

Charting a Course to Energy Independence

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Renewable Wheel of Fortune





Renewable Wheel of Fortune

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Contestants: DOE FEMP Program
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Another quiet year ?





Maybe Not





It's a Scary World Out There

- All energy projects have risks.
- Renewable energy projects have those and more, such as:
 - Resource availability
 - RECs
 - Easement/Leases
 - Utility Interconnect
 - Fuel supply
 - Weather
 - Permitting issues
 - Tax credits
 - O&M costs



Risk Management 101

- Parties must perceive the risk and its likelihood
- Risks need to be allocated before project starts
- Allocation is often determined by control over outcome and or prior ownership of risk
- Ideally, risk (and reward) will be held by party in the best position to manage it

If risk is rightfully yours, it will ultimately be more expensive to avoid it than to accept it.





Renewable Wheel of Fortune

Purpose of this session:

- Acquaint you with risks/reward common to renewable energy projects
- Discuss how risk/reward is usually allocated and managed
- Prepare you to be thinking about risk/reward decisions in your future projects
- See which contestant has fortune smiling on him



Let's Meet the Contestants

FEMP Federal Finance Specialists

- Advise agencies on variety of alternative finance contracting options (ESPC, UESC, PPA, EUL)
- Serve as intermediary between agencies and ESCOs on projects through development stages





Rules of the Game

1. Contestant will be presented with a risk/reward event and must decide whether to accept or not
2. Spin of Wheel will determine outcome and value for letters
3. Solving the phrase wins 250 points
4. **Other rules will be added as needed!!**



Scenario 1 Solar PV

- Agency located in Rhode Island plans to have a 500 kW solar PV project on roof top.
- Selected contractor will build, own, operate and sell power to government from system.
- Contract vehicle is a PPA.
- Project requires sale of RECs and use of federal tax benefits to be economical



Scenario 1 Solar PV

- 1st Risk/Reward Event - cost of PV system
- Over the last year the price of PV panels has dropped by 50%. Will that happen again? Or will it go up by 50% or more?



Will it be higher, lower, or close enough to expected cost?



Scenario 1 Solar PV

- 2nd Risk/Reward Event - REC price.
- Price for RECs is only known for 2 years. After that, best guess it will be worth X \$'s / MWh.



Will the REC price be higher, lower, or close enough to expected price?



Scenario 1 Solar PV

3rd Risk/Reward Event - Construction

- Always an opportunity for fun
- Typically held by contractor
- Strategy - contingency fund



Will it be clear sailing, an unknown encounter or something worse?



Scenario 1 Solar PV

4th Risk/Reward Event - system output. Will it be $>$ or $<$ than expected kWh per year

- Risk on contractor with PPA
- Mitigation – conservative estimate



Will it be higher, lower, or close enough to expected output?



Everything was running smoothly
and then.....





Scenario 2 Biomass

- Agency located in Michigan plans to have a 500 HP biomass boiler to supply steam to central plant.
- Selected contractor will build, supply fuel and operate plant.
- Contract vehicle is an ESPC.
- The project will be eligible for carbon offsets



Scenario 2 Biomass

- 1st Risk/Reward Event - cost of boilers
- 15 months ago prices were soaring. Since the economic downturn, prices have fallen
- Volatile market based on steel and other materials
- What will happen next year ???

Will it be higher, lower, or close enough to expected cost?



Scenario 2 Biomass

2nd Risk/Reward Event - Siting and environmental permitting challenges

- Confused with incineration
- Public notice and hearings often required



Will it take longer, shorter, be close enough or will you encounter something unknown?



Scenario 2 Biomass

3rd Risk/Reward Event - Fuel Supply Agreement

- No index like other commodities
- Localized suppliers – no national players
- Government already has fuel risk and may be in best position as biomass typically tracks fossil fuels.
- Contractor must add contingencies & higher interest premiums

Will it be higher, lower, or close enough to expected cost?



Scenario 2 Biomass

4th Risk/Reward Event - Construction

- Equipment delays
- Fuel handling equipment hiccups
- Lots of moving parts compared to other renewables.



Will it be clear sailing, an unknown encounter or something worse?



Scenario 2 Biomass

- 5th Risk/Reward Event - Operations
- Much more complicated than most renewables
- Typically managed by contractor

Will annual operations be under budget, over budget, close enough or the victim of an unforeseen calamity?



Yes, your car's been washed and is ready to be picked up





Scenario 3 Wind

- Agency located in Texas plans to have a 15 MW wind farm built on their property
- Selected contractor will build, own, operate and provide power to government from system and sell the balance to the local utility.
- Contract vehicle is an EUL.
- Project requires sale of RECs and use of federal tax benefits to be economical



Scenario 3 Wind

1st Risk/Reward Event - cost of wind turbines

- Prices for turbines are very demand oriented.
- Not long ago, production was back-ordered for several years.



Will it be higher, lower, or close enough to expected cost?



Scenario 3 Wind

2nd Risk/Reward Event - Siting and environmental permitting challenges

- Avian and other wildlife impacts may require studies
- Noise and visual impact may spark public concerns

Will it take longer, shorter, be close enough or will you encounter something unknown?



Scenario 3 Wind

- 3rd Risk/Reward Event - Utility Agreement
- A favorable agreement with the local utility must be reached to sell the excess power from the system
- Utility may not be motivated to negotiate fairly or quickly

Will it be higher, lower, or close enough to expected amount?



Scenario 3 Wind

4th Risk/Reward Event - system output.

Project economics expect X kwh per year

- Models are based on length and accuracy of wind study.
- Differences will emerge for seasonal variations.



Will it be higher, lower, or close enough to expected amount?



Damn the torpedos – full speed ahead





Scenario 4 Geothermal

- Agency located in Nevada plans to have a 4 MW low temperature geothermal to power system .
- Selected contractor will do drilling, build the system and operate plant.
- The project is eligible for Federal Tax Credits



Scenario 4 Geothermal

- 1st Risk/Reward Event - Resource quality
- A higher water temperature will produce more power.
- Higher water purity will reduce the operating / maintenance costs.

Will the temperature and purity be higher, lower, or close enough to expected amount?



Scenario 4 Geothermal

- 2nd Risk/Reward Event – Federal Tax Credits
- The project is eligible for Federal Tax Credits, but proposed legislation would change their amount.

Will the new tax credits be higher, lower, or close enough to expected amount?



We've located that part you ordered





Scenario 5 Concentrating Solar

- Agency located in Oklahoma plans to have a 50 MW concentrating solar power (CSP) plant.
- Selected contractor will build, own, operate and provide power to agency and balance to local utility.
- Contract vehicle is an EUL.
- Oklahoma has no REC market for CSP but one is being proposed.



Scenario 5 Concentrating Solar

- 1st Risk/Reward Event - cost of CSP system. New technology could drop cost dramatically but is unproven
- Technology demonstrations are high risk and deserves high rewards.

Will it be higher, lower, or close enough to expected cost?



Scenario 5 Concentrating Solar

- 2nd Risk/Reward Event – Contract renewal
- Under the EUL, every year the agency has the ability to renew or cancel the off-take agreement.
- Assume the agency will cancel and the contractor must find a new buyer for the power.

Will the new off-taker pay higher, lower, or close enough to price paid by agency?



Sorry, I need to sign off, I'm in a bit of a jam at the moment





Scenario 6 Ocean Energy

- Agency located in Hawaii plans to have a 20 MW Ocean Thermal Energy Conversion (OTEC) power system built.
- Selected contractor will develop technology, build plant, operate and bring power to land.
- Contract vehicle is an PPA.
- The project will be eligible for a Federal New Technology Loan Guarantee



Scenario 6 Ocean Energy

- 1st Risk/Reward Event - cost to develop new technology
- Very high risk to develop unproven technology
- Demand high returns – patents rights, etc.

Will it be higher, lower, or close enough to expected cost?



Scenario 6 Ocean Energy

- 2nd Risk/Reward Event - Construction
- One of a kind materials – long lead items
- Sea creature issues



*Will it be smooth waters, an unknown encounter
or something worse?*



Scenario 6 Ocean Energy

- 3rd Risk/Reward Event – Federal Loan Guarantee
- The project is a candidate for the Federal Loan Guarantee program. However, due to delays, approval is not known until year 2 of the project.

Will the benefits of the loan guarantee be higher, lower, or close enough to expected cost?



I checked and your order has
been just dropped off





You Can Run, But You Can't Hide

What we've learned

- Every project has risks that must be addressed
- Past risk allocation has not always been to the best party
- Agencies and contractors need to have open dialog about their risk/reward decisions to avoid surprises
- All the contestants had fortune smiling on them