



Los Alamos National Laboratory TA-3 Campus circa 1955

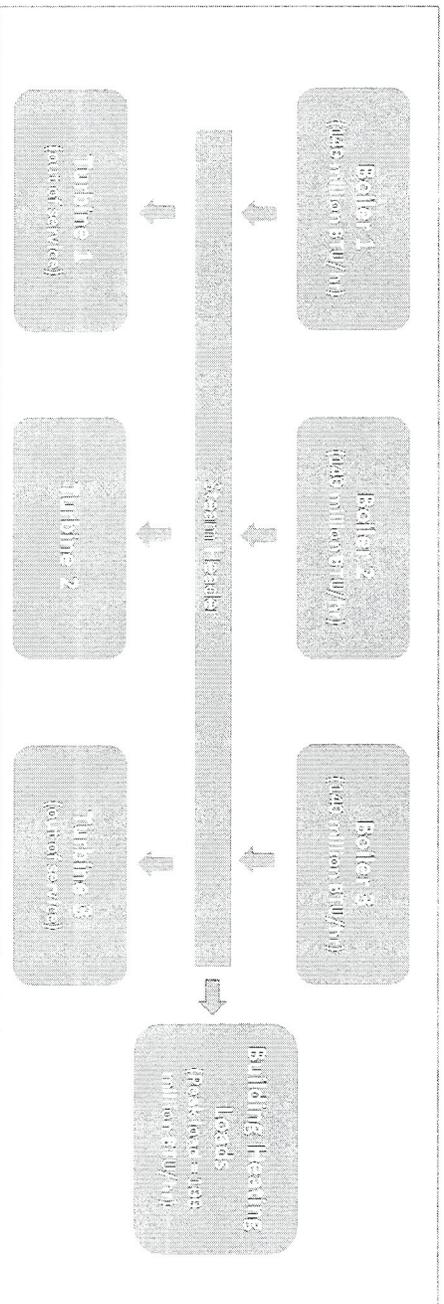
Steam Plant Replacement

A single project to achieve multiple goals: district heating, power generation and greenhouse gas reduction

Existing TA-3 Steamplant & Stand-by Combustion Gas Turbine Generator

60+ year old power plant

- Originally designed and operated to produce 20MW of electricity and heating to serve a larger TA-3 campus (280 million BTU/hr on an N+1 basis)
- Now at end of service life with limited function



Existing 10 year old gas turbine for power during external supply shortage:



Gap Description

- **District Heating Needs**
 - Current plant sized is oversized, inefficient, and has accumulated \$15M in deferred maintenance.
- **Increased Electrical Power Needs and Reduce Supply Portfolio Options**
 - Increased energy and demand forecasts over next ten years
 - San Juan coal-fired power plant (36MW) agreement till 2022
 - Laramie River coal-fire power plant (10MW) uncertain access
- **DOE/NNSA Greenhouse Gas Reductions Goals**
 - 50% reduction by 2025

Status quo does not allow us to meet future energy needs or executive initiative. Investments are necessary to proactively support core DOE/NNSA missions. Heating, power, and greenhouse gases have a symbiotic relationship



Los Alamos
NATIONAL LABORATORY

UNCLASSIFIED

Operated by Los Alamos National Security, LLC for NNSA



Slide 3

Approach – Maximize use of Existing Assets

Leverage existing assets

- Air quality permit
- Natural gas pipeline allocation
- Central steam distribution system
- Combustion Gas Turbine Generator (CGTG)
 - State-of-the-art efficiency as a fossil fuel power generation plant

Approach: Rethink/Revise the Heating Network

Central Steam System Buildings

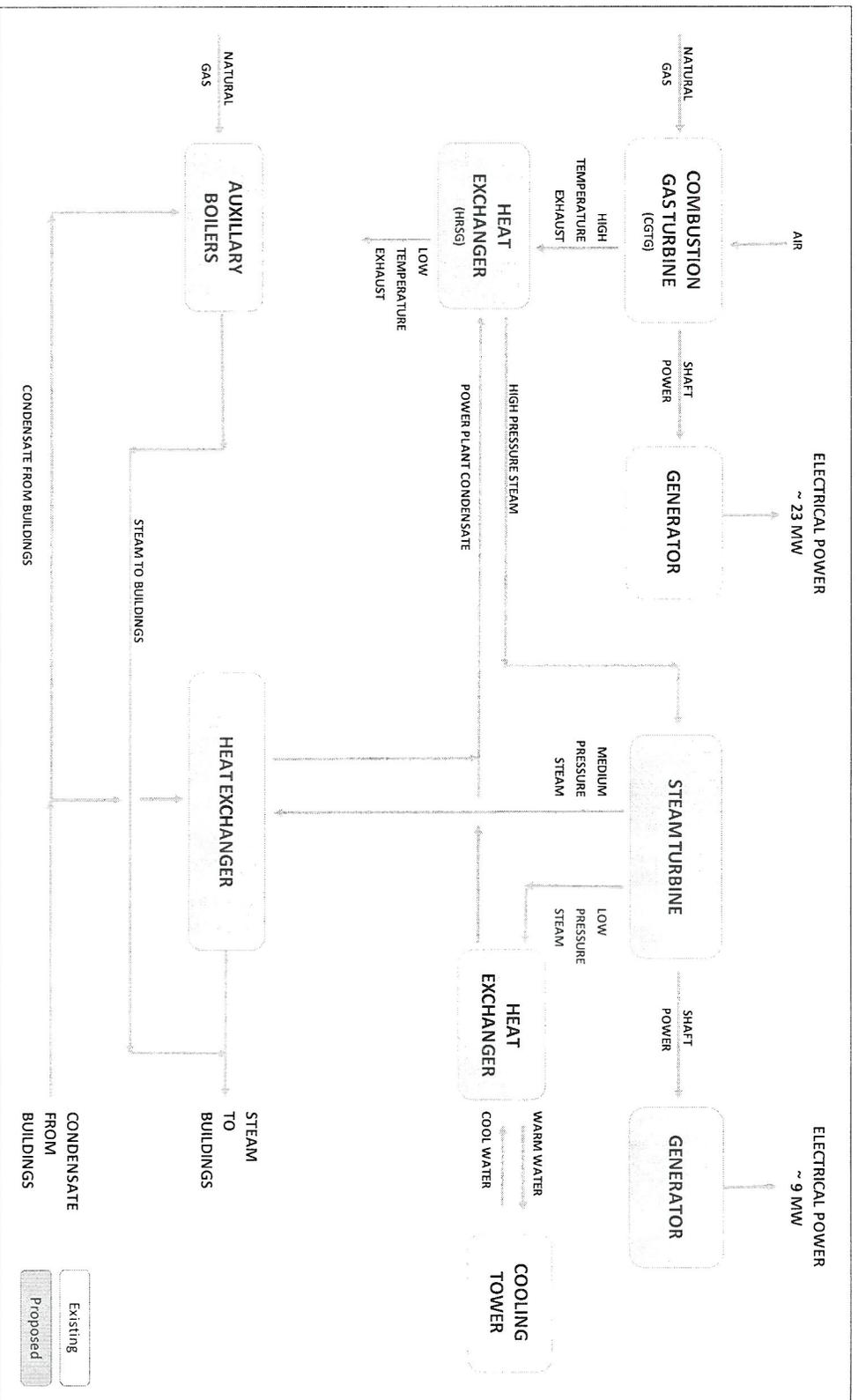
Central Steam System

Proposed permanent local boilers

Proposed temporary boilers

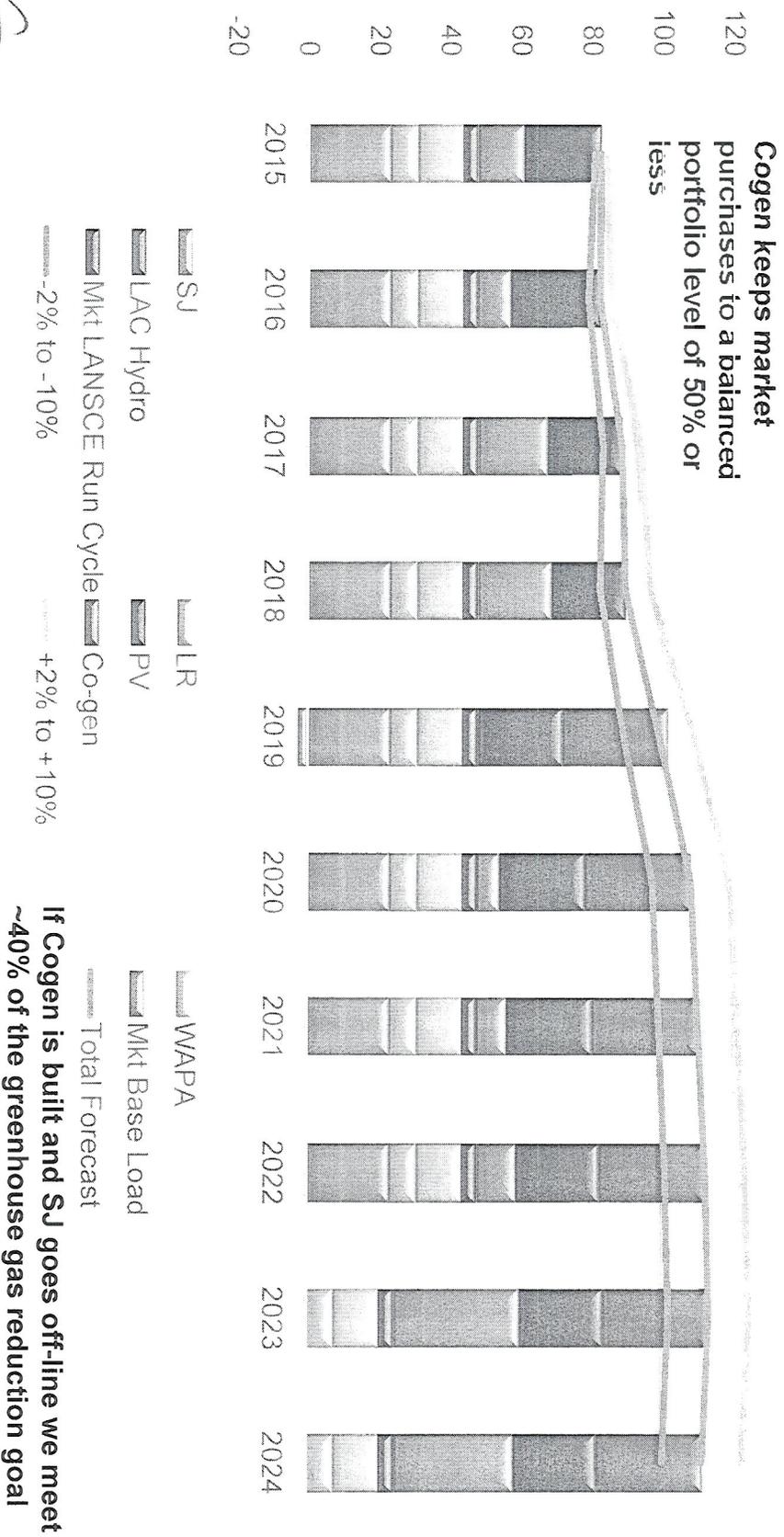


Approach: Proposed End State Configuration



Approach: Balanced Power Supply Portfolio, less Coal-Fire produced energy

SJ S/D 2022, COGEN Add 2019



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED



Approach: Apply Lessons Learned from Argonne's Experience

- Projects have many similarities: existing central steam plant, scale of energy demand, and insight from previous ESPC experiences.
- Attractive features of the current Argonne project:
 - Notice of opportunity was specific; it included a conceptual design consisting of a specification package and ~30 drawings
 - M&O employed an experienced CHP engineering firm, Burns & McDonald, to prepare the conceptual design and review submissions
 - Measurement and verification (M&V) of benefits is completely based on metering, not projections
 - Project includes 6 month 'proof run' by the energy service company (ESCO) to demonstrate the quality and durability of the design
 - ESCO provides repair and major maintenance as part of the scope.

Approach: Maximize NEPA Allowances and Existing Air Permit Envelope

- National Environmental Policy Act (NEPA) implementing regulations provide for a fairly wide Categorical Exclusion (CatEx) which would be applicable
 - *DOE 10 CFR Part 1021, B 5.14 Combined Heat and Power or Cogeneration Systems*
 - CatEx applied at Argonne
- **An air quality permit exists for the existing over-sized CHP steam plant**
 - Amendment is required to address the new plant
 - New plant will be operated within established emission boundaries
 - Current permit strategy avoids larger compliance programs requiring modeling, emissions controls, and reporting
 - Following Argonne's prescriptive project approach, such amendments will be agreed upon prior to ESPC contracting to reduce risk

Approach: Acquisition as ESPC

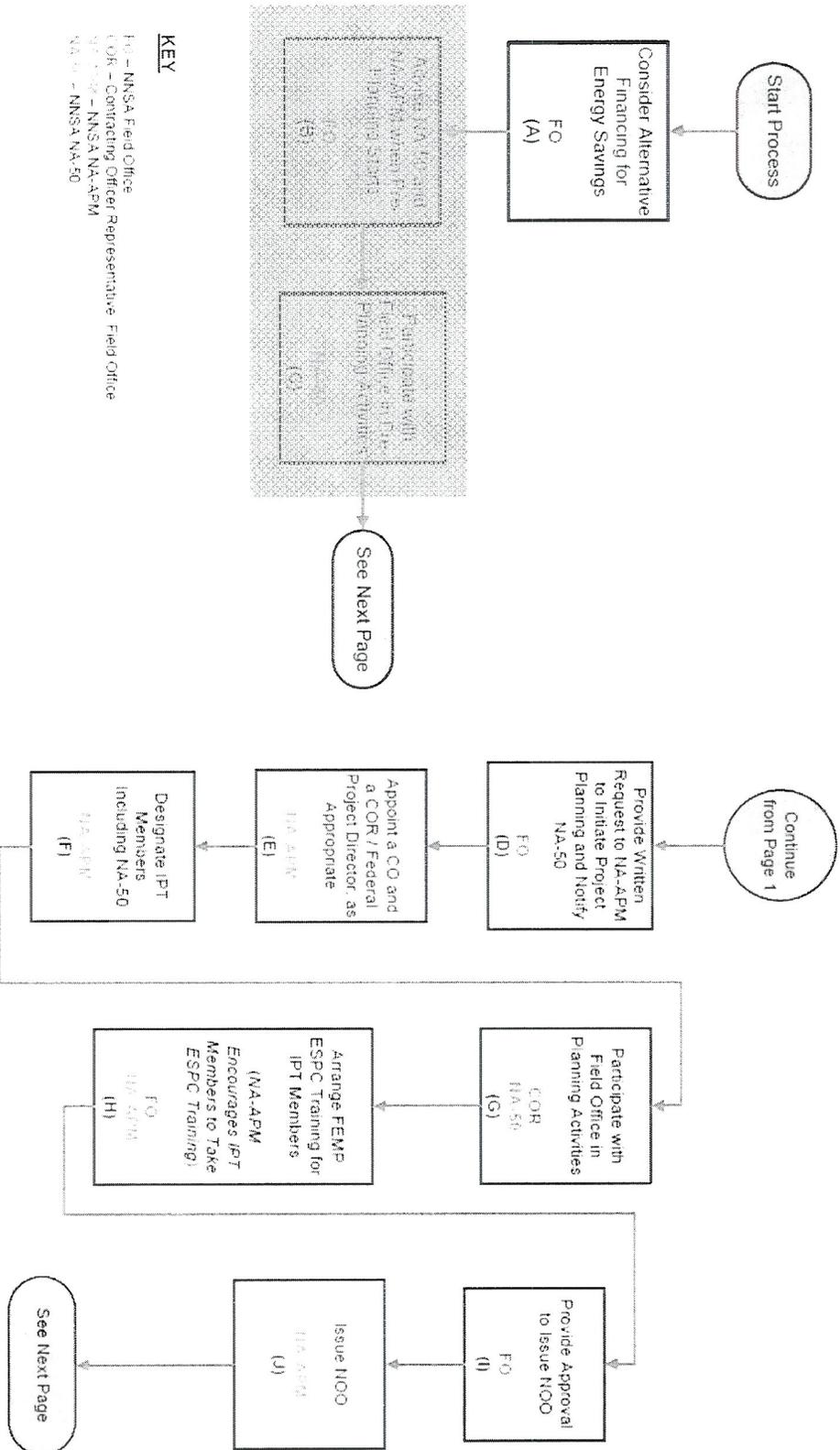
- FEMP has examined and endorsed the financial feasibility of the project
- Power and heat bill is a significant commodity expense (~\$32M in 2015)
- LANS obtained a detailed financial feasibility study using the midpoint estimate and it showed that an ESCO investment of \$115 million could be financed over 22 years through energy savings
 - Field Office conducted technical feasibility review through the USCOE
- Estimated net present value (NPV) of the project over 30 years:
 - NPV benefit/cost ratio: 1.39

Project ROM estimate is \$100-120M
Energy Savings Performance Contract Financed

Approach: Management (Discussion)

- Consensus/Authorization
 - ✓ NA-50 and Site Endorsement
 - NNSA Authorization process as ESPC?
 - Past acquisition by Line Item was considered
 - Application of AoA Process to formalize authorization? Other?
 - Technical alternatives studies available
 - ESPC process inherently evaluates technical alternatives and selection based on guaranteed cost savings
 - MNS/PRD documents drafted
- NA-50 BOP 03-06 *Supplemental Procedures for Alternative Financed Energy Savings Projects*
 - NA-APM Centric, FEMP approach
- Document selected management approach in PEP

BOP-03-06



KEY
 FO – NNSA Field Office
 COR – Contracting Officer Representative- Field Office
 NA-APM – NNSA/NA-APM
 NA-50 – NNSA/NA-50



Operated by Los Alamos National Security, LLC for NNSA

UNCLASSIFIED

