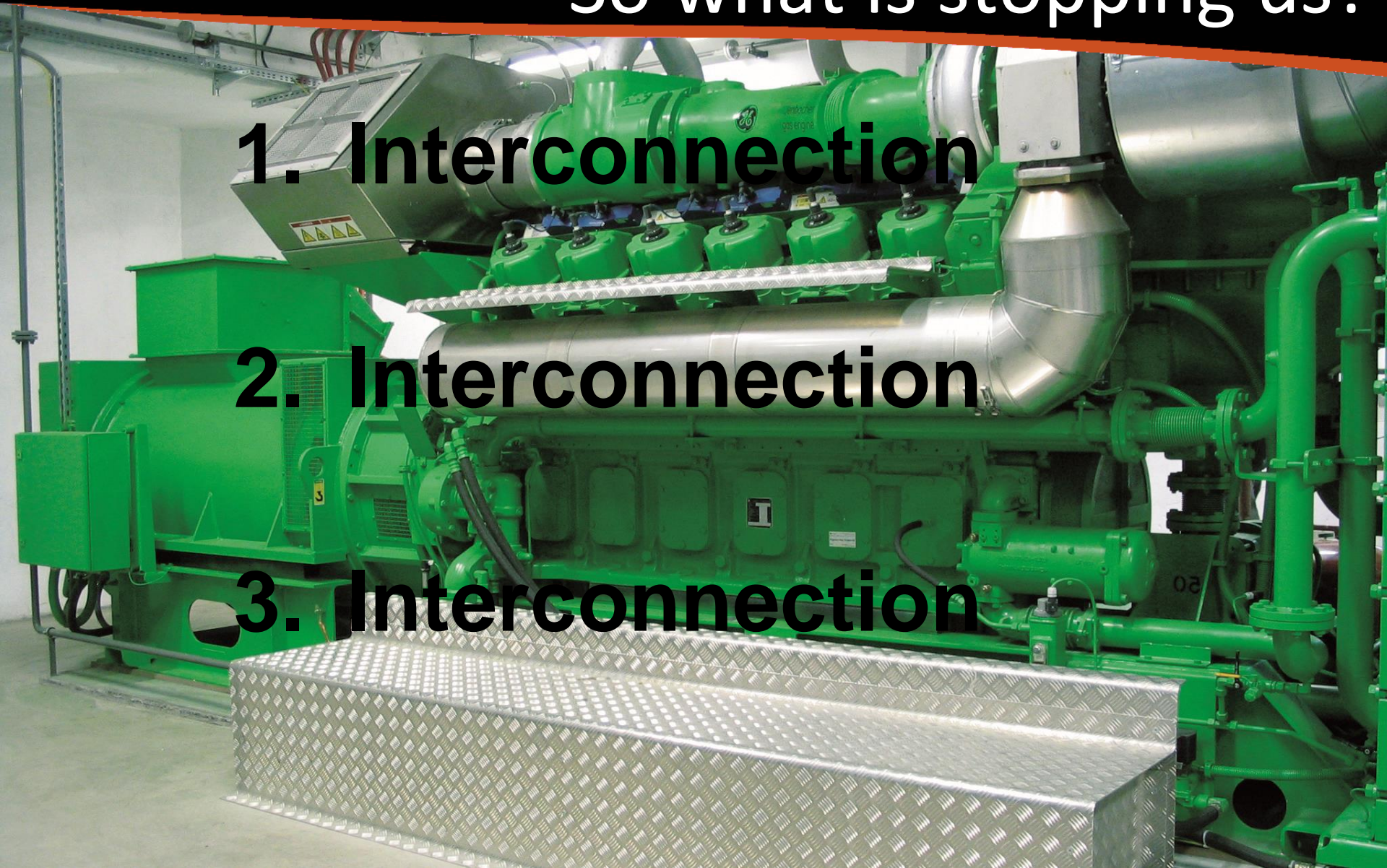


So what is stopping us?

**1. Interconnection**

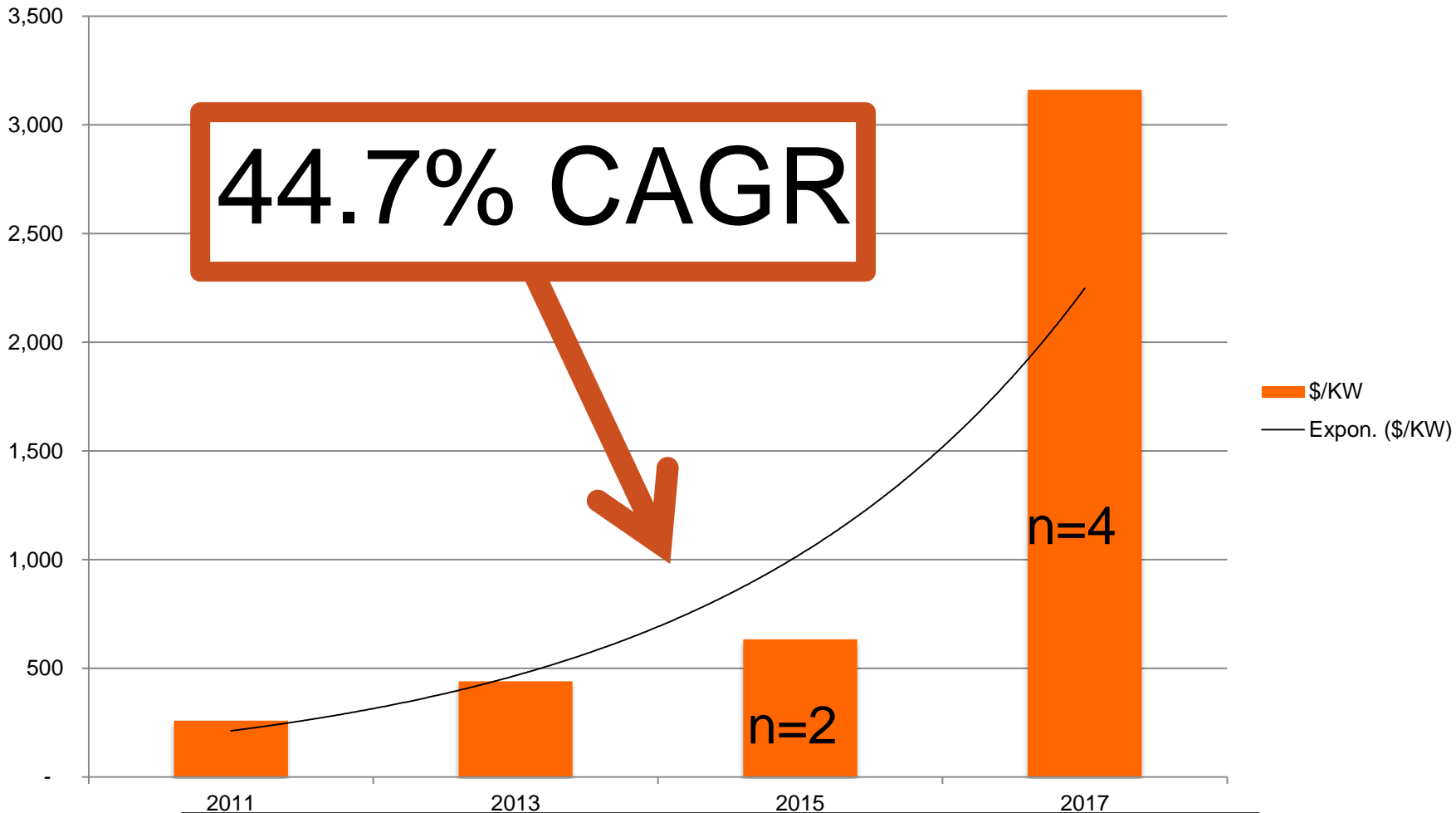
**2. Interconnection**

**3. Interconnection**



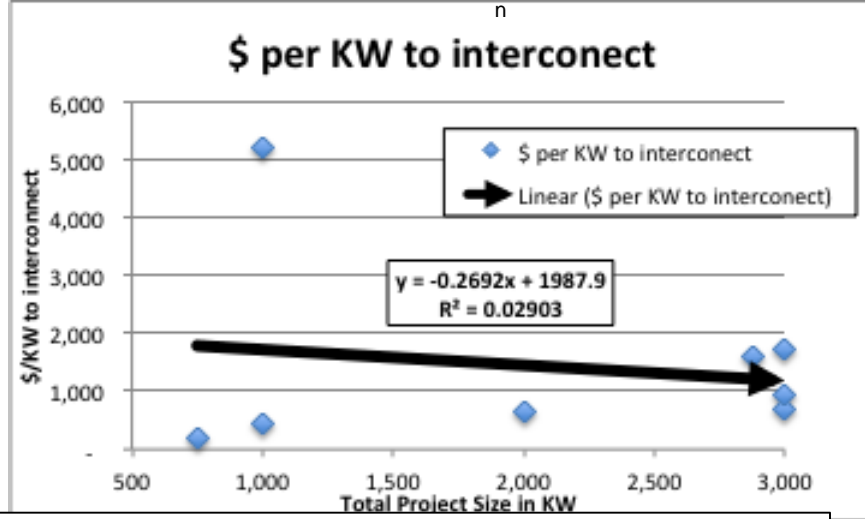
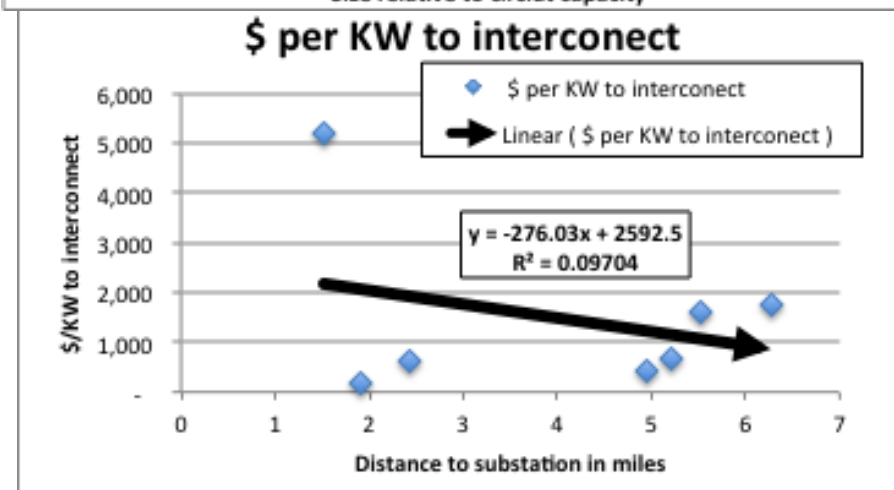
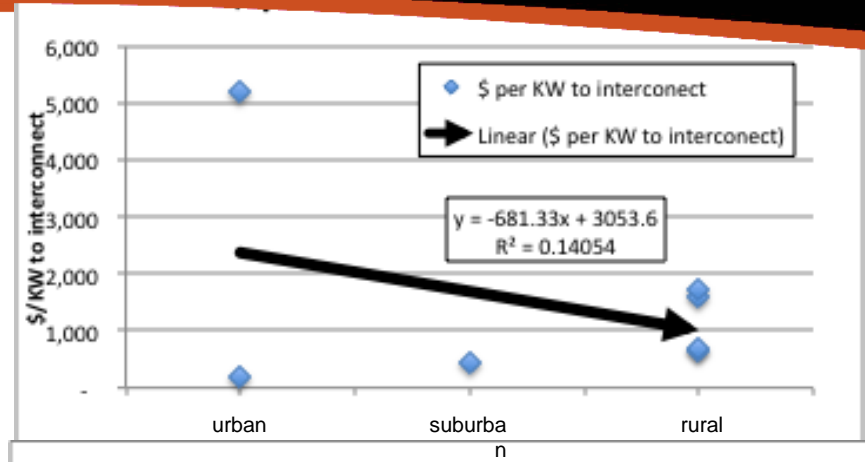
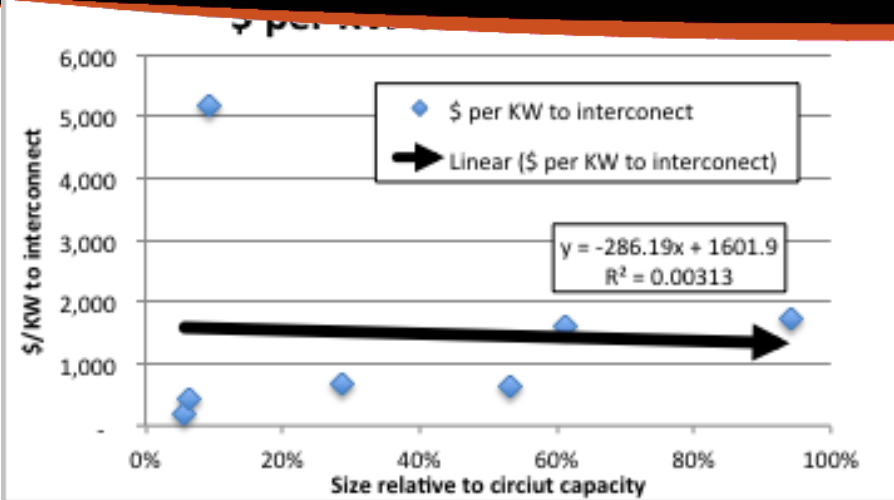
# Interconnection over time

Average cost to interconnect \$/KW



Where did the cost certainty process begin?

# Interconnection



No meaningful connection (m or  $r^2$ ) with project size, substation size, distance to sub, location

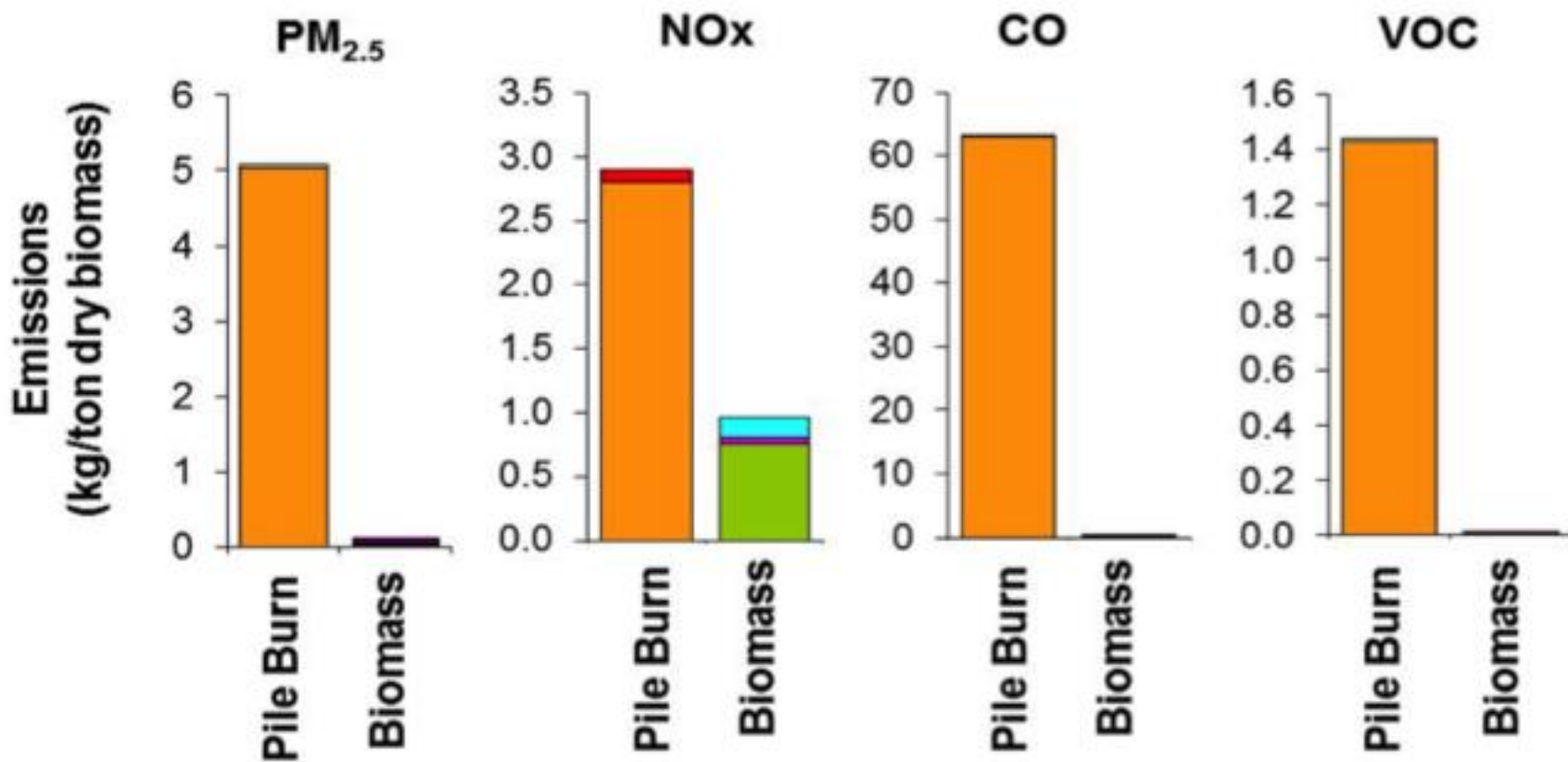
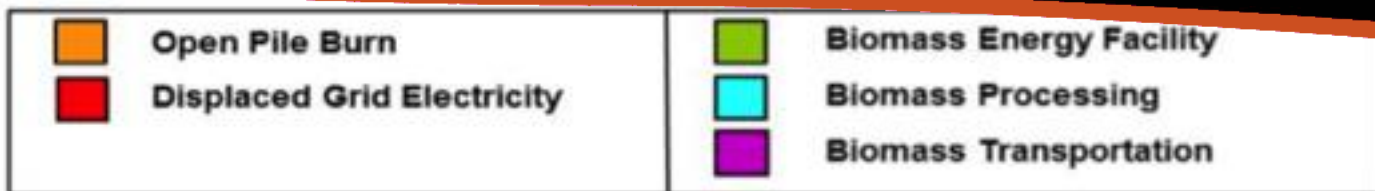
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# Please make your voice heard

- The rise of consumer choice
  - Biomass Energy Nexus
  - Retail v wholesale
  - Biochar
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- A close-up photograph of a person's hands, wearing a dark long-sleeved shirt, holding a large quantity of dark, charred biomass (biochar) in front of a blue container. The biochar consists of many small, irregular, black fragments. The background is slightly blurred, showing the person's blue pants and the ground.

# Black Carbon from Burning



Source: Placer County APCD



PHOENIX ENERGY™

2017 – The year of bioenergy



Photo: North Fork, Dan Rosenberg