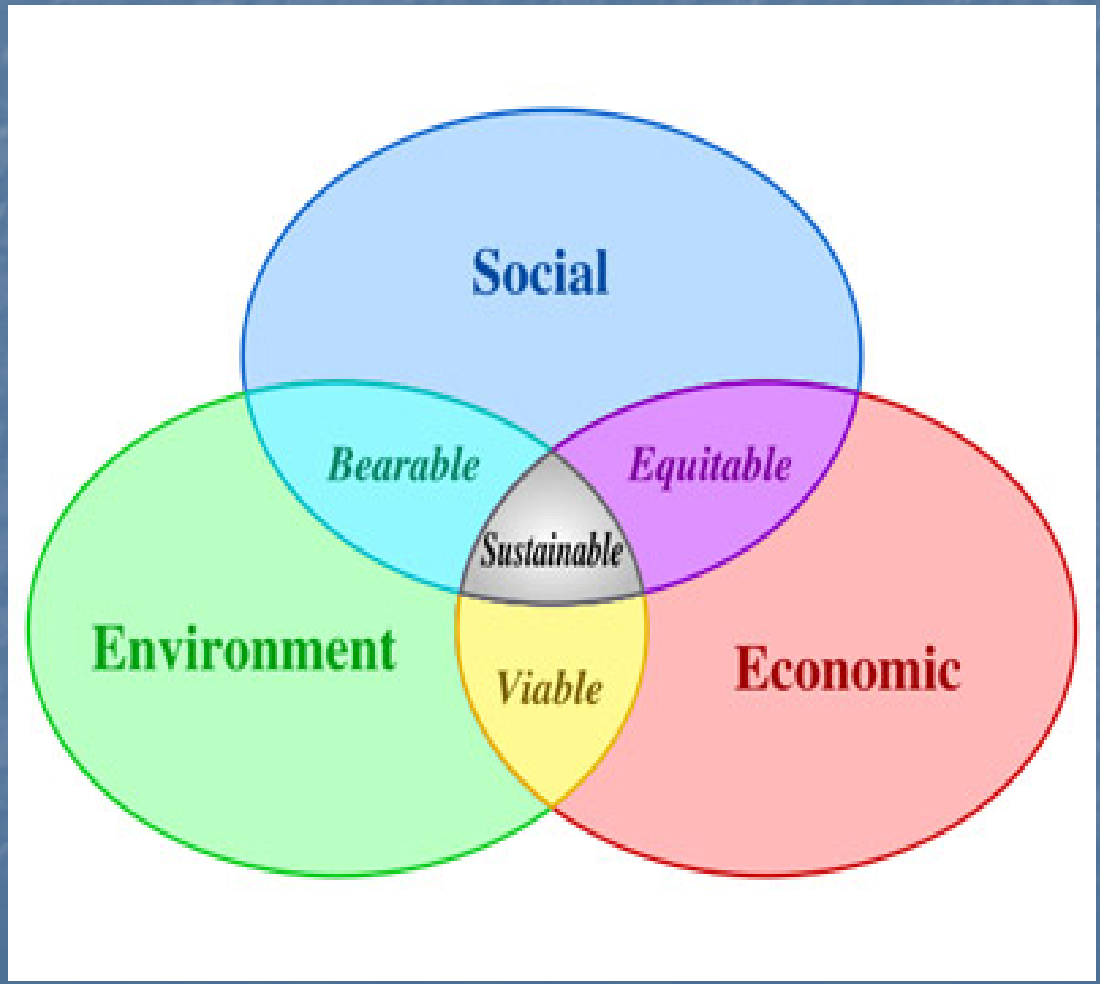
Sol Coast Consulting & Design, LLC ccb#164208
Professional Engineering, Alternative Energy Systems, Water Rights, Sustainable Design

Sol Coast Construction, LLC ccb#175383
Sustainable Construction

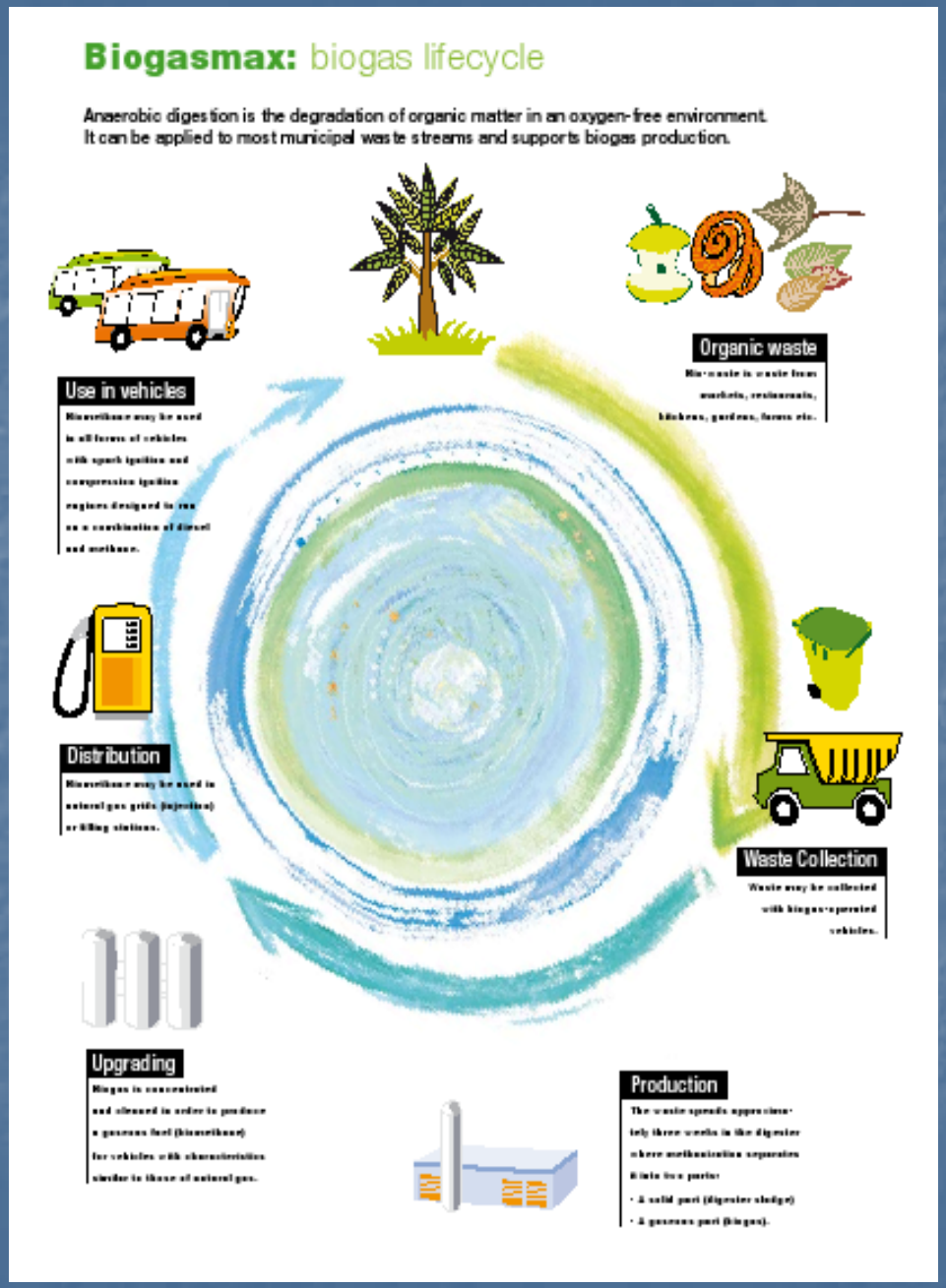
Our mission is to support strategic growth, responsible development and sustainable living.

# What is Sustainable?



# Ecological Balancing Act: Energy, Economics and the Environment

Desire to Displace Coal and Foreign Oil Dependency
Wave Technology vs. Habitat and Fishing Industry
Hydro vs. Fish Passage and Fishing Industry
Wind vs. Visual Impacts. Bats and Migratory Birds
Section 1039 Grants Not subject to NEPA




# BioPower: Crops (weeds) and Bi-products as Fuel

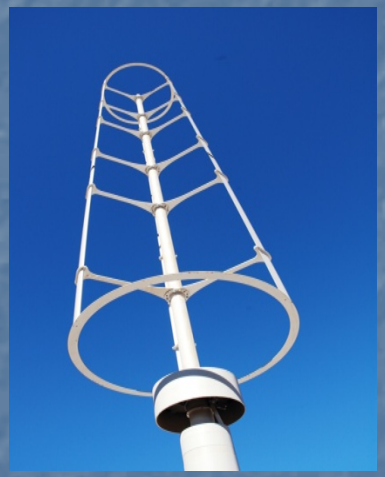
*Hydro Opportunities:*

Well mounted micro-hydro

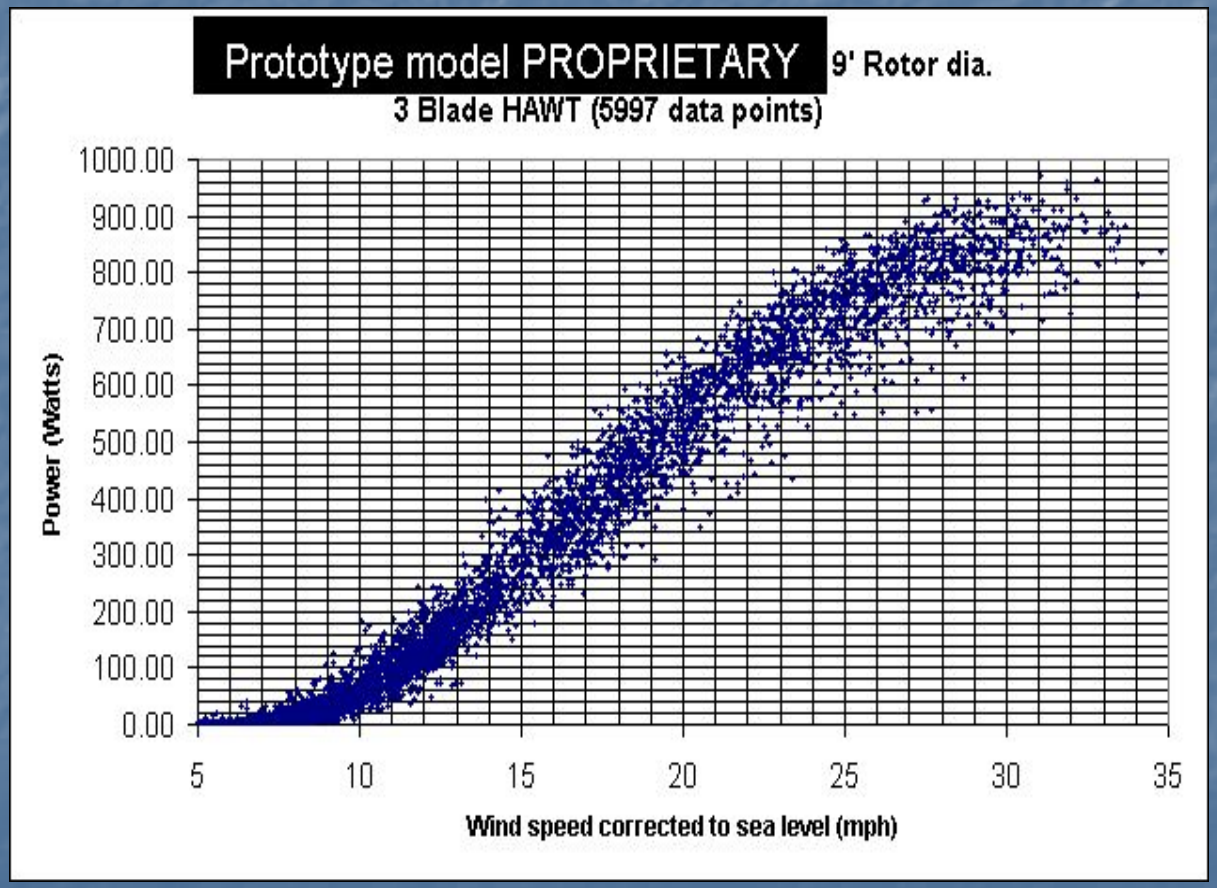
Generating pressure relief valves

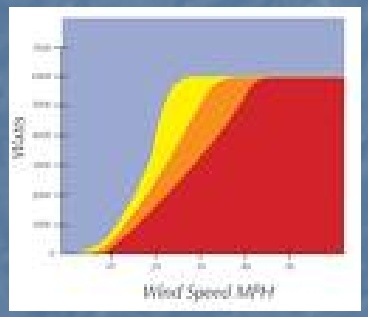
Existing reservoir dams

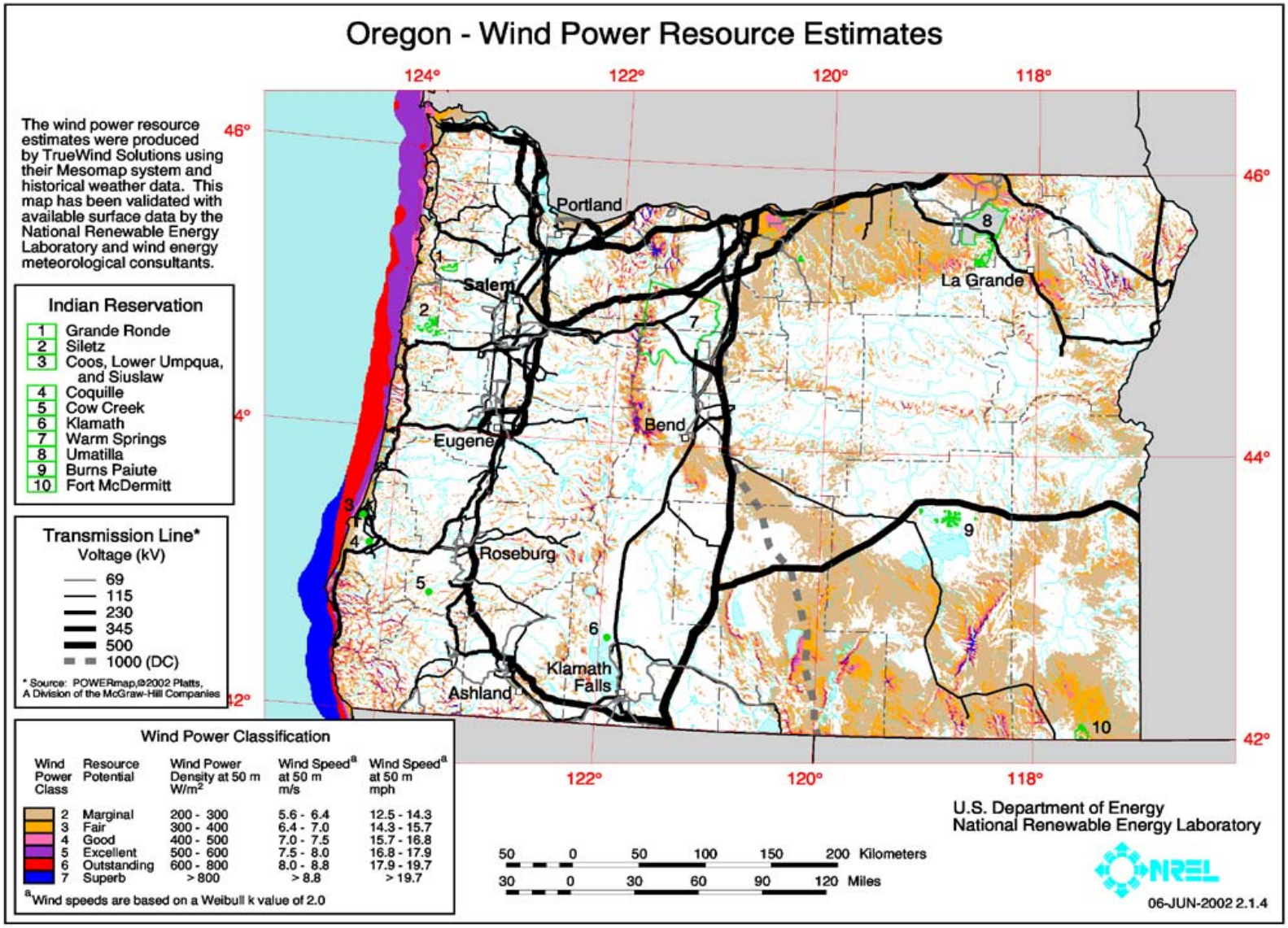
# Wind on the Horizon?



# Uncertainties of Coastal Performance




Oregon - Wind Power Resource Estimates
124°
122°
120°
118°
46°
44°
42°
The wind power resource estimates were produced by TrueWind Solutions using their Mesomap system and historical weather data. This map has been validated with available surface data by the National Renewable Energy Laboratory and wind energy meteorological consultants.
Indian Reservation
1 Grande Ronde
2 Siletz
3 Coos, Lower Umpqua, and Siuslaw
4 Coquille
5 Cow Creek
6 Klamath
7 Warm Springs
8 Umatilla
9 Burns Paiute
10 Fort McDermitt
Transmission Line*
Voltage (kV)
69
115
230
345
500
1000 (DC)
* Source: POWERmap,©2002 Platts, A Division of the McGraw-Hill Companies
Portland
Salem
Eugene
Roseburg
Ashland
Klamath Falls
Bend
La Grande
Wind Power Classification
Wind Power Class | Resource Potential | Wind Power Density at 50 m W/m² | Wind Speed[a] at 50 m m/s | Wind Speed[a] at 50 m mph
2 Marginal 200 - 300 5.6 - 6.4 12.5 - 14.3
3 Fair 300 - 400 6.4 - 7.0 14.3 - 15.7
4 Good 400 - 500 7.0 - 7.5 15.7 - 16.8
5 Excellent 500 - 600 7.5 - 8.0 16.8 - 17.9
6 Outstanding 600 - 800 8.0 - 8.8 17.9 - 19.7
7 Superb > 800 > 8.8 > 19.7
[a]Wind speeds are based on a Weibull k value of 2.0
50 0 50 100 150 200 Kilometers
30 0 30 60 90 120 Miles
U.S. Department of Energy
National Renewable Energy Laboratory
NREL
06-JUN-2002 2.1.4

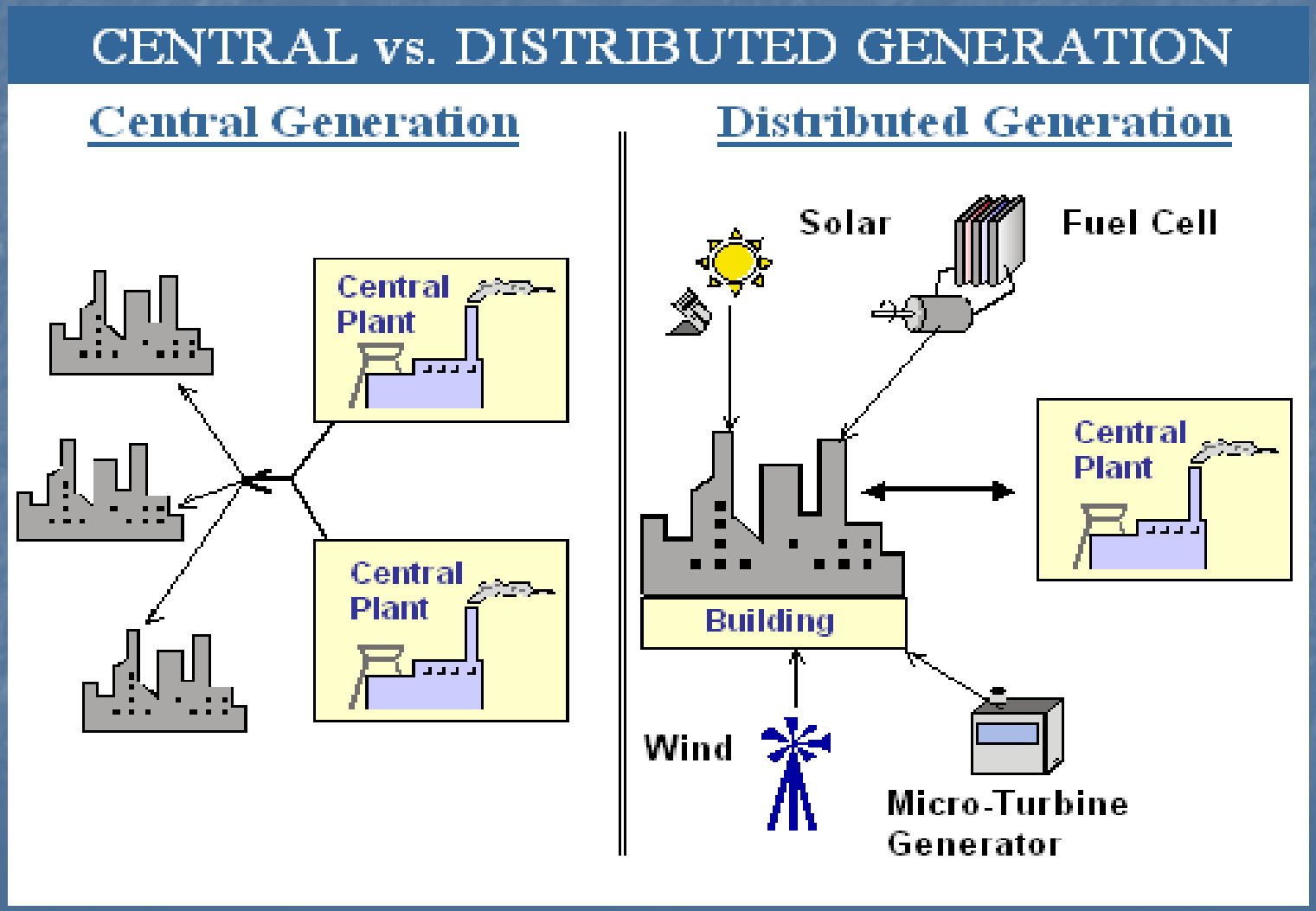
# Solar Electric Viability in our Region:
# 1 acre = 300 kWatts DC

| Eugene | North Bend | Medford |
|---|---|---|
| 342,000 kWh/Yr | 378,000 kWh/Yr | 396,000 kWh/Yr |
| 50-54 homes | 56-60 homes | 59-63 homes |

# *Solar Thermal Efficiency*

50-60% of domestic heating needs during winter months

# Getting from here to there



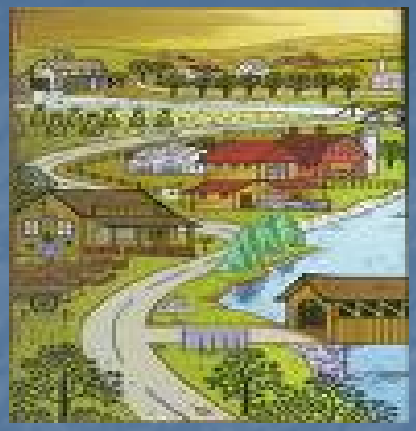
# Electric Utilities:

- Manic Pricing on the Wholesale market
- Increasing customer demands – with or without census growth
- Varied states of grid readiness (line maintenance, substation communications, smart meters)
- Diminishing returns on conservation for long established programs

- OR

- Fledgling conservation programs with limited contractor capacity to deliver
- Renewable Portfolio Standards (RPS)

# Municipalities and Non-Profits



- Limited ability to use tax credits
- Limited staff and budget
- Depressed tax base
- Third Party Ownership (PPA's)
- USDA Grants (15% up to 50k) for small towns
- Increasing pressure from constituents to implement renewable programs
- Higher electricity costs and established Utility incentives
- OR
- Lower electricity costs with no Utility incentives
- House Bill 2620 (1.5% for solar in all new public buildings)

# Private Industry

- Economic and technological uncertainty
- Section 1603, Federal Grant Option (30%)
- USDA REAP Grants for Rural businesses (25%)
- Pass-through of BETC or 50% over 5 years
- Umpqua Lending Program
- USDA Loan Underwriting
- Green Marketability
- Attractive ROI
- Some Utility Incentives

# Residents

- Economic and technological uncertainty
- Section 1603, Federal Grant Option (30%)
- USDA REAP Grants for Rural businesses (25%)
- $6,000 State Tax Credit Potential
- Ecology, National or Personal Independence
- Local wind regulations often prohibitively expensive to address
- Greatly Improved ROI
- Some Utility Incentives
- Umpqua Lending Program

# The reality of leveraging investments

$73.8M in B&RETC in Oregon, 2006 resulted in: 1,240 new jobs

Each $1 of Energy Tax Credits resulted in:

- $1.93 increase to state economy
- $0.25 in wage increases
- $0.14 increase in tax revenues
- $0.65 in energy cost savings

Projection for the next 15 years of average project life:

- $1.26 increase to state economy
- 889 additional new jobs
- $0.13 increase in tax revenues

Economic Impacts of Oregon Tax Credit Programs in 2006
(EconNorthwest, 2007 for Oregon Dept of Energy)

# Residential Market

- Home Value:
  - $4,000 per 2kW
- State Tax Credits:
  - Solar Electric $3/Watt (capped at $6,000 = 2 kW)
  - Solar Hot Water $.60/Watt (capped at $1,500)
  - Wind, Hydro, Biodeisel
- Federal Tax Credits:
  - 30% of costs (solar), no cap
  - 30% of costs (wind), $4,000 cap

# Residential Solar without incentives

2,000 Watt DC Installation
$18,000 Project Cost
($6,000) State Tax Credit
($6,000) Federal Tax Credit
$6,000 Net Cost
Produces 2,520 kWh/yr
Savings of $201.60/yr

## ROI of 22 years

*Assumes 3% annual increases in power costs.*

2,400 kWh/yr Hot Water
$9,000 Project Cost
($1,500) State Tax Credit
($3,000) Federal Tax Credit
$4,500 Net Cost

Savings of $192/yr

## ROI of 18 years

# Residential Utility Incentive Comparison

## Solar Electric

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | $2/W$_{DC}$ | $2/W$_{AC}$ | $2.25/W$_{DC}$ | $500/kW$_{DC}$ |
| Customer ROI | 9 Years | 12 Years | 7 Years | 19 Years |
| Equivalent Utility Avoided Cost | $83/MWh | $67/MWh | $94/MWh | $10/MWh |

* Cash incentive or 0% loan for purchase of system, 5 yr terms

ETO: Energy Trust of Oregon
EWEB: Eugene Water & Electricity Board
City of Ashland: Conservation Department
Consumer's Power: Private Non-Profit

*Source: Database of State Incentives for Renewables and Efficiency*

# Residential Utility Incentive Comparison

## Solar Thermal

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | $.40/kWh$_{AC}$ Annual | *$600/System maximum | *$.40/kWh$_{AC}$ Annual | $500/System |
| Customer ROI | 16 Years | 17 Years | 16 Years | 17 Years |
| Utility Avoided Cost | $20/MWh | $15/MWh | $20/MWh | $13/MWh |

* Cash incentive or 0% loan for purchase of system, 5 yr terms

ETO: Energy Trust of Oregon

EWEB: Eugene Water & Electricity Board

City of Ashland: Conservation Department

Consumer's Power: Private Non-Profit

*Source: Database of State Incentives for Renewables and Efficiency*

# Commercial & Industrial Markets

- Oregon Department of Energy:
  - 50% Tax Credit
  - MACRS (Five Year)
- Internal Revenue Service:
  - 30% Tax Credit
  - MACRS (Five Year)
- USDA REAP Grants
  - 25% of Project Grant

# Commercial Solar without Incentive

10,000 Watt DC Installation
$82,500 Project Cost
($41,250) State Tax Credit
($24,750) Federal Tax Credit
($32,175) Accelerated Depreciation
$42,730 Net Cost Yr 1
Produces 12,600 kWh/yr
Savings of $829/yr

ROI of 5 years

12,600 kWh/yr Hot Water
$54,000 Project Cost
($27,000) State Tax Credit
($16,200) Federal Tax Credit
($21,060) Accelerated Depreciation
$27,837 Net Cost Yr 1

Savings of $829/yr

ROI of 5 years

*Note: Assumes 3% annual increases in power costs.*

# Commercial Utility Incentive Comparison

## Solar Electric

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | $1.50/$W_{DC}$ | $1/$W_{AC}$ | $1.00/$W_{DC}$ | na |
| Customer ROI | 2.2 Years | 3.1 Years | 2.8 Years | 5 Years |
| Equivalent Utility Avoided Cost | $75/MWh | $40/MWh | $50/MWh | $0/MWh |

Incentive Consideration: $1/Wdc

Goal: Minimize up-front costs during credit crisis, attract businesses & PPA's

ETO: Energy Trust of Oregon

EWEB: Eugene Water & Electricity Board

City of Ashland: Conservation Department

Consumer's Power: Private Non-Profit

*Source: Database of State Incentives for Renewables and Efficiency*

# Commercial Utility Incentive Comparison

## Solar Thermal

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | 35% Project Cost | NA | NA | NA |
| Customer ROI | 2.25 Years | 5 Years | 5 Years | 5 Years |
| Equivalent Utility Avoided Cost | $75/MWh | $0/MWh | $0/MWh | $0/MWh |

Incentive Consideration: $.40/kWh annual rating (same as residential)

Goal: Minimize up-front costs during credit crisis, attract businesses & PPA's

ETO: Energy Trust of Oregon

EWEB: Eugene Water & Electricity Board

City of Ashland: Conservation Department

Consumer's Power: Private Non-Profit

*Source: Database of State Incentives for Renewables and Efficiency*

# Non-Profit Solar without Incentives

10,000 Watt DC Installation
$82,500 Project Cost
($27,638) State Tax Credit
($0) Federal Tax Credit
$54,862 Net Cost
Produces 12,600 kWh/yr
Savings of $829/yr

ROI of 37 years

12,600 kWh/yr Hot Water
$54,000 Project Cost
($18,090) State Tax Credit
($0) Federal Tax Credit
$35,910 Net Cost

Savings of $829/yr

ROI of 28 years

*Note: Assumes 3% annual increase to power costs.*

# Non-Profit Utility Incentive Comparison

## Solar Electric

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | $1.75/W$_{DC}$ | $1/W$_{AC}$ | $1.00/W$_{DC}$ | na |
| Customer ROI | 29 Years | 34 Years | 33 Years | 37 Years |
| Equivalent Utility Avoided Cost | $88/MWh | $40/MWh | $50/MWh | $0/MWh |

Incentive Consideration: $1.20/Wdc, avoided cost of $60/MWh

Goal: Matching Grant fund leveraging.

*Source: Database of State Incentives for Renewables and Efficiency*

# Non-Profit Utility Incentive Comparison

## Solar Thermal

| | ETO: PPL | EWEB | City of Ashland | Consumer's Power |
|---|---|---|---|---|
| Incentive | 35% Project Cost | NA | NA | NA |
| Customer ROI | 21 Years | 28 Years | 28 Years | 28 Years |
| Equivalent Utility Avoided Cost | $75/MWh | $0/MWh | $0/MWh | $0/MWh |

Incentive Consideration: $1,20/kWh annual, avoided cost $60/MWh, ROI 19 yr

Goal: Matching Grant fund leveraging.

*Source: Database of State Incentives for Renewables and Efficiency*

# Bottom Line Opportunities

## USDA REAP Grants

- 25% private, 15% public renewable facilities
- 100% ($30k) for development of municipal Renewable Energy Development Audits

## Utility Incentives

- Target projects with utility based incentive funds to leverage investment

# American Recovery & Reinvestment Act

## Develop "Roof Ready" Community Demonstration Projects

- Immediate Job Creation
- Use of Oregon Companies
- Promote Renewable Energy, Carbon Reduction and Sustainable Development
- Potential to Incorporate *Green* Job Training Opportunities
- Use of Innovative Green Technologies
- Showcase Oregon's Commitment to Sustainability to Attract More Federal Dollars

The OREGON Way

# Hurdles to Overcome

- Availability of Renewable Energy Tech's in rural areas
- Misconceptions about Renewable Technology Viability
- Development of local green collar workforce
- Up-front investment costs – prohibit projects for those who need it most
- Development of Programs in smaller Utilities

# Collaborative Example

Oregon Coast Community Action, Sol Coast Companies, Energy Trust of Oregon , Low Income Solar Access, Oregon Dept. of Energy (invited collaboration with CLPUD, & Schuco Solar) :

Expand existing low income (200% of poverty level) weatherization program to include:

- Domestic solar hot water installations
- Expand renewable energy technician training to the coast
- Net zero multi-housing rental unit demonstration project

# Local investment in renewable, distributed power.

Wise management of today's assets for sustained livelihood of the generations to come.

*More power to yOu!*