



Bioenergy Options

May 12, 2010
University of Washington
Go Dawgs!
Cal Mukumoto, CEO/ Board Chair
CEDCO
North Bend, Oregon



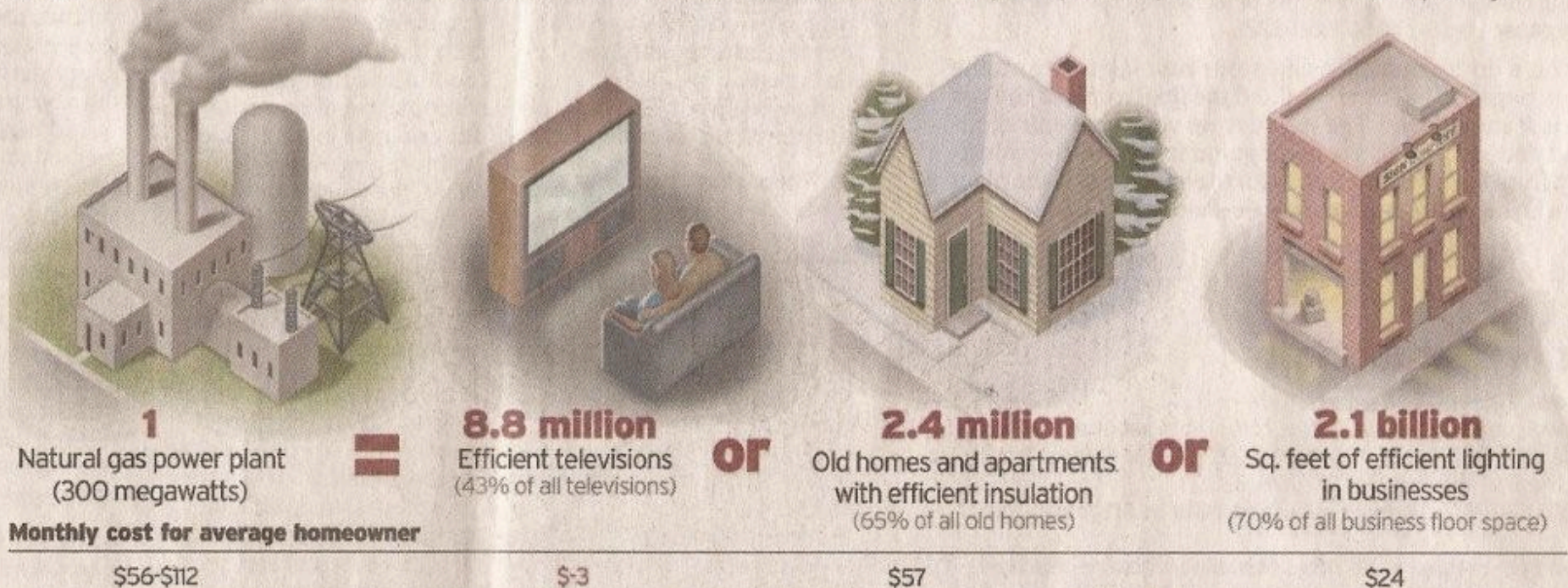
Efficiency & Conservation First!

- **Energy efficiency is cheapest source of energy!**
The Oregonian, September 13, 2009
- **Energy conservation could meet almost all of the Northwest's new power needs for the next two decades at a cost lower than building new power plants.**
NW Power and Conservation Council
- **Energy Incentives**
 - **Database of State Incentives for Renewable Energy**
 - <http://www.dsireusa.org/incentives/>



Northwest energy efficiency savings

The Northwest Power and Conservation Council says aggressive electricity conservation could meet almost all the Northwest's new power needs in the next two decades – at a lower cost than building new power plants. Below is the annual power output of a power plant compared with annual efficiency savings.



Note: Costs are spread over 20 years and based on average household use of about 900 kwh a month. For conservation programs, costs are offset by certain benefits, such as reducing the size of needed transmission lines, that bring the net costs of efficient televisions and other low-cost conservation measures below zero.

Source: Northwest Power and Conservation Council

STEVE COWDEN, SCOTT LEARN/THE OREGONIAN



Bioenergy Outline

- Why Bioenergy?
- Bioenergy options
- Renewable Energy
- Climate
- Strategic Planning
- Evaluation of Options
- Energy Project Phases
- Project Finance
- Project Development
- Project Risks
- Summary



We tend to use the term 'bioenergy' for biomass energy systems that produce heat and/or electricity and 'biofuels' for liquid and gas fuels

- Biomass — all plant and plant-derived materials including animal manure, not just starch, sugar, oil crops already used for food and energy — has great potential to provide renewable energy for America's future.
- Biomass is already making key energy contributions in the United States in 2003.
- It has surpassed hydropower as the largest domestic source of renewable energy.
- Biomass currently supplies over 3 percent of the total energy consumption in the United States.



Why Bioenergy?

- Take a waste product and make it valuable – Steam and Power (renewable and green)
- Reduce your carbon load
- Reduce forest fire hazards, forest restoration
- First foods restoration
- River restoration
- Provide jobs for local community
- Avoid cost
- Reduce emissions
- Energy independence



Growing Problem

GAO has identified 190 million acres of forest land in the west at risk to lost by fire



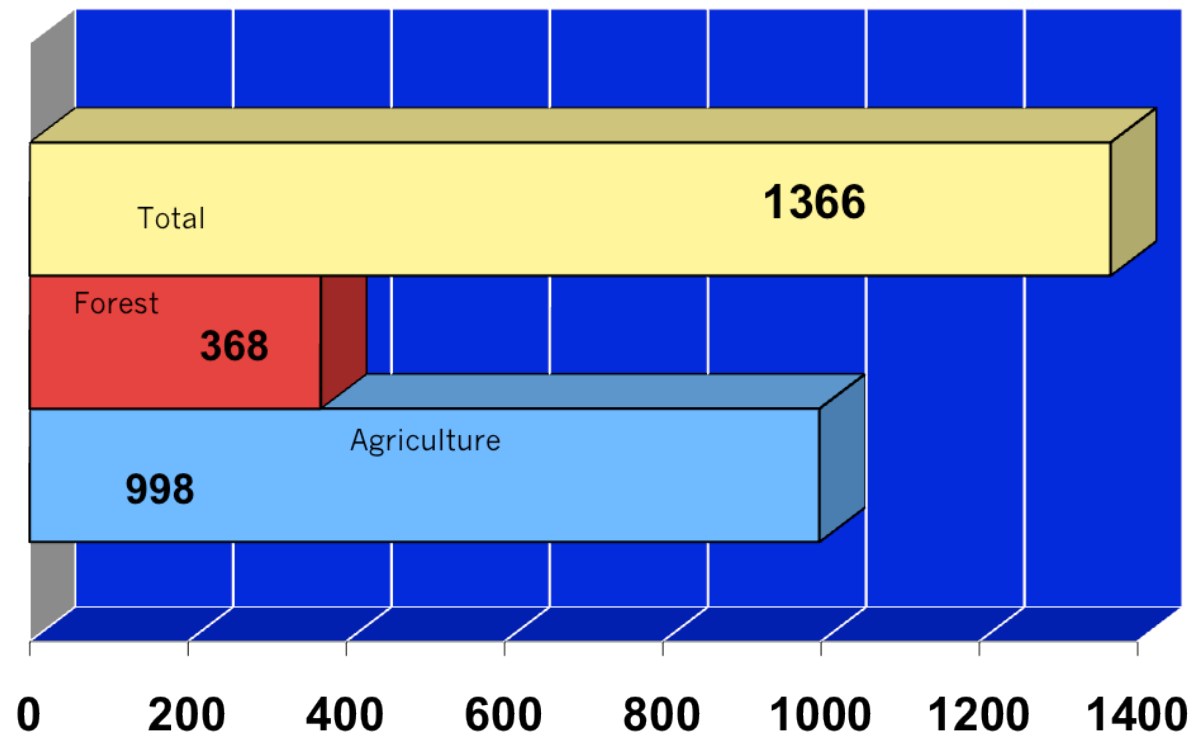


Reservation Forests

- According to the Bureau of Indian Affairs, 9.6 million acres of Reservation forests are at classified category 3.
- Slightly over half of all Reservation forests

Potential Annual Biomass
Resources of 1.3 Billion dry tons
per year!

The 2005 Billion Ton Report



Source: BIOMASS AS FEEDSTOCK FOR
A BIOENERGY AND BIOPRODUCTS INDUSTRY:
THE TECHNICAL FEASIBILITY OF A BILLION-TON
ANNUAL SUPPLY April 2005



So we have a choice to make. We can remain one of the world's leading importers of foreign oil, or we can make the investments that would allow us to become the world's leading exporter of renewable energy

-President Obama, March 19, 2009



Tribal Bioenergy examples

- **Tulalip Tribes' biomethane plant benefits salmon restoration**
 - Removing nutrients and bacteria from river by eliminating cow manure
 - Enough energy for 300 homes

- **Warm Springs 20 Mw Co generation**
 - Forest health project
 - Renewable green energy
 - Enough energy for 15,000 homes

- **Sealaska Wood Pellet Boiler system**
 - Cost avoidance of over \$1,000,000 per year
 - Improved air quality
 - Downtown expansion opportunities



Renewable Portfolio Standards for Electricity

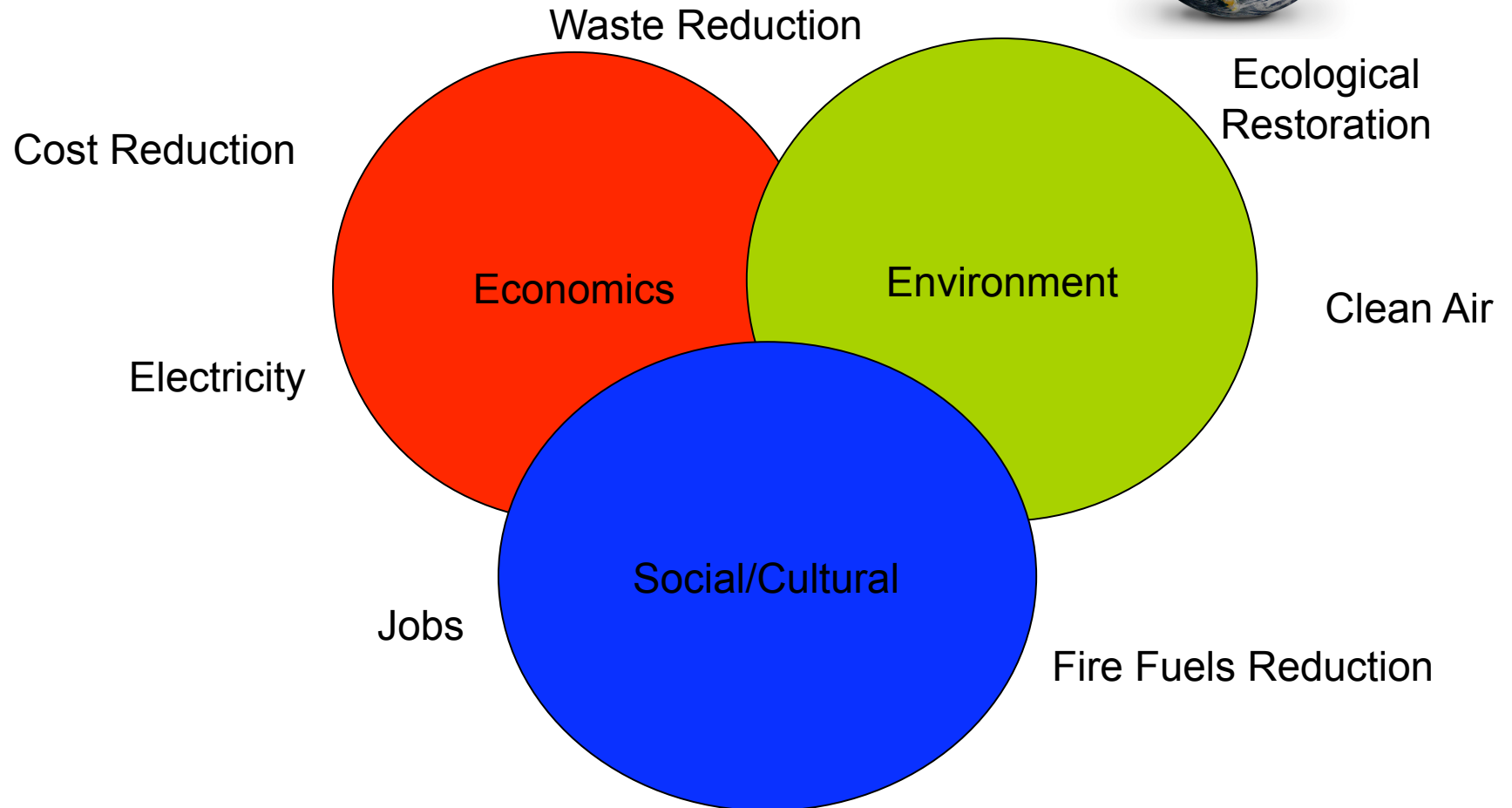
- Oregon: 25% by 2025
- Washington : 15% by 2020
- California: 33% by 2030
- Montana: 15% by 2015
- 24 states plus the District of Columbia



Strategic Planning

- Vision – Where you want to be
- Resources
- Team
- Future energy needs
- Options

Sustainable Trifecta





Project Phases

- Predevelopment - Evaluation of Options
- Development
- Construction
- Operations



Evaluation of Options

- Feasibility Analysis
 - Reduction of environmental, financial, technical and commercial risks
 - Fuel Analysis
 - Fatal Flaws

- Business plan for project
 - Resource/Site Assessment
 - Technology Assessment
 - Environmental
 - Project agreements
 - Land, Fuel, Grid, for example
 - Economic
 - Financing
 - Management (Construction, O&M)
 - Project Team



Project Phases

- Project Development : The period of time which the project is conceived,
- contracts are negotiated and signed;
- and the equity and project finance debt is put in place and ready to draw.
- The end of Development is known as “Financial Close”



Project Development

- Due Diligence Feasibility Analysis
- Set up a well coordinated development team that can cover:
 - Engineering and Construction
 - Operation
 - Legal covering
 - Site acquisition, Permits, tax issues, power sale contracts,
 - Other Project contracts, financial documents, etc.
 - Environmental
 - Accounting and tax
 - Financial modeling
 - Financial structuring
 - Motivations – tax, strategic, self, forest health



Project Phases

- Construction: The period in which
 - The project finance is drawn down and the project is built
 - The end of this process is known as “Commercial Operations Date” or COD
- Operations: The period of time which the project produces
 - Cash-flow
 - Pays debt and interest and
 - Provides equity return



Commercial Risk Analysis

- Commercial Viability
- Completion Risks
- Environmental Risk/ Permitting
- Operating Risk
- Revenue Risk
- Force Majeure Risks





Risk Process Questions

- Identify the risk
- Can risk be cover in Project Contracts?
- Are there other mitigations for risk such as insurance or guarantees?
- What effect does the remaining risk have on project and lenders?
 - Recourse on Tribe?



Political Risk

- Affect on project
 - Fuel
 - Permits
 - Effect on others
- Community meetings
- Collaborative groups





Project Contracts/Agreements to Develop

- Power sales contract
 - Also Green tags , Steam Sales, Carbon Credits
- EPC
- Operations and maintenance
- Grid Interconnection Agreement
- Fuel Supply if needed
- Permits and other rights (i.e., shared facilities, rights of way)
- Insurance
- Tax exemptions



Project Finance

- Investors and lenders must know with a high degree of confidence:
 - Bioenergy project can be completed on time and on budget
 - Is technically capable of operating as designed
 - There is enough net cash flow from project's operation to cover debt and provide return to project owners
 - Project economics are robust enough to cover any temporary problem



Investors/Lenders Want Project Sponsors with:

- Experience in Industry (power production, operating boilers, etc.)
- A reasonable amount of equity in project
- A reasonable return on equity
- A long term interest in the project
- The financial ability (although not an obligation) to support project if it runs into difficulty.

In Backing Clean Energy Start-Ups, Fund Looks for Longer Résumés
By CLAIRE CAIN MILLER
Published: May 9, 2010 New York Times



Financial Modeling

- The Financial Model is an important tool
 - Initial evaluation and revaluation of project aspects and returns
 - Formulating financial provisions in contracts
 - Stress test
 - Structuring finance
 - Lenders due diligence
 - Quantifying critical issues in finance negotiations
 - Provides base case and sensitivity analysis



Summary Project Steps

1. Conduct preliminary feasibility study (Fatal Flaw Analysis)
2. Confirm community support
3. Assess fuel resource availability
4. Consider siting and infrastructure issues, including environmental permit review
5. Complete due diligence Feasibility Study
6. Secure developer and/or investment banker



Summary Project Steps Continued

7. Complete power purchase/thermal delivery agreement

8. Enlist equity partners

9. Secure financing

10. Select EPC firm

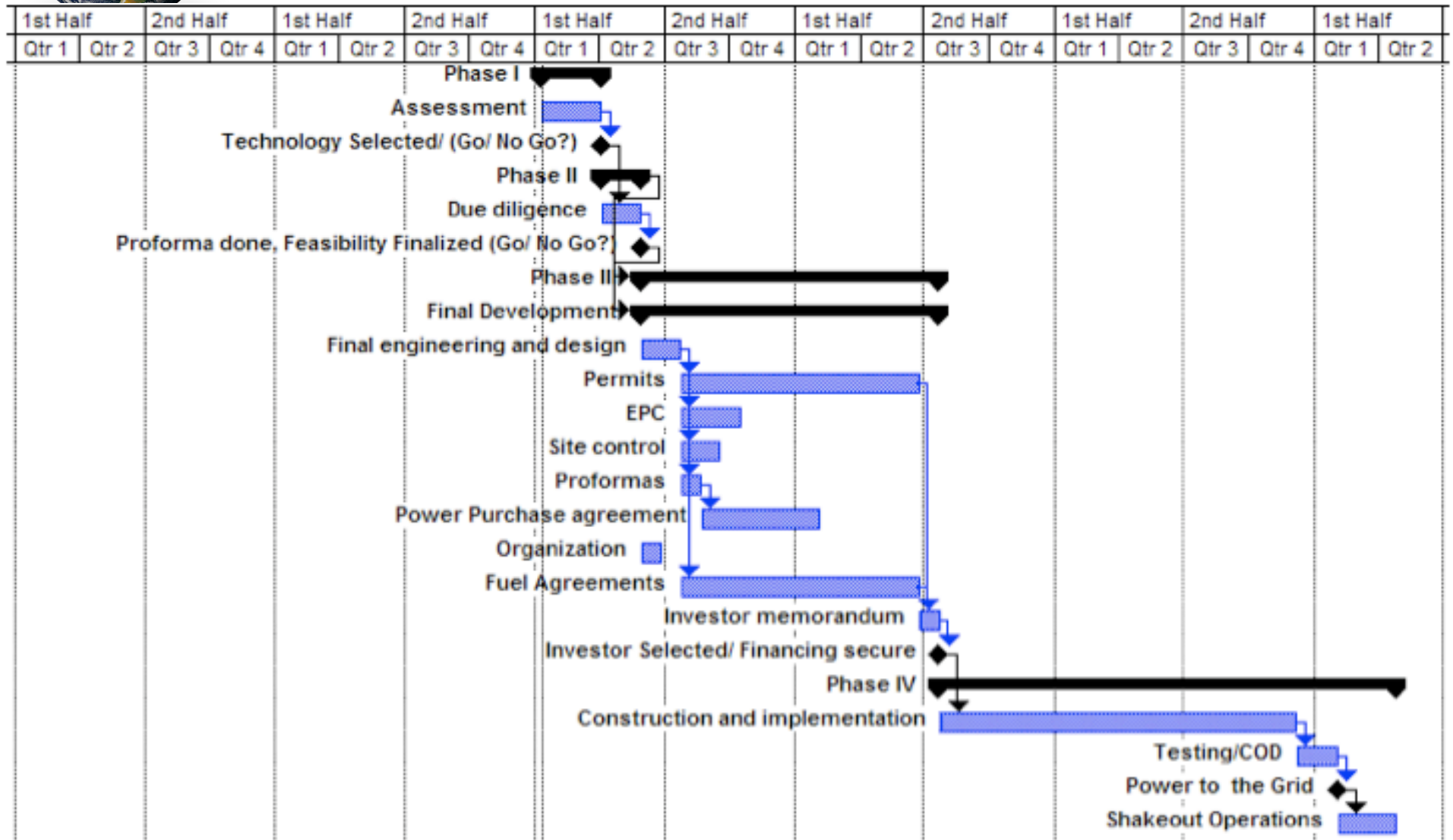
End of Development

11. Engineer/construct project

12. Generate renewable energy

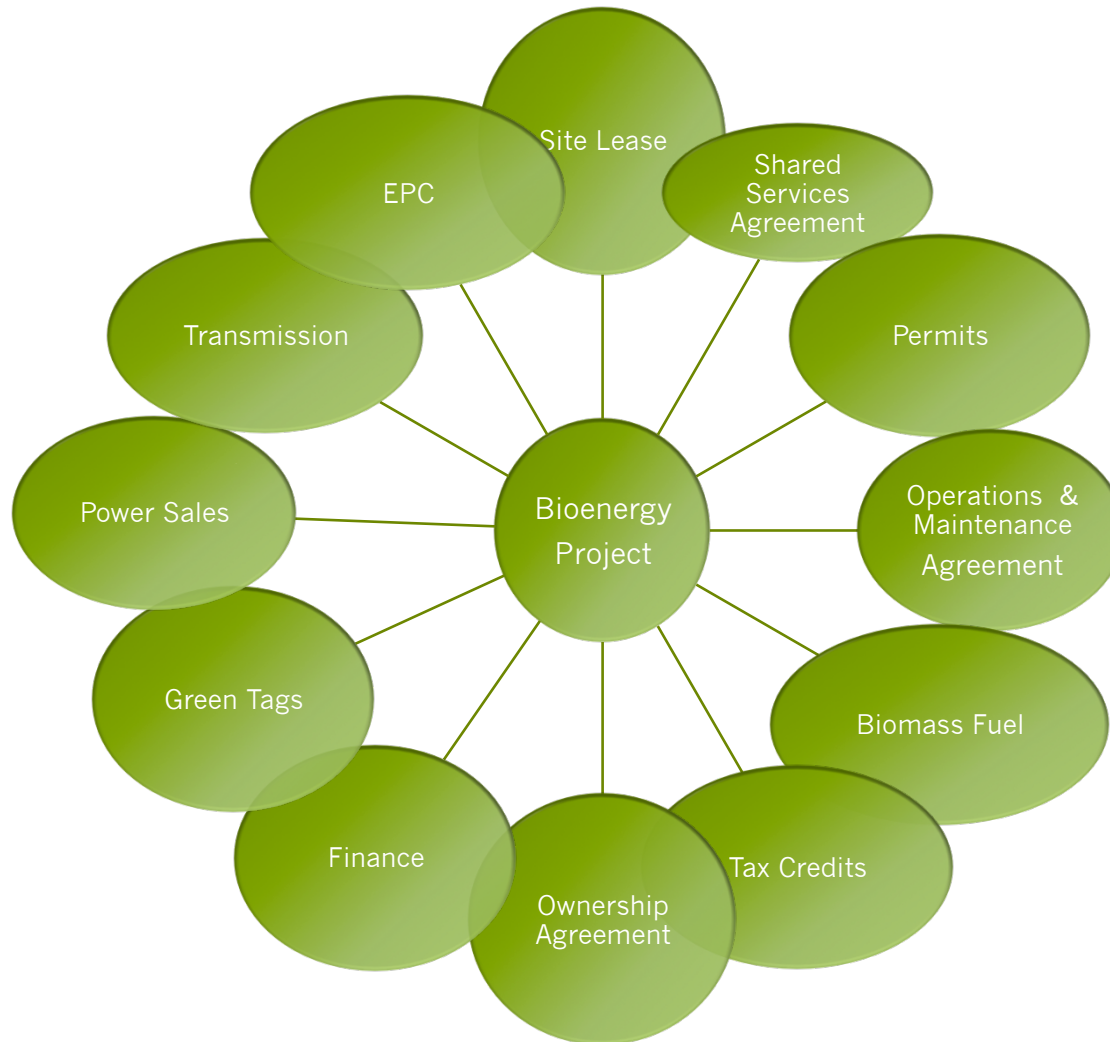


Biomass Project Plan





Biomass Project Task Map





Challenges Faced by Tribes

- Local development issues
 - Review by BIA
 - Permits
 - Rights of Way
 - Access to the Grid
- Capitalization
 - Development Funding



Examples of Government Incentives for Renewable Energy

- Oregon offers a business energy tax credit
 - Was a great incentive, now viewed as a “windfall” if you get it.
 - Under attack
- Check DSIRE database on web for incentives in your State
- Section 45 Production Tax Credit
 - Significant incentive
 - Stop and Go
 - Tribes are unable to monetize tax credit
- Investment Tax Credit
- New Market Tax Credit
- BCAP



Bioenergy Summary

- Efficiency & Conservation First!
- Strategic planning
- Quantify the risks inherent with the project
- Financial models are important tools in the process
- Incentives are available