Renewable Energy Feasibility Study

Oct 19, 2005

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Department of Energy

Tribal Energy Program Review

Pueblo of Laguna
Utility Authority

Discussion Outline

- Background: Demographics, UA Formation
- Project Overview
- Project Objectives
- Project Tasks
- Project Contacts

Pueblo Demographics

- Federally recognized Indian Tribe

- 533,000 acres straddling I-40, approximately 44 miles west of Albuquerque spanning four Counties

- The Pueblo inhabitants have occupied this land since the early 1400s

- According to 2004 estimates, the reservation is home to 4,294 residents living in the six unincorporated villages

Tribal Member Economic Status!

Pueblo of Laguna Household Income
2000 Census

Households	1,087	Percent
Less than $10,000	192	17.7
$10,000 to $14,999	109	10
$15,000 to $24,999	212	19.5
$25,000 to $34,999	145	13.3
$35,000 to $49,999	191	17.6
$50,000 to $74,999	183	16.8
$75,000 to $99,999	44	4
$100,000 to $149,999	11	1
$150,000 to $199,999	0	0
$200,000 or more	0	0
Totals (percent rounded)	**1,087**	**100**
Median household income (dollars)	27,664	

•POL median household income of **$27,664** is 23 percent lower than New Mexico's household-median income of $34,133

•60 percent of the Pueblo population has a household income less than New Mexico's median income

•Unemployment rate for Pueblo residents is 7.7 percent as compared with 6.1 percent unemployment for Cibola County and 4.4 percent unemployment for New Mexico

•25.2 percent of Pueblo families are below the
•poverty level as compared with 21.5 percent for Cibola County and 14.5 percent for New Mexico

•According to the 1990 Census, median household income on the Pueblo was $17,210 compared to $24,087 for the state of New Mexico.
(GAP HAS NOT CHANGED)

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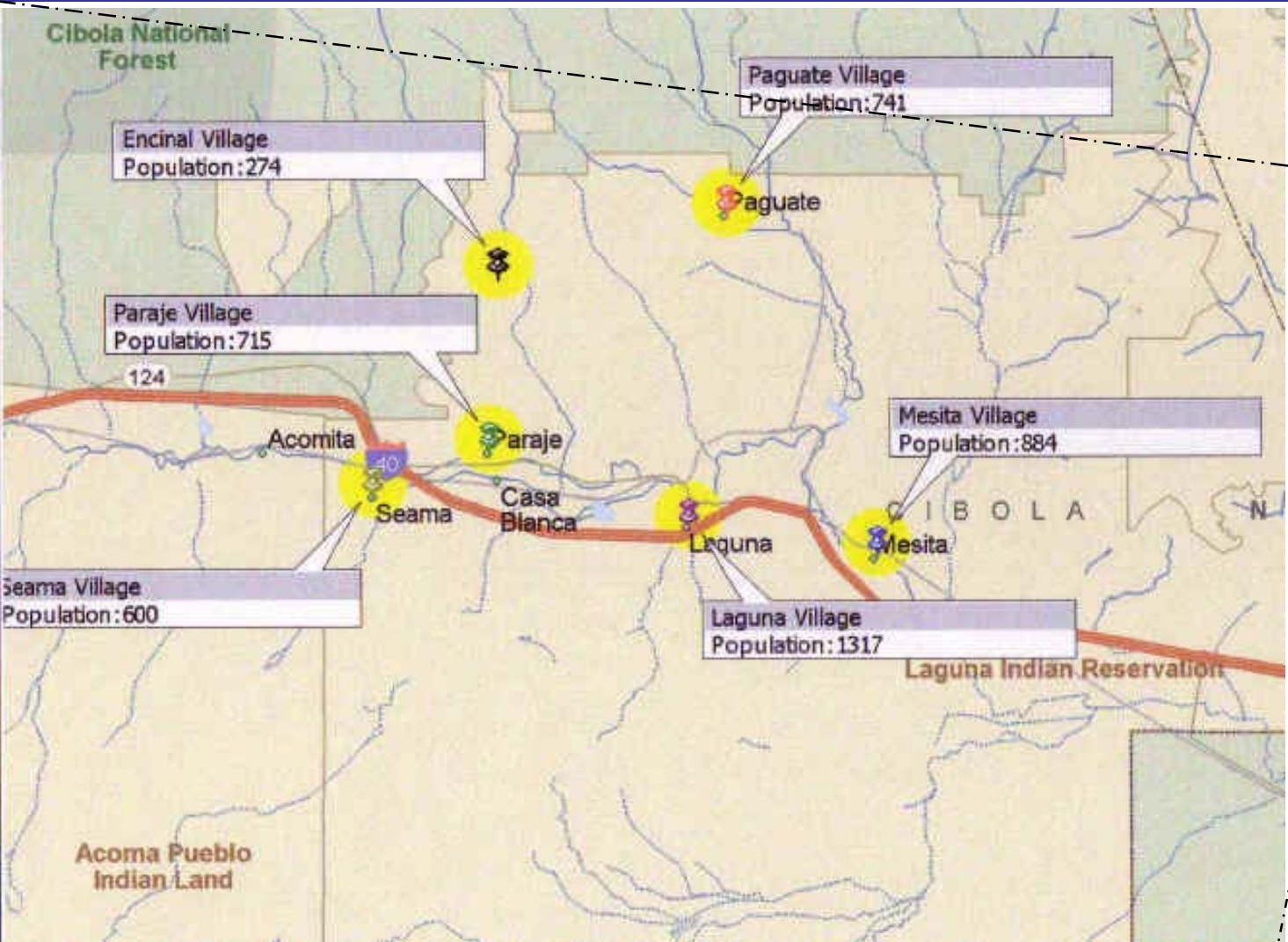
Pueblo of Laguna Reservation



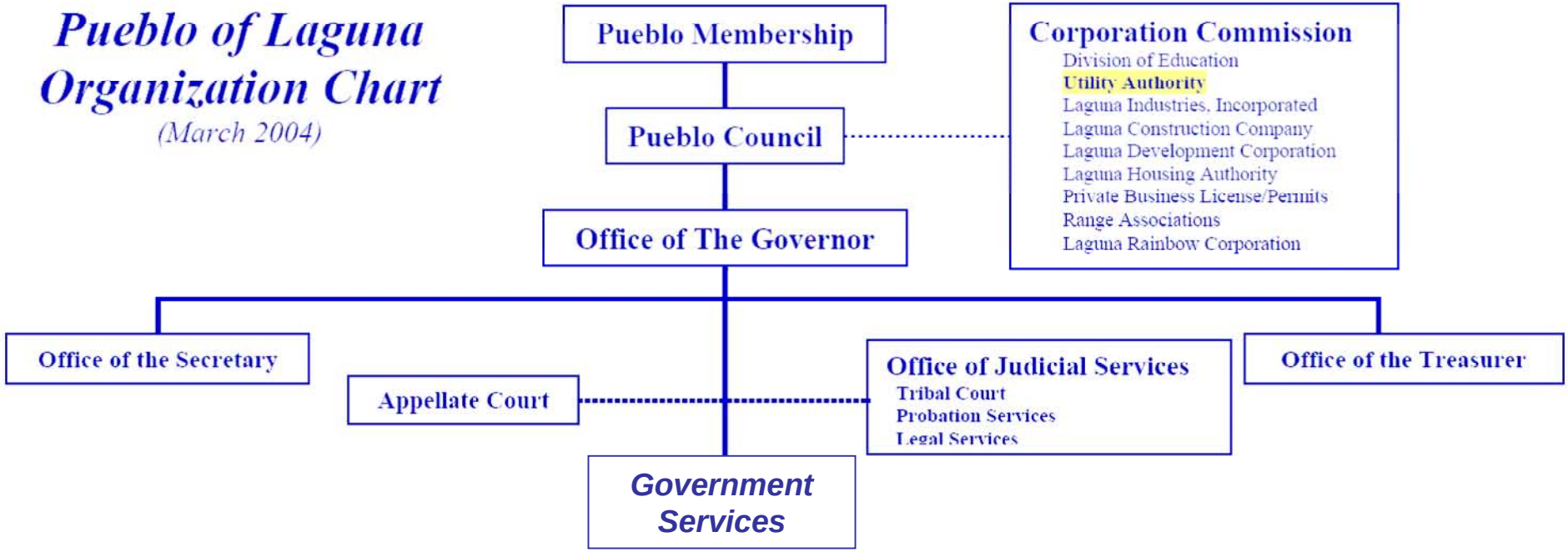
Six Villages

(approximately 1,203 households)

Utility Formation

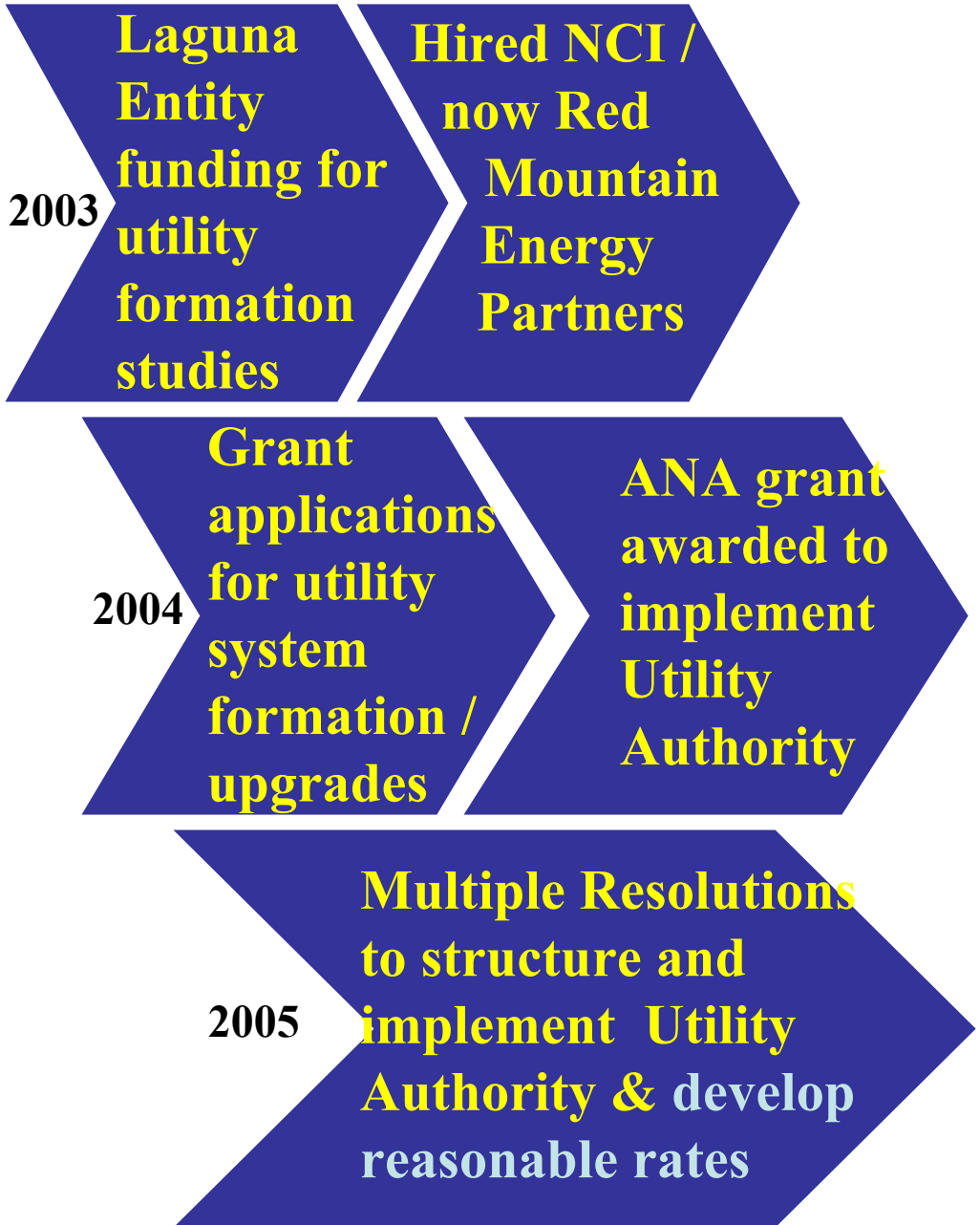
Pueblo of Laguna Organization Chart

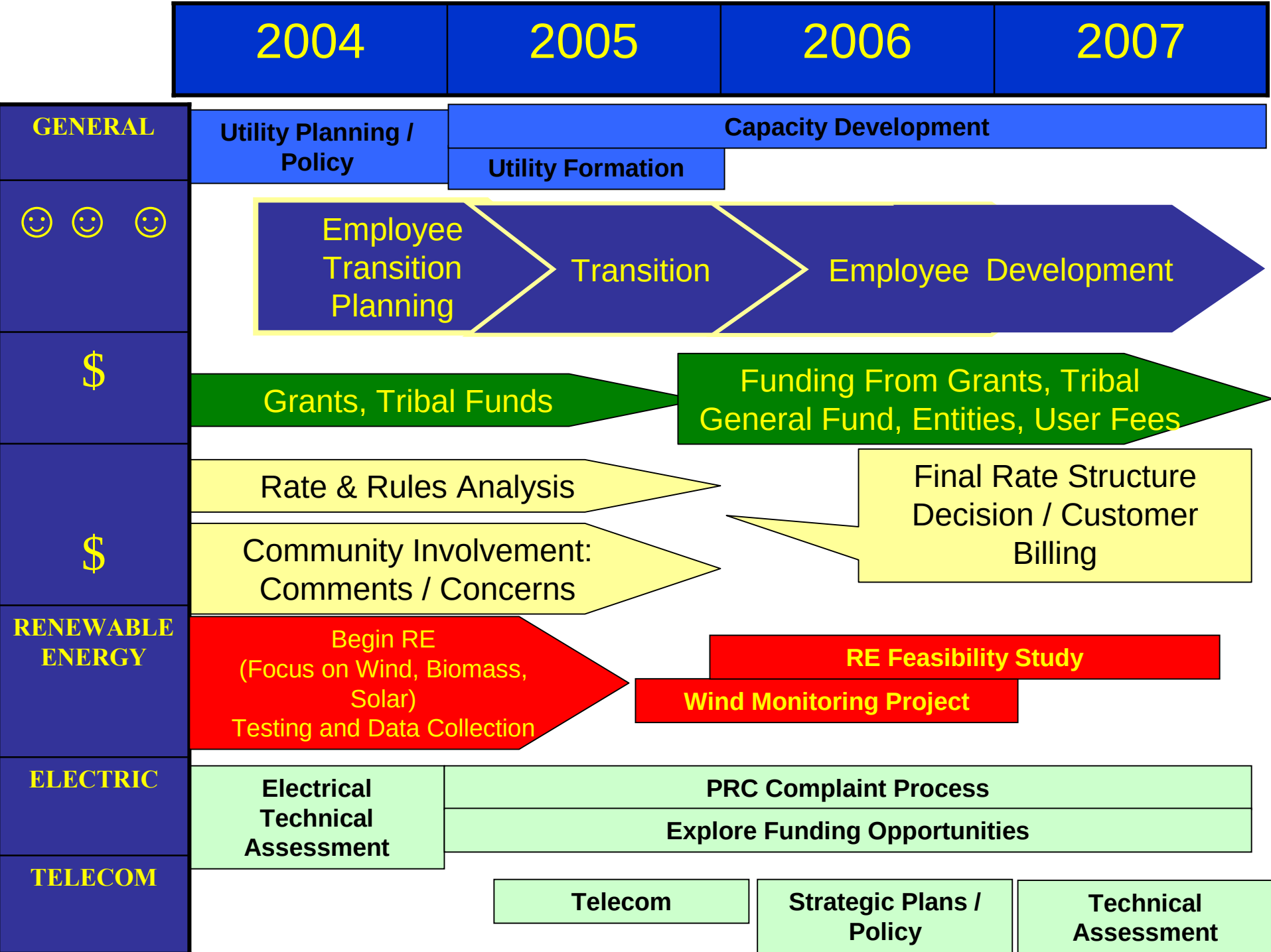
(March 2004)



- Initial plans began mid-1980s
- Tribal Council created Utility Authority in 1998
- Tribal Government Programs transitioned Aug/Sept 2005

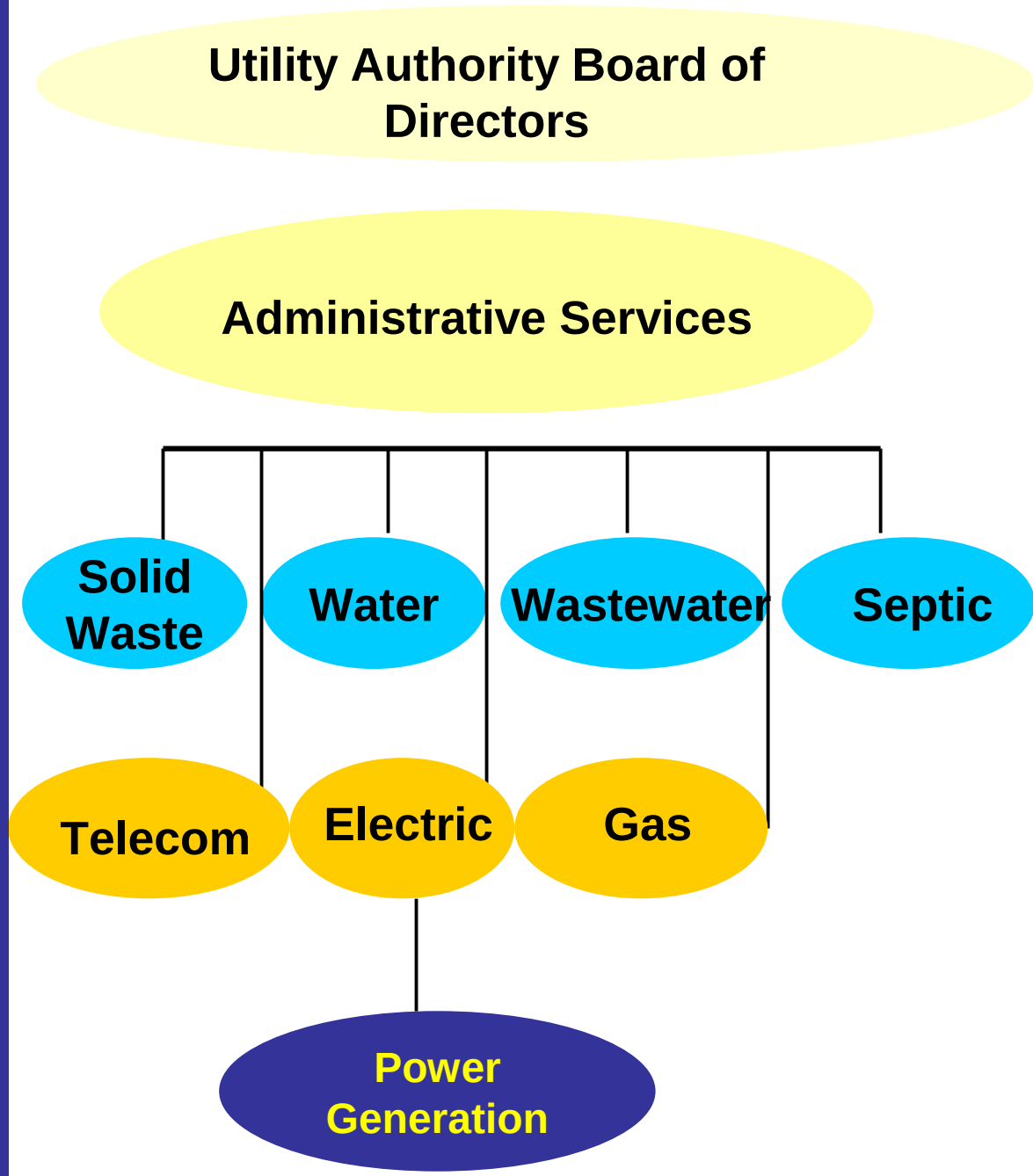
Utility Formation Timeline




2004
2005
2006
2007
GENERAL
Utility Planning / Policy
Capacity Development
Utility Formation
Employee Transition Planning
Transition
Employee Development
$
Grants, Tribal Funds
Funding From Grants, Tribal General Fund, Entities, User Fees
$
Rate & Rules Analysis
Final Rate Structure Decision / Customer Billing
Community Involvement: Comments / Concerns
RENEWABLE ENERGY
Begin RE (Focus on Wind, Biomass, Solar) Testing and Data Collection
RE Feasibility Study
Wind Monitoring Project
ELECTRIC
Electrical Technical Assessment
PRC Complaint Process
Explore Funding Opportunities
TELECOM
Telecom
Strategic Plans / Policy
Technical Assessment

Utility Authority is in place – Next Steps . . . .

- Develop Organizational Capacity
- Improve Services
- Identify Permanent Funding Sources
- Evaluate feasibility of Telecom,



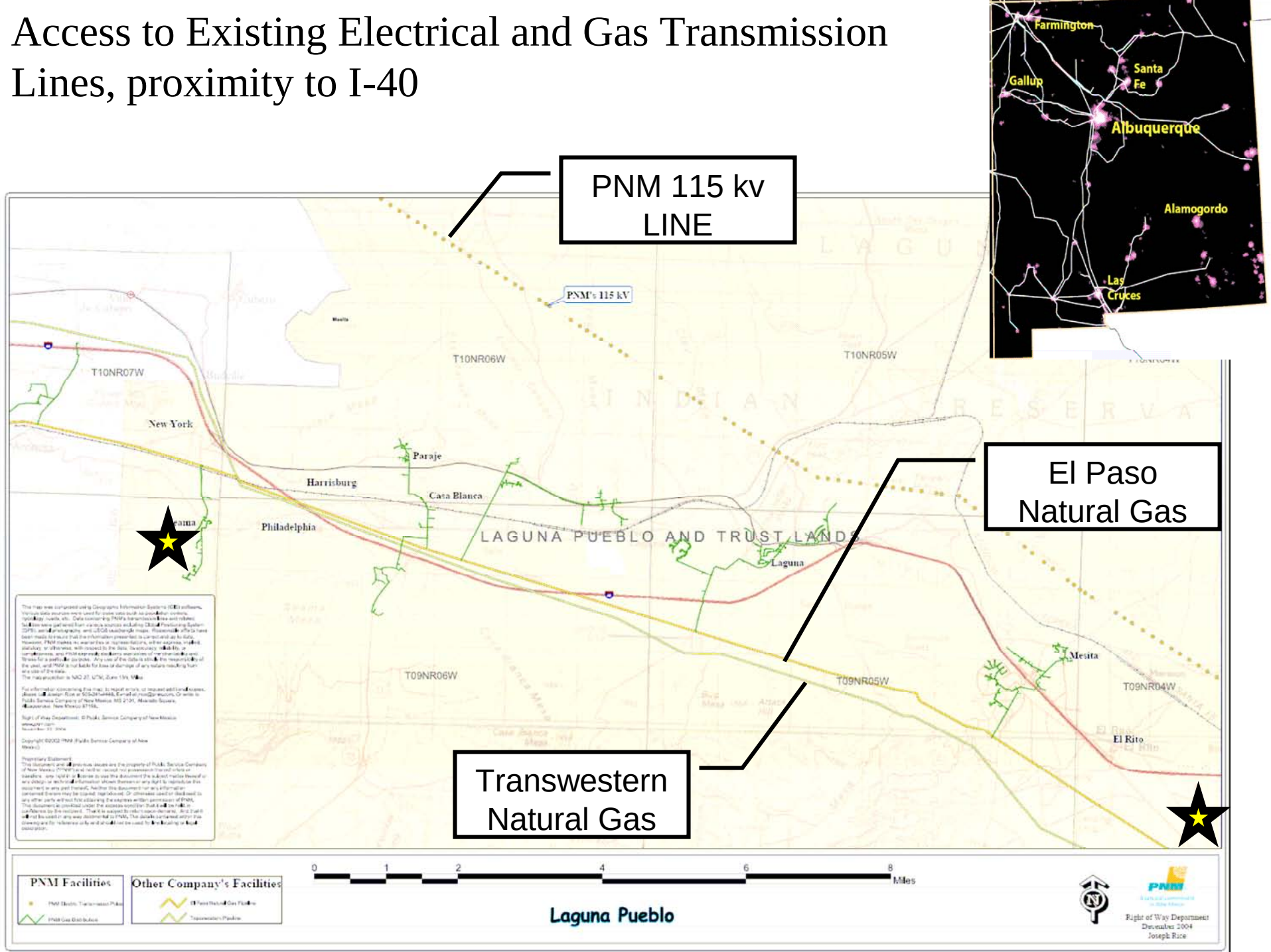
Renewable Energy Project Drivers

- Improve **quality and reliability** of electric service on the reservation
- Work to promote **energy self-sufficiency**
- Encourage **economic development**
- Environmentally **clean energy** source

Potential Benefits

- External electricity sales
- Internal electricity use
- Land royalty payments: as much as $100,000 to $200,000 per year
- Tax payments: property taxes on the order of $100,000 to $200,000 per year
- Local economic development: construction of a $100 million wind farm would bring major opportunities for local firms and construction companies
- Local jobs: construction of a megawatt facility could involve about 150 people during construction and 6 - 10 permanent, well paying jobs on the Pueblo.
- Cleaner environment: when the wind blows, less coal and gas will be burned in New Mexico, helping to clean the air and water
- Tourism: opportunities to operate wind

Access to Existing Electrical and Gas Transmission Lines, proximity to I-40



Pueblo of Laguna Renewable Energy History

Wind Feasibility

Entered into a Wind Development Agreement with Foresight Wind Energy to explore the feasibility of developing a 40-60 MW, utility-scale wind power project on reservation land.

When: The data towers were installed in early summer 2005 and the study will continue through early summer 2006 when a feasibility study will be reviewed and the Pueblo will decide whether to continue forward to explore developing a project.

Next: The Utility Authority is working with Foresight to review the data and assess other issues related to wind power development to determine if Pueblo lands are attractive for this type of project and to determine if the Pueblo wants to move forward.

Funding: Pueblo assisted by Foresight in securing a Clean Energy Grant from the New Mexico Energy, Mineral, and Natural Resources Department (EMNRD). The $38,000 grant was awarded in March, 2005, to fund wind assessment activities through June, 2006. Additional funds may be sought if the feasibility study proves positive.

Lucero Mesa Wind Monitoring Tower

20 meter tower – loan from NREL
anemometers: 10m, 20m
wind vane: 20m

Seama Wind Monitoring Tower

50 meter tower – std NRG equipment
Anemometers: 10m, 30m, 50m x 2
Wind Vanes: 30m, 50m
Pyranometer: 3m

Pueblo of Laguna Solar Installations

•The Majors Ranch is miles from any transmission or distribution lines so power for the Ranch must come from distributive energy sources.

•Now used as a Youth camp by the Pueblo, the project is primarily complete. Sacred Power (SPC) designed and installed a full line of renewable energy products including photovoltaic, wind turbines, solar hot water, solar hot air, solar powered water pumps, and satellite communications for the Majors Ranch Youth Camp.

•The Pueblo of Laguna Youth Ranch is set up to provide guidance to youth through positive role modeling experiences, that allows youth to build confidence in themselves and increase self-esteem.

SPC Solar installations

- Southwestern Indian Polytechnic Institute (SIPI), Albuquerque, NM

- SPC is actively involved in developing an renewable energy curriculum that can be implemented at the institute in the very near future.

- The institute would be one of a handful of universities educating students in the engineering, design and use of renewable energy technologies.

- In order for renewable energy systems to be effective, personnel must be trained in use, operation, and maintenance of those systems.

SPC Solar Installations

•SPC has federal contracts to design, manufacture and install Tel Sol Shelters and SP PV/Hybrids in support of Law Enforcement communications systems upgrades.

•The energy efficient shelters will house new digital radios, repeaters and other communications systems that are situated from outside police stations ranging to high mountain tops. Part of Project 25, the communication system upgrade will replace old analog with digital, providing greater range and clarity.

•The systems will be completely cooled and heated passively (no power required) and powered by renewable energy

DOE Feasibility Project Overview

1. Evaluate of opportunities to pursue large scale RE generation
   - Wind
   - Solar
   - Biomass

2. Build on knowledge gained from prior projects, studies

3. Consider “hybrid” project to provide firming (with natural gas)

Project Tasks

1. Business/organization planning

2. Community awareness/support
   - Community Outreach Program
   - Community Newsletter Development

3. Tribal energy load assessment
   - Update Estimates of Meter and Load Data
   - Evaluate Load Data
   - Review impacts of identified conservation measures

4. Power market assessment
   - Wholesale Power Purchaser Survey
     - Survey AZ, NM, CO
   - Survey IOUs (APS, PNM, TEP, PSCO)
   - Survey Publics (SRP, Cooperatives)
   - Survey Federal and State Agencies (WAPA)
   - Wholesale Generator Survey

Project Tasks (continued)

5. Site-specific resource monitoring
   - Quantify Wind Resource
   - Quantify Solar Resource
     - Review Sunlab solar insolation data
   - Quantify Biomass Resource
     - Quantify solid waste resource
   - Quantify other biomass resource
6. Natural gas availability/cost
   - Survey for Nearby Pipelines
     - Prepare and Submit Study Applications
     - Review, Revise Study Results
7. Transmission/interconnection
   - Research Transmission Market
   - Research Nevada, Arizona, New Mexico
8. Preliminary system design
   - Size Wind Facilities
     - Determine Type, Number,
     - Arrangement of Wind Turbines
     - Estimate Annual Energy Production
   - Size Gas Turbine Facilities
   - Develop Power Price Forecast
   - Develop Monthly Natural Gas Price Forecast
   - Determine Type, Size, Arrangement of Gas Turbine(s)

Project Tasks (continued)

9. Project location/resource maps

10. Evaluate potential environmental impacts/and fatal flaws:
    - Geology and Soils
    - Traffic & Transportation
    - Socioeconomics
    - Hazardous Materials
    - Waste Management
    - Cultural Resources
    - Air Quality
    - Biological Resources
    - Land Use
    - Paleontological
    - Public/Worker H&S,
    - Visual Resources
    - Water Resources
    - Identify Jurisdictions, Regulations
    - Discuss Target Projects with Air Quality Regulators
    - Discuss Target Projects with Federal Agencies

11. Tribal benefit assessment
    - Training and Other Tribal Professional Development
    - Identify Tribal Roles and Skill Sets
    - Identify Tribal Training Needs, Plans, Costs

Project Tasks (continued)

12. Long-Term Operation and Maintenance Planning
    - Identify O&M Structure, Roles, Schedule

13. Economic Analysis and Feasibility Decision
    - Prepare Development Plan and Schedule (s)
    - Develop Capital Cost Estimates
    - Develop Power Sale Price Estimates
    - Develop Operating Cost Estimates
    - Develop Financing Cost Estimate
    - Determine Applicability of Incentives and Tax Credits
    - Develop Pro-forma Projected Operating Results
    - Evaluate Impact of Project on Electric System Acquisition
    - Determine Feasibility
    - Present Results of Economic, Technical Analyses

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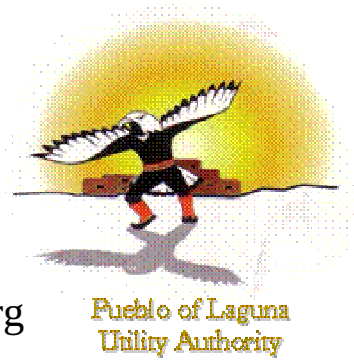

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THANKS TO DOE, CONSULTANTS, QUESTIONS!!!!!!

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SACRED POWER