



DEC SW 40th Street Thermal Energy Plant

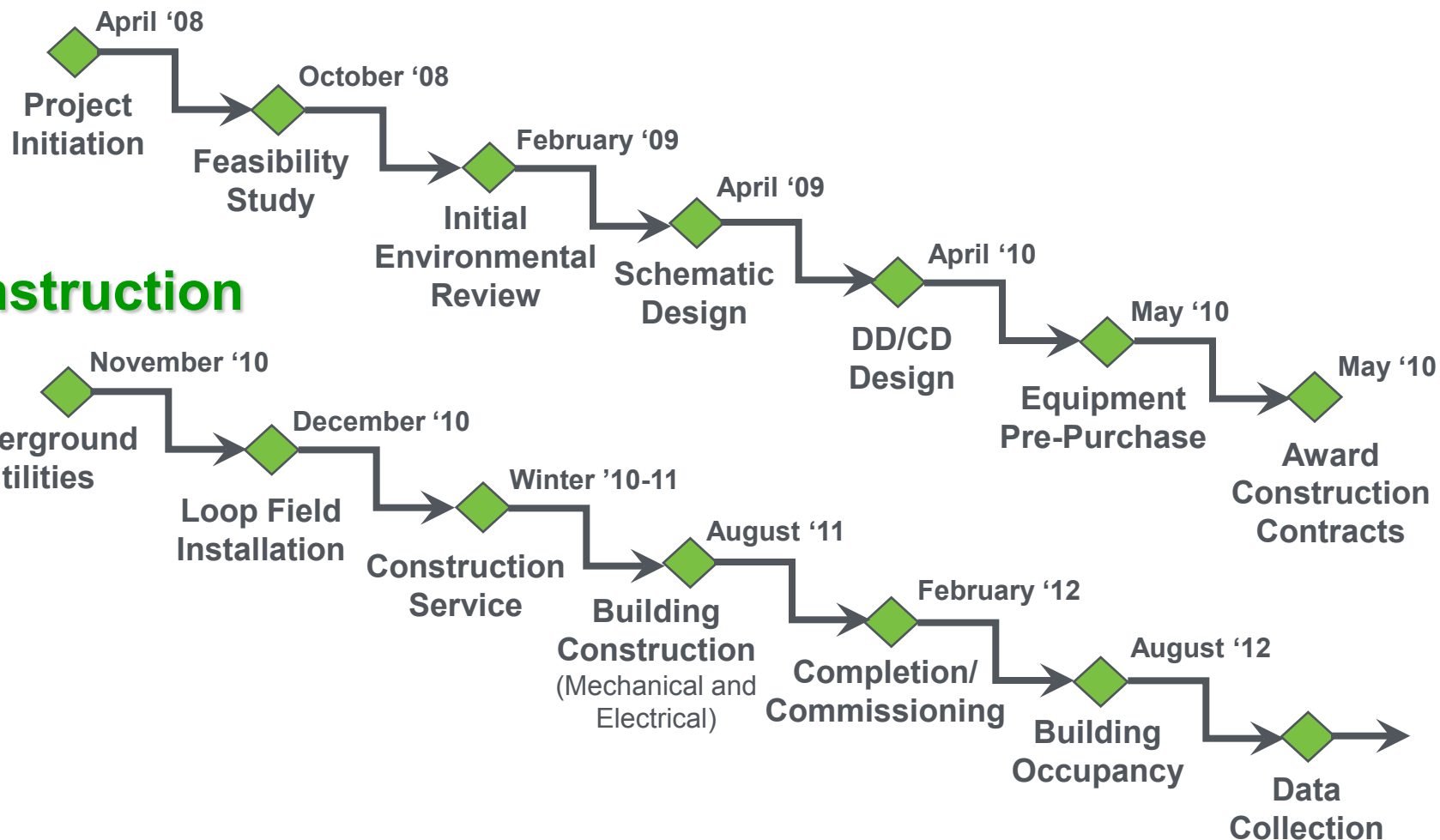
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District Energy Corporation
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Farris Engineering

Ground Source Heat Pumps Demonstration Projects

- Geothermal Heat Pump Central Plant
 - 667 Boreholes at 300 ft depth
 - 25 nominal 70 ton of water-to-water heat pumps
(1050 tons firm capacity)
- Serving County Adult Detention Facility
 - 779 Beds
 - 270,000 Square Feet
 - Critical Load
 - Secured Facility
- Domestic Hot Water Pre-Heat System
- Emergency Power System

Design



Construction

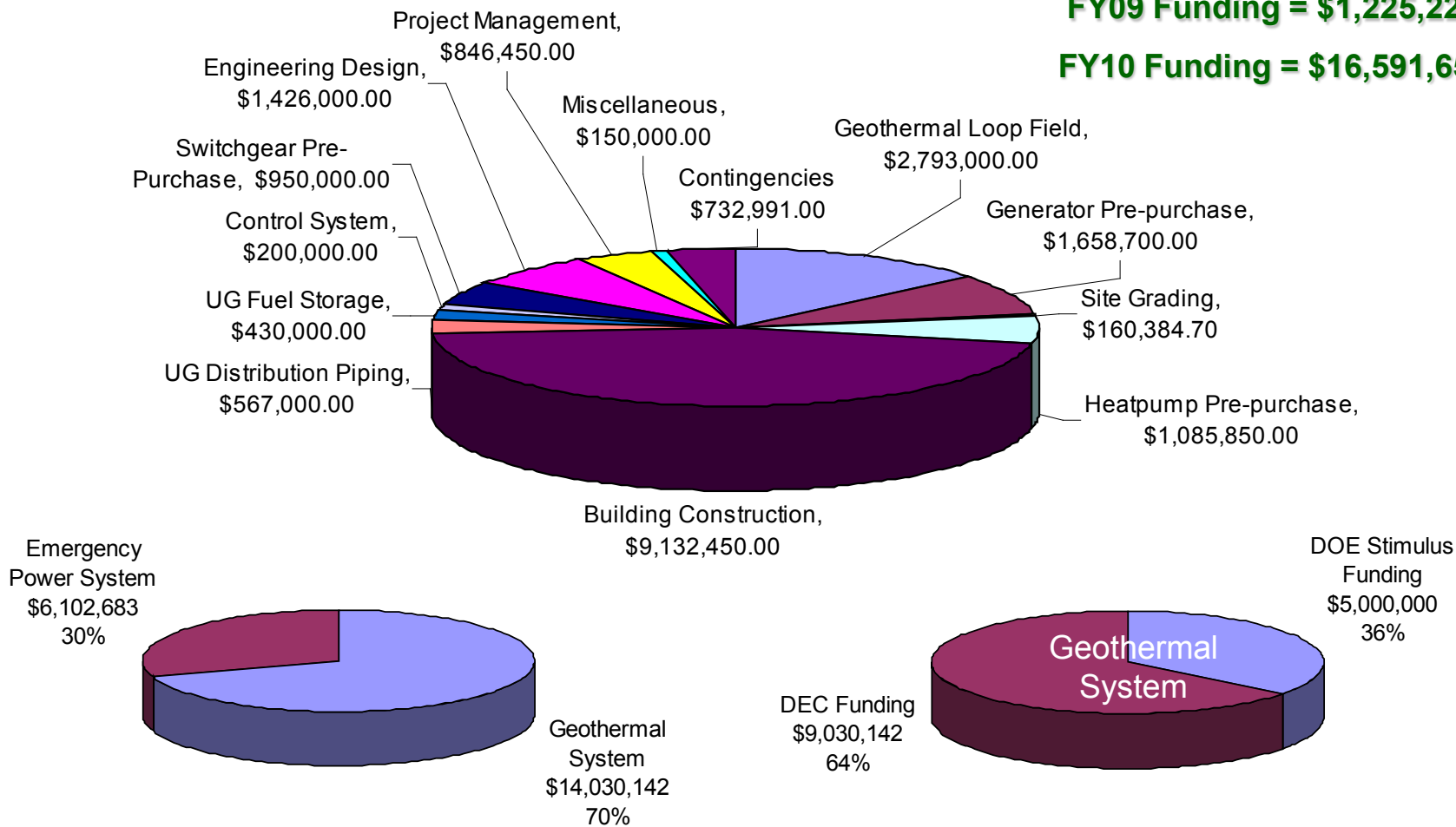
Project Overview

Budget

Total Project Cost \$20,132,824

FY09 Funding = \$1,225,224

FY10 Funding = \$16,591,659

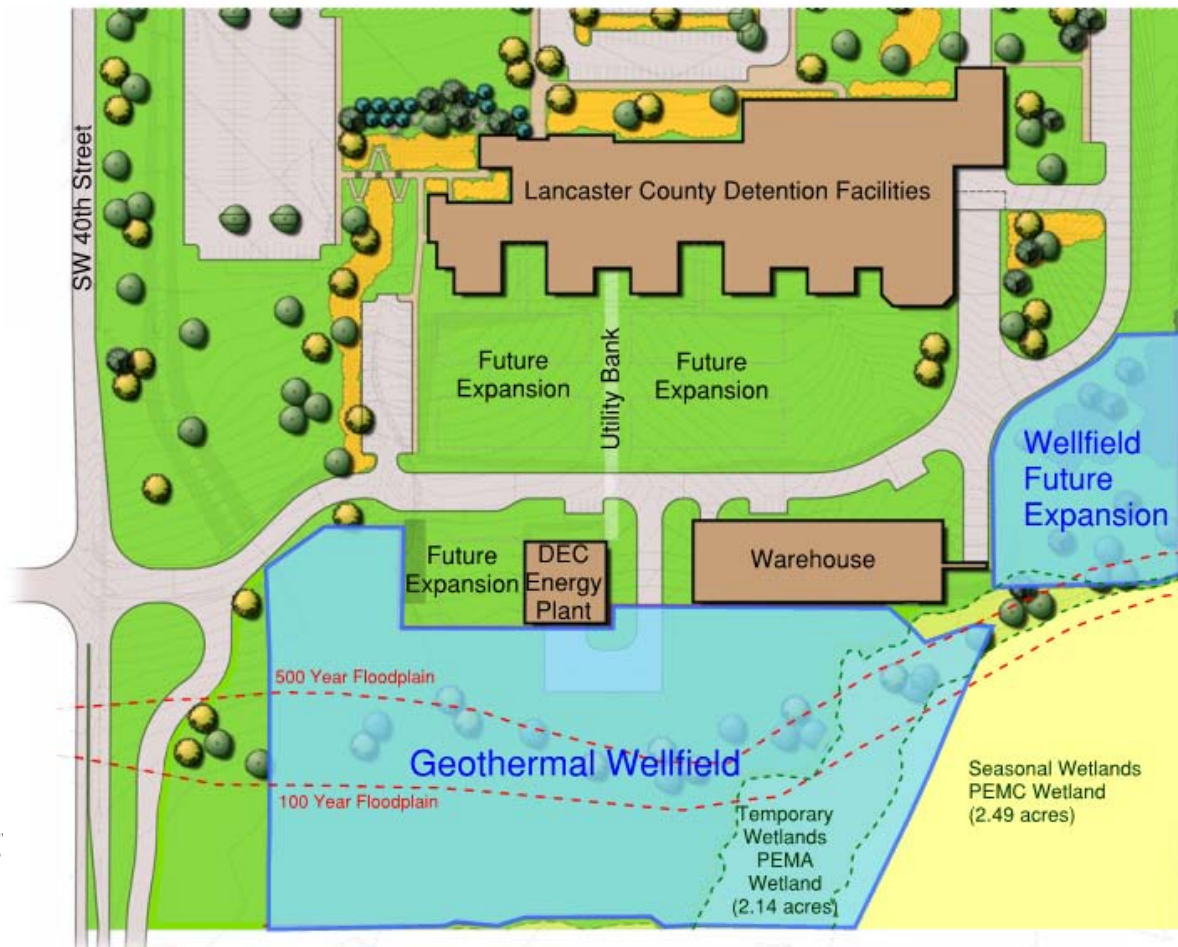


- Barriers

- Environmental Concerns
 - Wetlands
 - Floodplain
- National Environmental Policy Act Clearance
- Bond Financing

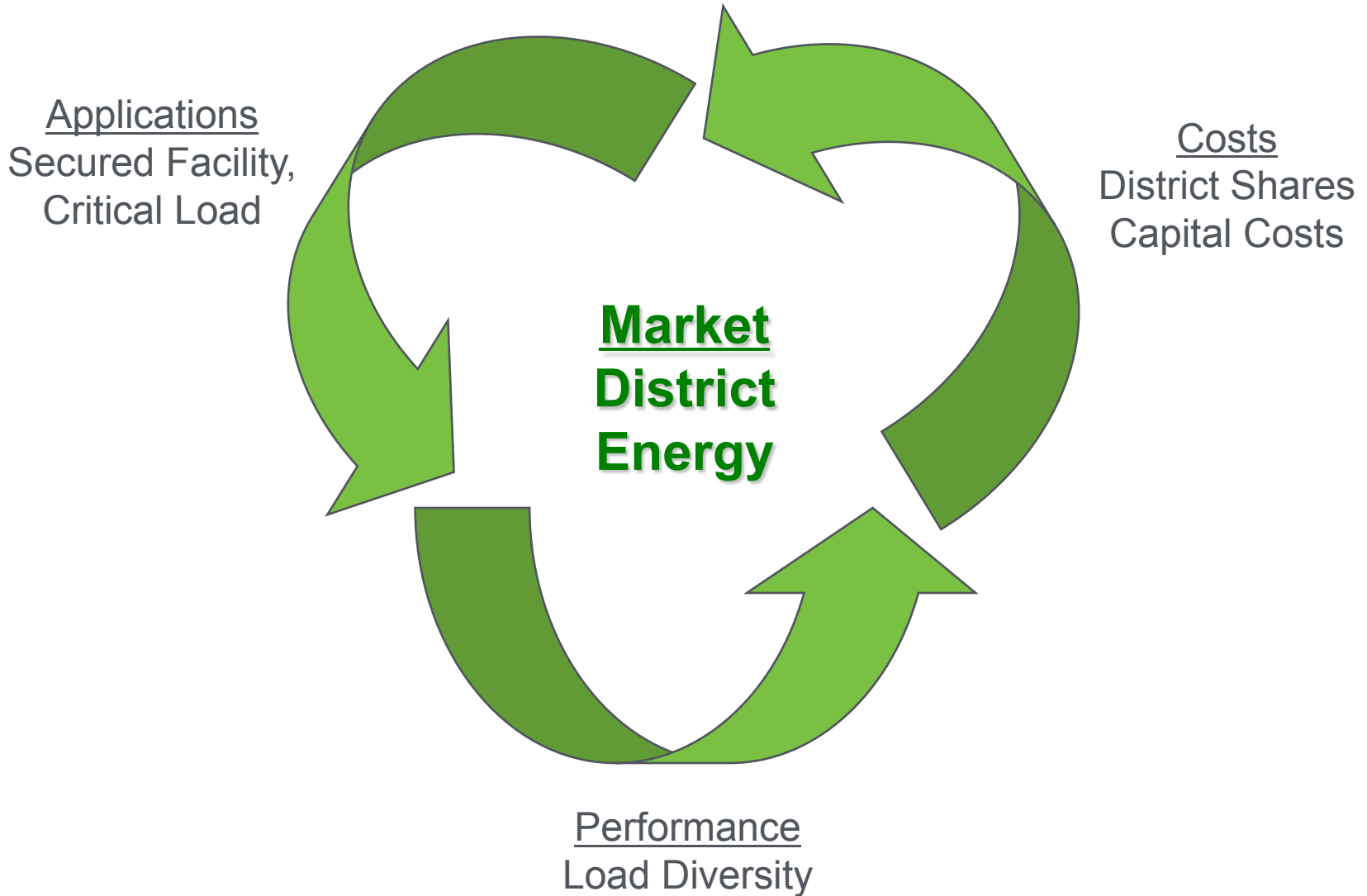
- Partners

- Project Management
District Energy Corp
- Project Engineering
Farris Engineering
- Project Environmental
Lincoln Electric
- Project Customer Count
A/E Firm



Relevance/Impact of Research

Program Goals

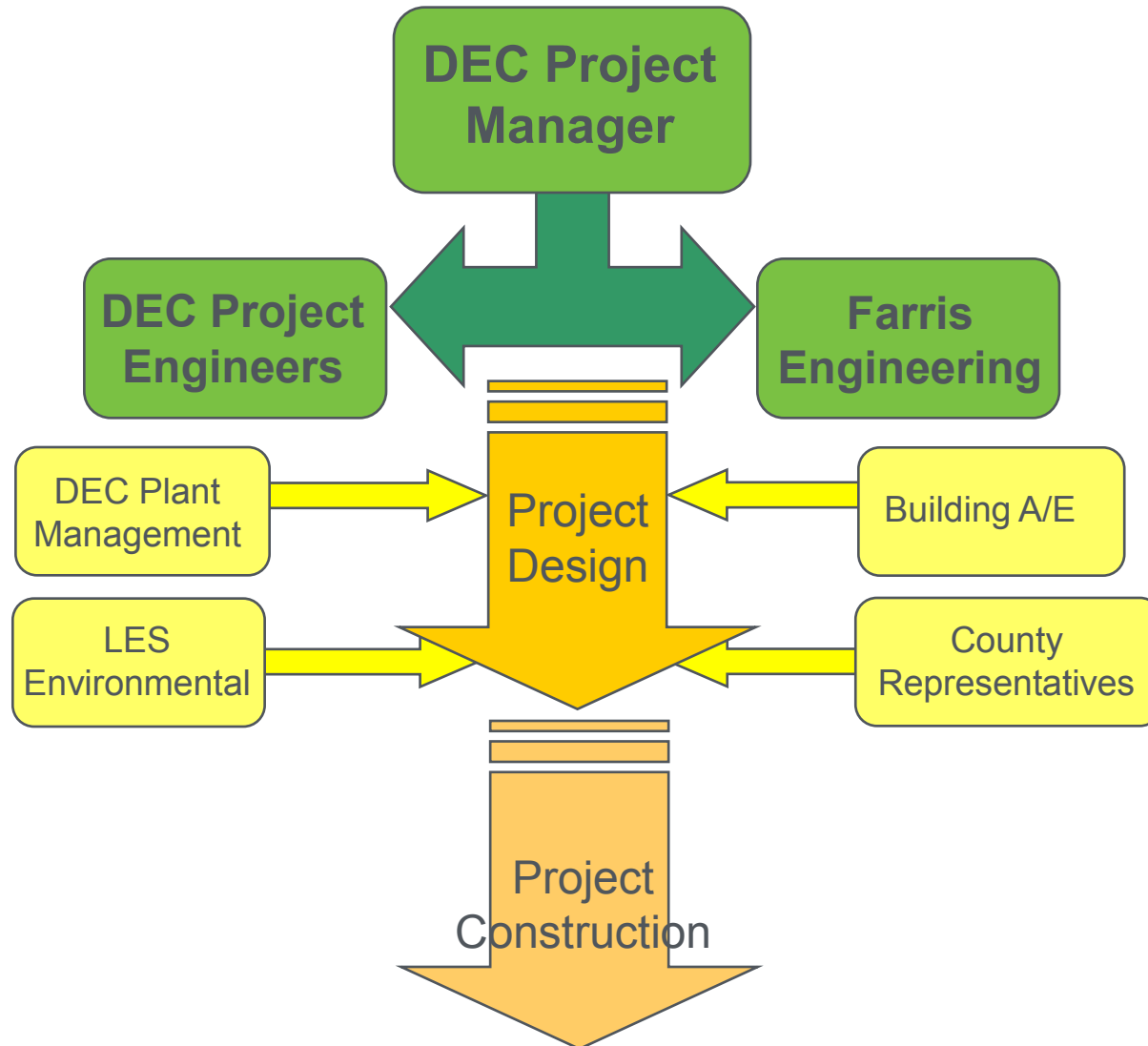


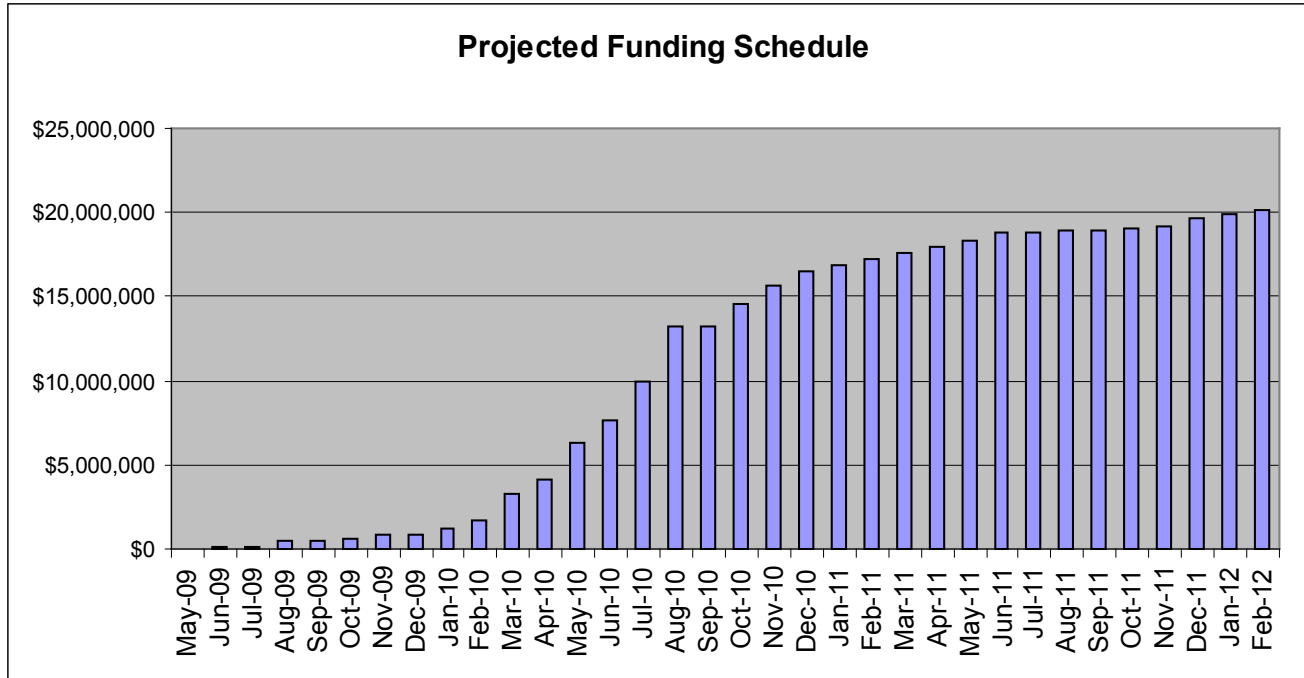
- Research results that will achieve DOE Program goals
 - Demonstration of Reduction in Energy Consumption and Cost
 - Data Collection to Support Application of Geothermal Technologies in District Energy Systems
 - Future Added Loads to Show Benefits Available with District Structure
 - Future Expansion to Explore the Versatility of Plant Growth Options
 - Plant Solutions to Possibility of Long Term Temperature Migration

- Feasibility Study
 - Comparison of Mechanical Systems
 - Technical Feasibility
 - Life Cycle Cost Analysis
- Modeling
 - Building Load Modeling
 - Hydraulic Modeling
- Design
 - Collaboration with Industry Experts
- Data Collection/Recording
 - Metering
 - Plant Control System

- Go/No-Go Decisions
 - County Approval
 - Feasibility Study
 - Initial Environmental Review
 - NEPA Clearance
- Milestones
 - Pre-Purchase Equipment Contracts
 - Construction Documents Packages
 - Bond Issuance
 - Loop Field Installation
 - Building Construction
 - Equipment Delivery
 - Thermal Service for Construction Activities
 - Final Completion/Commissioning
 - Metering/Data Collection

- Progress to Date
 - Design Substantially Complete
 - Bonds Issued for Recipient Financing
 - NEPA Clearance Granted
- Expected Outcomes
 - Construction of GSHP District Energy Plant
 - Energy/Cost Savings of HW, CHW, and DHW service (~8-9%)
 - Data Collection to Establish Model for Geothermal District System
- Team Qualifications
 - Experience in District Energy and Plant Design
 - Experience in Geothermal System Design
 - Engineering Involved on All Levels
 - Experience in Development and Implementation of Successful District Energy Business and Financial Model





Budget Phases	DOE Cost Share \$ / %	Recipient Cost Share \$ / %	Total Estimated Costs
Phase I	\$503,645 / 41%	\$721,579 / 59%	\$1,225,224
Phase II	\$4,458,903 / 27%	\$12,132,756 / 73%	\$16,591,659
Phase III	\$37,452 / 2%	\$2,278,487 / 98%	\$2,315,939
Total Project	\$5,000,000 / 24.8%	\$15,132,822 / 75.2%	\$20,132,822

Short Term

- FY10 Plans
 - Issue Bonds to Finance
 - Pre-Purchased Equipment Delivery
 - Underground Utilities Installed
 - Construction Service
- FY11 Plans
 - Plant Building Complete
 - Loop Field Installation Complete
- Upcoming Key Milestones
 - Start of Construction
 - Completion of Design Packages
 - Controls System Configuration

Long Term

- Alternative Development Pathways
 - Contingency Plan for Construction Service
 - Addition of Conventional Equipment to Resolve Temperature Migration
- Reporting to National Geothermal Data System
 - Plant Instrumentation
 - Plant Control System
 - System Optimization Analysis
 - Long Term Borefield Conditions

- Current Status
 - Project is ahead of schedule
 - Project is under budget
 - Major challenges to date have been resolved
- Future Steps
 - Complete Construction
 - Data Collection, Reporting to National Geothermal Data System
 - System Growth
 - District Energy Market Expansion
- Impact to DOE Goals
 - Market=Applications=Performance=Cost