Economic Viability and Environmental Security for Rural Areas From Increasing Renewable Energy Use Based on Forest Resources and Hydrogen Fuel Cells

Pursuing the traditional modes of income generation from forests in rural communities is not working because rural economies are being held hostage by the continuing conflicts and human values held by those wanting the polar ends of either conservation or development. Traditional resource use practices continue to be mired in legal conflicts between conservationists and resource extractors, are impacted by increasing environmental regulations, and are facing increasing transportation costs and competition from global markets. Despite conservation organizations recognizing the need to include the development of economic opportunities in resource extractive communities to achieve their conservation goals in the early 1990s, the number of jobs has generally decreased in rural areas as more land has been preserved and taken out of production or management. Rural communities are characterized by: lower average incomes compared to urban areas, emigration of skilled labour to urban areas for jobs, primary economic opportunities linked to higher paying resource extraction jobs or providing environmental services at lower salary scales, fewer new economic options developing compared to urban areas, and natural disturbances (e.g. fires) more likely to significantly reduce the economic viability and environmental security of communities. Without sufficient economic return, viable rural economies will continue to be difficult to achieve as forests become targets for conversion to other uses (i.e. urban development) or landowners find that neither the markets nor the infrastructure exist to gain economic return from forest ownership.

To revitalize rural economies will require the development of new economic opportunities that are not linked to traditional forest resource harvesting practices. New economic options in rural areas can be produced from the collection of forest biomass materials of current low economic value (small diameter thinned materials) and converting these materials to higher quality products (i.e. transformed for use in decentralized energy production systems to generate electricity using fuel cells). Thinning can be a profitable forest management option and provide more frequent income streams from the forest if markets exist for these harvested materials – linking forest biomass to technology platforms in the energy sector are producing new markets. Thinning as a management strategy has the potential to provide higher and more frequent economic return, reduce the costs of fighting fires, while allowing conservation values to be achieved from forests. The most important change would be a reduction in the conflicts between conservationists and developers which should result in more robust and sustainable economic environment in rural areas.

The rural areas are ideally suited to contribute to the development of new economic opportunities based on small diameter materials because of: 1) the significant amount of material that is available here with high fire hazard when not managed and 2) it is difficult and expensive to provide electricity in rural areas because of their greater distances from centralized energy production systems. The high transportation costs in rural areas requires the development of mobile, decentralized biomass transformation systems that are ideal for rural environments. A system for transforming forest biomass on a small scale has not been commercialised to date, but technology for transforming biomass does exist.

New economic return and more product options for markets in rural areas

In addition to the direct economic benefits (providing electricity, economic value for low-valued biomass, job creation, reduced costs for buying energy and decreased need to buy fossil fuels), indirect benefits are possible. Besides serving as a source of hydrogen for fuel cells, methanol can also be used as a raw material in the production of other products (plastics, paints, construction materials, de-icing fluids). The transformation process also qualifies as market tradable C credits from reducing GHG emissions, as green credits for generating electricity using renewable resources, and other government ‘tax

incentives'/'subsidies'. It has been suggested that co-products from transforming biomass will make bioenergy economically viable even in the absence of carbon credits/subsidies.

New permanent jobs created

Linking biomass collection and transformation to produce the starting material for fuel cells can create new, high skilled jobs for people specializing in engineering systems, computers, economics, and international trade while also providing opportunities for forest managers, forest biologists and forest engineers. Generating bioenergy from renewable resources has an employment rate much higher than from other renewable resources and has a lower investment cost for job creation; it also creates a hundred times more jobs than what results from adopting wind or solar energy production systems. Domac (2002) predicted bioenergy would result in 100 times more jobs than what would result from solar thermal heating, and 1000 more jobs than with adopting photovoltaics. The Quincy Library Group (1997) reported that a modest sized production plant that produced ethanol (plant capacity 15 million gal/yr) would create approximately 28 new jobs directly, with an additional 53-100 employees needed to collect and transport material to the plant. A softwood ethanol plant in Ketchikan, Alaska (capacity of 6 million gal/year) was estimated to provide 40 permanent year round jobs.

References

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QLG (Quincy Library Group). 1997. Northeastern California Ethanol Manufacturing Feasibility Study. Executive Summary. November 1997. pp. 49. www.qlg.org/pub/

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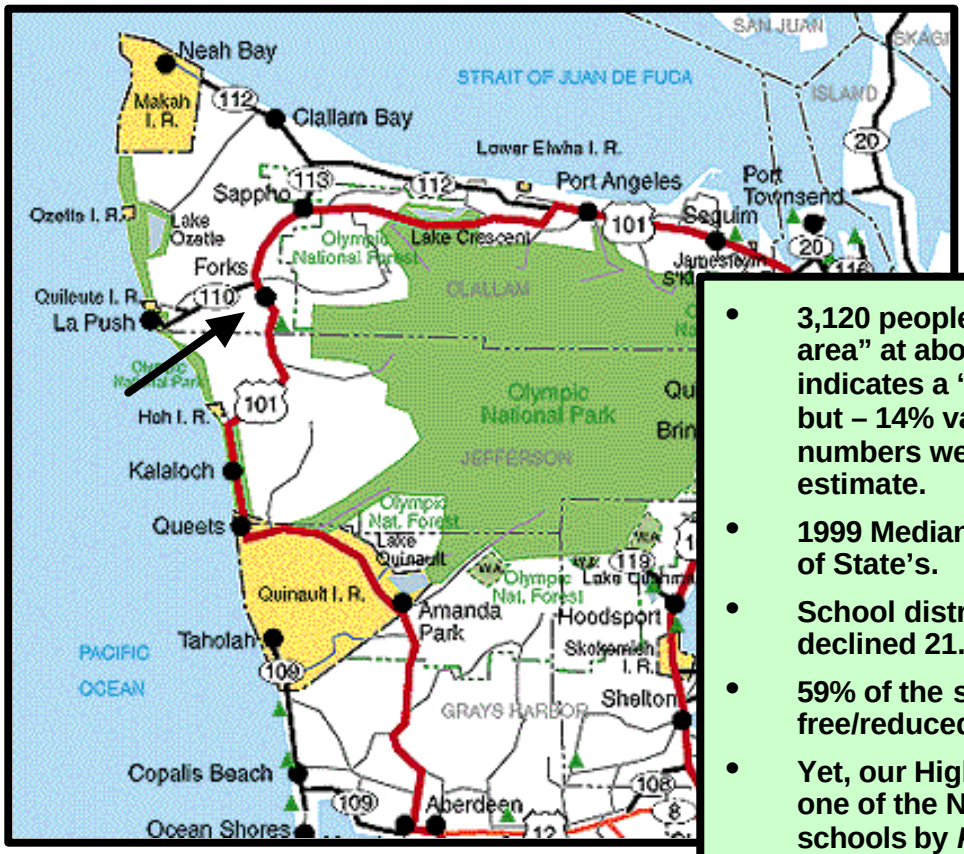
Appendix. Snapshots of two rural communities (Forks and Republic) in Washington

FORKS



- **3,120 people in City, with "urban growth area" at about 4,900. Census 2000 indicates a "growth" of 10% since 1990, but – 14% vacancy rate, and Census numbers were 480 people short of state estimate.**
- **1999 Median Income was less than 75% of State's.**
- **School district enrollments have declined 21.5% over last five years.**
- **59% of the students qualify for free/reduced lunch.**
- **Yet, our High School has been named one of the Nation's top 100 wired high schools by *PC Family Magazine.***
- **Current efforts focusing on diversification of economic base; increasing availability of technology; continue tourism promotion efforts to grow that cluster; and, address infrastructure needs to maintain and attract businesses.**

- Mayor Nedra Reed
  - Elected in 2001
- Incorporated in 1945
- City Council:
  - Bob Kilmer
  - Pat Mansfield
  - Josh Broo
  - Artie Anderson
  - Tim Fletcher
- Major recent initiatives:
  - **Forks Industrial Park**
  - **SR 101 Improvements**
  - **Quillayute Airport**
  - **Technology integration**
  - **Regional Eco Devo Strategic Plan**
  - **Sappho Gap**

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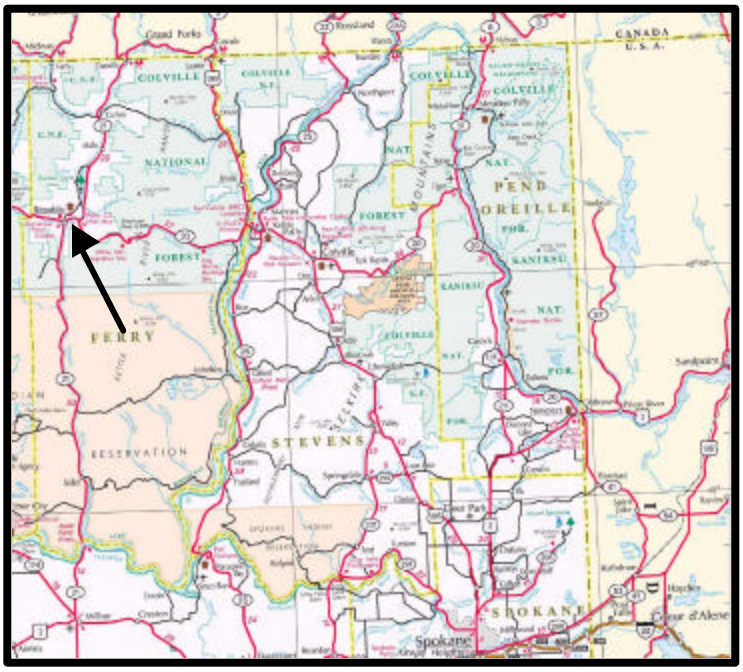
Republic & Ferry County



Republic, located in the Kettle Range in Northeast Washington, is the County seat and sole incorporated city. Gold mining, timber, and agriculture have been our traditional economic mainstay.

Population (2000 census)
- **County** 7260
- **City of Republic** 975
- **Republic School enrollment**
  - 1998-1999 520
  - 2003-2004 **471** (all grades)

PUD #1 of Ferry County (the Utility) is a rural Public Utility District, located in the City of Republic, Ferry County, Washington State. The Utility provides electricity to an area of roughly 1500 square miles. The service area extends from the Canadian border on the north, to Lake Roosevelt on the south and east, and encompassing the western portion of Ferry County (**2000Census tract # 9801,and 9802**), the northeastern portion of the Colville Confederated Tribes Indian Reservation (**2000 Census tract # 9803**), and the extreme northeast corner of rural Okanogan county (located within **2000 Census tract # 9703**). The District is a full-requirements customer of the Bonneville Power Administration, with a 13mW average load. US Census data finds the poverty percentage of Ferry County at 13.3% in 1999. Since 1999, Vaagen Brothers Lumber and Echo Bay Mines have closed operations resulting in the loss of over 300 jobs from a workforce of 3,269. (2000 Census SF 3).

The largest, and only, incorporated city within the Districts' service area is the City of Republic. According to the most recent Census data, GCT-PH1 Population, Housing Units, Area, and Density: 2000, Republic has a population of 954. As of November of 2002, the latest figures available, the District serves a total of 3,130 retail customers, distributed as follows: Residential customers - 2,183; Seasonal customers - 441; Commercial customers – 409; Irrigation customers – 92; Industrial customers – 4; Street lighting customers – 1.

Looking to Republics' future...

The Republic Public Development Authority (RPDA)

- Working with RWE/Schott to bring a photovoltaic module manufacturing facility to Ferry County

Ferry County PUD
- Offering a solar alternative to off-grid residents
- Developing a Grid-Tied solar 'SNAP" program to promote local distributed generation

The Republic School District
- Working with RPDA to develop the Republic Learning Center to house the Community College and a new workforce training facility

Republic TV Association
- Expanding its high-speed internet from Republic into the rest of the County, beginning with our rural health clinic in Curlew

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