



# Chevron Pipe Line Company Energy Optimization

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## Agenda

- Chevron Pipe Line Company Energy Management Objectives
- Sustainable Success
- An Opportunity to Expand
- Ideal Application Capabilities
- Technology Leverage
- Project Schedule
- Future Considerations



## CPL Energy Management Objectives

- Objective is to use financial and engineering concepts to develop an energy efficient approach to optimize production and conserve natural resources
- Focus on building competency in asset and process energy efficiency
  - Continue to design for efficiency in project development
  - Strategic power procurement and rate selection decisions
  - Pursue, analyze, identify and address inefficiency in asset base
- Endeavors to support CPL operations groups, assisting with a variety of energy related issues and opportunities
  - High-efficiency equipment installations
  - Utility contract negotiation
  - Power purchasing strategy development in deregulated markets
  - Energy consumption analysis
  - Power system reliability
  - ***Energy Optimization***



## Historical Difficulties

- SCADA related data, operating costs, demand, and pipeline operations were not integrated in a centralized application approach for energy optimization
- Extremely difficult to obtain data that is reflective of current operations
  - Forced to use historical data in energy audits
    - ▶ Electric rate schedule analysis
    - ▶ Energy consumption / bbl
    - ▶ Energy cost / bbl
- Identification of price change horizons in time-of-day rates and schedule details require continuous monitoring of controllers
- Complexity of dynamic energy prices and telemetry data gathering make real-time optimization of pumping operations difficult
- No centralized GUI for Energy Coordinator, Schedulers, and Controllers to review energy consumption related data



# Energy Optimization Opportunity

## Opportunity Statement:

Develop tools to increase Organizational Capability and Operational Excellence in operating pipelines more energy efficiently.

## Expanding the ability to capture opportunity (Key Drivers):

- Putting tools and information in the hands of operational decision makers
- Improving ability to consistently operate more energy efficiently
- Opportunity to schedule with energy costs as an input
- Ability to see energy costs in near real-time for operating decisions
  - “If you can’t measure it, you can’t manage it”
- Ability to take advantage of time-of-day pricing
- Asset efficiency is important, but is only part of the battle
- Aid the effort to achieve world class standards of Operational Excellence



## Ideal Application Capabilities

- Integrate pipeline configuration data, SCADA data, and electric power tariffs into one centralized application to determine
  - Current energy consumption
  - Current energy cost
  - Optimal solution for pump selection
- Early Warning runs warn of approaching rate transitions
  - Early Warning cost in time of use rates
- High-level "What-If" capability to estimate cost impacts on alternative operations
  - Leverage the pipeline hydraulics information
- Web-based GUI for all runtime displays based on Web-Services
- Dashboard GUI for configuration purposes



## Technology Solution

- Leverage one near real-time hydraulic model across several applications within existing SCADA architecture
  - Engineering Analysis
  - Operator Qualification
  - Leak Detection
  - Energy Optimization



## Project Schedule

- Energy Optimization designed by a partnership of two pipeline operators and an application developer
- Development Phase
  - Phase 1
    - ▶ Design and Project Scoping
  - Phase 2
    - ▶ Near Real-Time Power Cost
  - Phase 3
    - ▶ Power Optimization Algorithms
- Implementation
  - Testing, Measurement and Verification, and Roll-Out



## Intangible Savings

- Motor / Pump Savings
  - Reduced throttling
  - Avoid unnecessary start-up / shut down
  - High-efficiency retrofit studies
- Energy Management Analysis
  - EM metric tracking
  - Expands overall energy awareness
  - VFD opportunity studies
- Energy Expense Forecasting
  - Power costs
    - ▶ Annual
    - ▶ Pipeline modifications



## Future Considerations

- Costing Module to have added capability to acquire real-time spot pricing
- Batch schedule optimization
- Long-term planning and projections
- Base lining initial conditions for "What Ifs"
- Leverage interval history data to review utility billing