

Equity and Environmental Justice in Early-Stage NNSA Project Planning

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Background and Purpose of Study

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Key Drivers:

- Political: Executive Order 13985 calls on the Federal Government to identify and assess systematic barriers to opportunities for underserved communities within their work scope. Executive Orders 13990 and 14008 require the prioritization of environmental sustainability and environmental justice to tackle the climate crisis.
- Practical: Within the NNSA, Environmental Impact Assessments (EIA) typically occur after the Analysis of Alternatives (AoA) has occurred, which is too late to incorporate findings into the alternative selection process.

Through this effort, PA&E seeks to bring Equity and Environmental Justice considerations into the alternative selection process.

Disadvantaged Communities and NNSA

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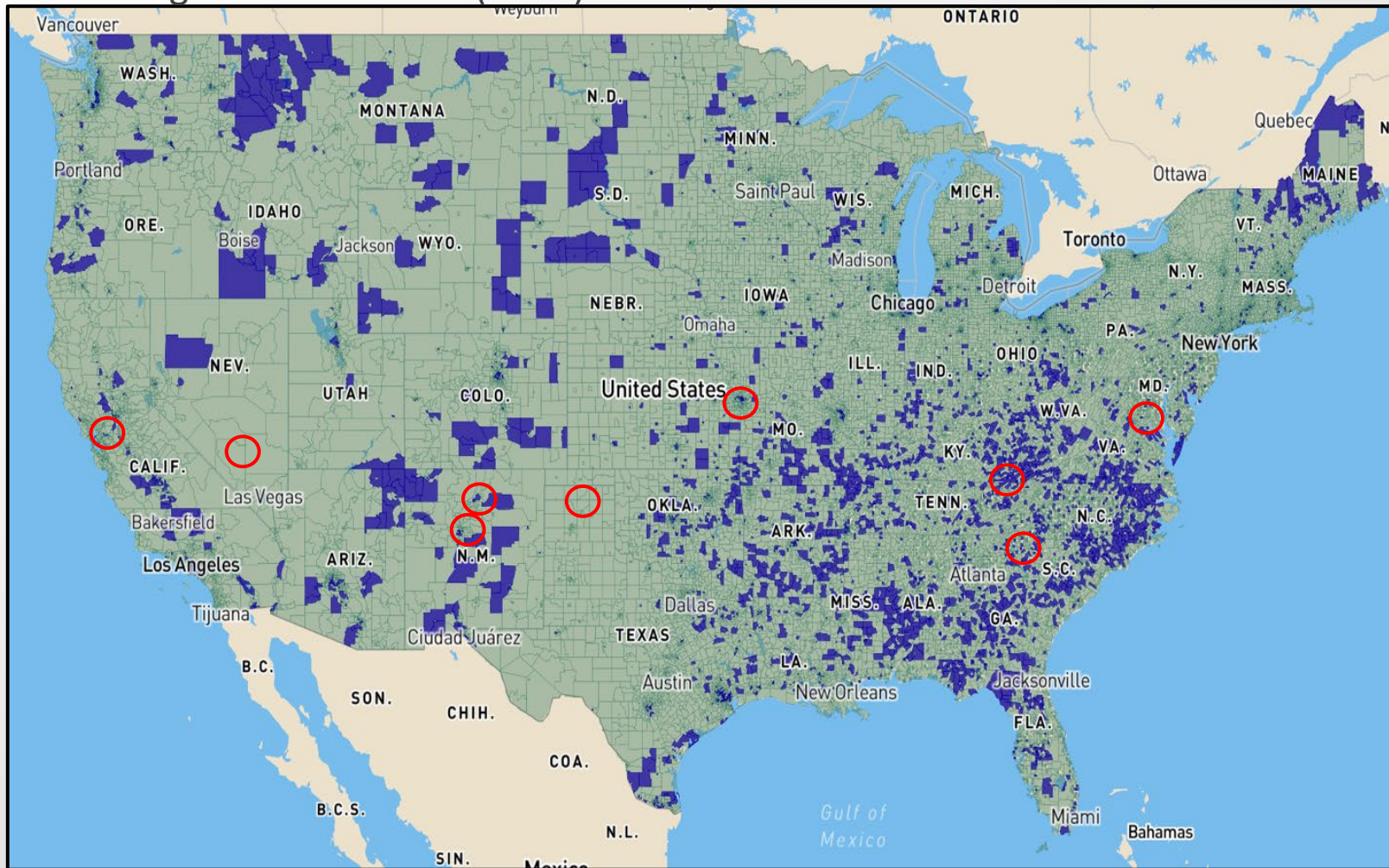
The NNSA has labs, plants and sites across the country – all of which are either in or near regions that have been identified as Disadvantaged Communities (DACs)



Disadvantaged Communities and NNSA

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NNSA Facility 

NNSA's Office of Programming, Analysis and Evaluation

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The Office of Programming, Analysis and Evaluation (PA&E) provides analytical decision support throughout acquisition and budgeting

- Promotes data-driven decisions and managing portfolio risk in budget-constrained environments
- Promotes credibility in cost estimating and long-term planning through objective, unbiased, and technically sound analyses and tools

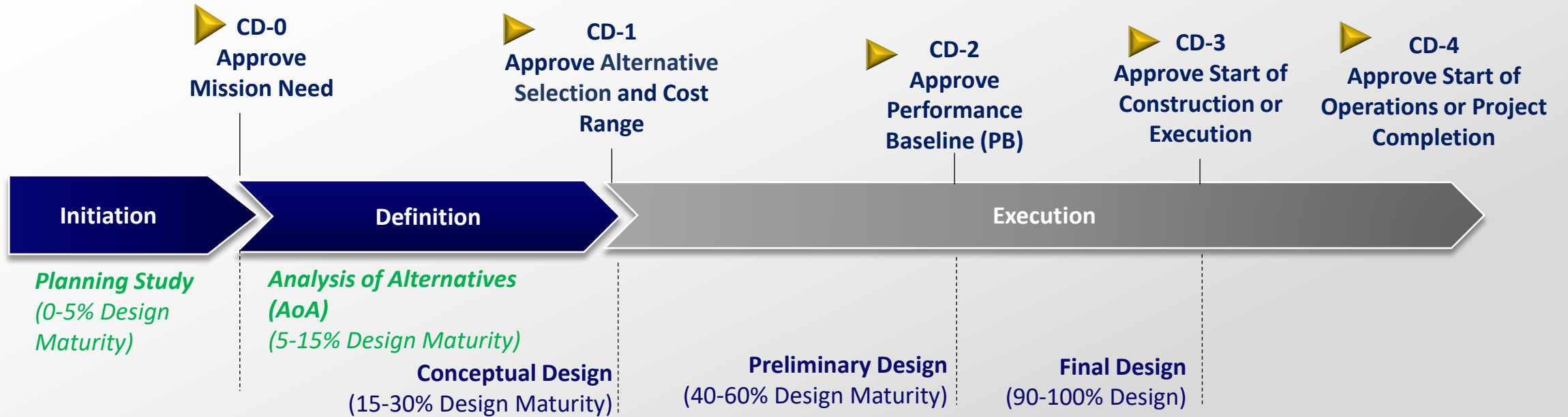
PA&E leads:

- Programmatic cost estimation
- **Execution of all Analysis of Alternatives (AoAs)**
- **Pre-project planning studies**
- Programming process of annual Planning, Programming, Budgeting, and Evaluation (PPBE)
- Continuous improvement and innovation in analytical models, tools, and processes

PA&E's involvement in early-stage comparative analyses makes it well suited to study Equity and Environmental Justice impacts during early project planning.

E&EJ Assessments in the Capital Acquisition Process

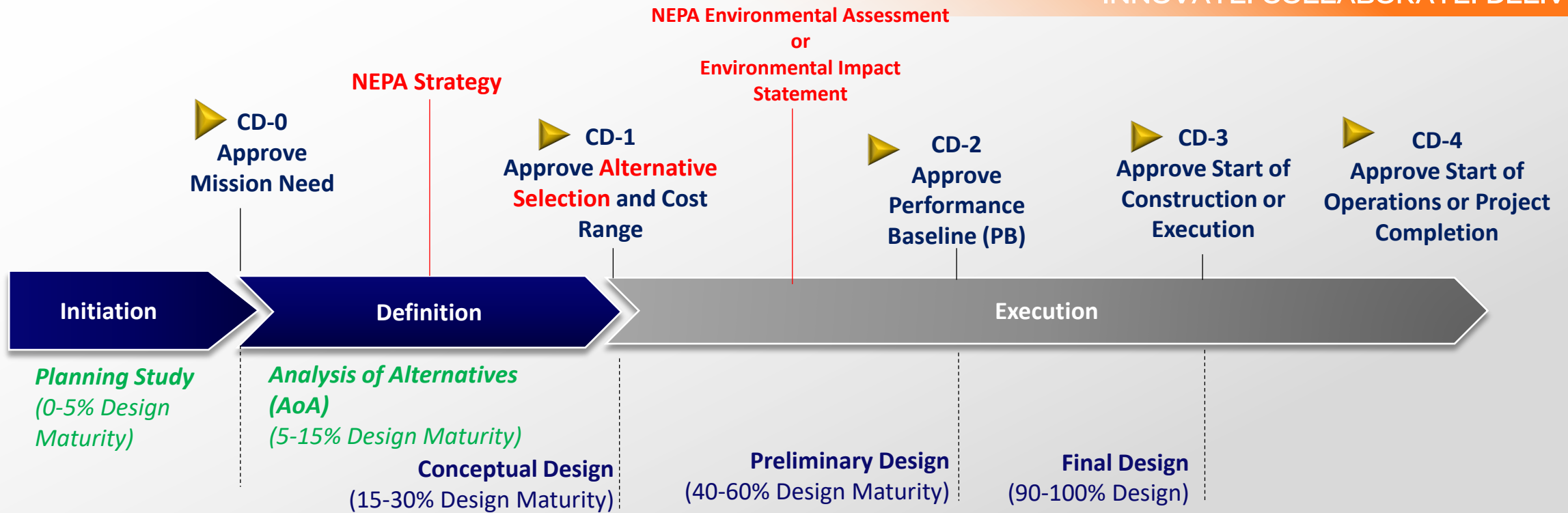
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- AoAs are very early stage (pre-conceptual design, 5-15% design maturity)
- Primarily meant as *comparative* analysis so leadership can understand cost, schedule, and risk tradeoffs before making down-select decision

E&EJ Assessments in the Capital Acquisition Process

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- The NEPA Environmental Assessment or Environmental Impact Statement is completed before start of construction/commitment of resources, but *after* alternative selection.
- It would be extremely difficult to do full NEPA analysis for each alternative

Guiding Principles

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To develop this framework and methodology, PA&E adopted several guiding principles which are based on the Department of Energy's Justice40 policy priorities:

1. Decrease environmental exposure and burdens in disadvantaged communities (DAC)
2. Increase enterprise creation and contracting for Minority/Disadvantaged Business Enterprises
3. Increase job opportunities, job pipeline, and job training for individuals in DAC
4. Increase self-determination in DAC

A fifth guiding principle, based on leadership priorities in the Department of Energy, is to promote sustainability in energy sourcing, construction, and operations.

Literature Review

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PA&E conducted interviews and a literature review to study past and present efforts to incorporate Equity and Environmental Justice in federally managed projects, both within the DOE and at other federal agencies, including:

- Environmental Protection Agency (EPA)
- Food and Drug Administration (FDA)
- Department of Defense
- Department of Commerce
- National Oceanic and Atmospheric Administration (NOAA)
- DOE Office of Economic Impact and Diversity
- DOE Office of Nuclear Energy
- DOE Office of Congressional and Intergovernmental Affairs
- DOE Office of Legacy Management
- NNSA DEIA & Defense Programs DEIA
- NNSA Office of NEPA Policy and Compliance

Major findings from the literature review were grouped into 3 key areas:

- Tribal and Stakeholder Engagement
- Data Collection and Metrics Development
- Management and Governance

Requirements for E&EJ Metrics

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Based on information gathered during the literature review and through interviews, PA&E focused on developing questions and metrics that are:

- **Answerable**

- Something that an analyst could feasibly answer during an AoA or planning study
- Two categories here:
 - Things that can be answered completely internally
 - Things that might require a request for information (RFI)

- **Informative**

- From an alternative selection standpoint, it is helpful to have metrics that differentiate between alternatives.
- However, metrics should not be required to be differentiating. It may still be important for the decision maker to understand that every alternative will, for example, generate intense public pushback, or create hazardous waste that must be disposed of.

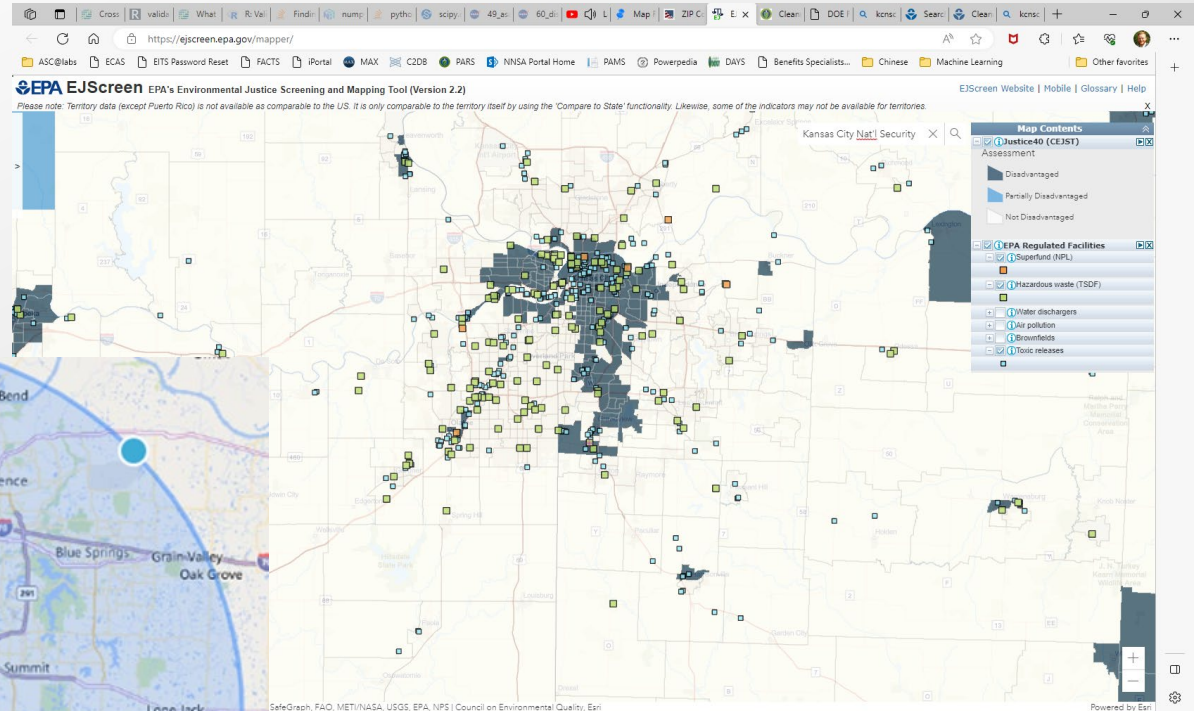
- **Relevant**

- Based on the Justice40 guiding principles
- Not duplicating effort with NEPA or other efforts

Site Profiles

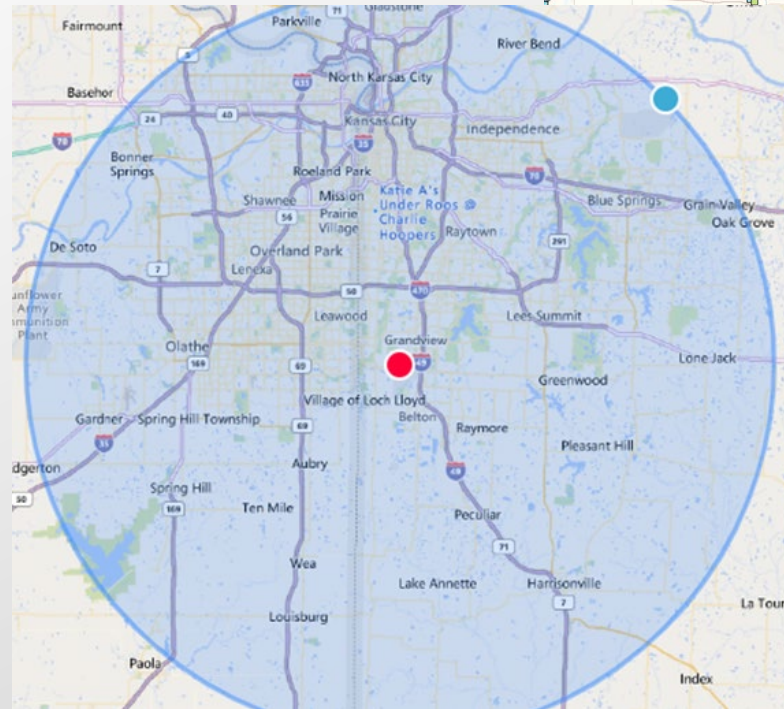
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Using federal data sources, PA&E developed site profiles for each of the NNSA M&O partners by collecting and summarizing data for census tracts within 25 miles of each lab, plant, or site.



Data Sources:

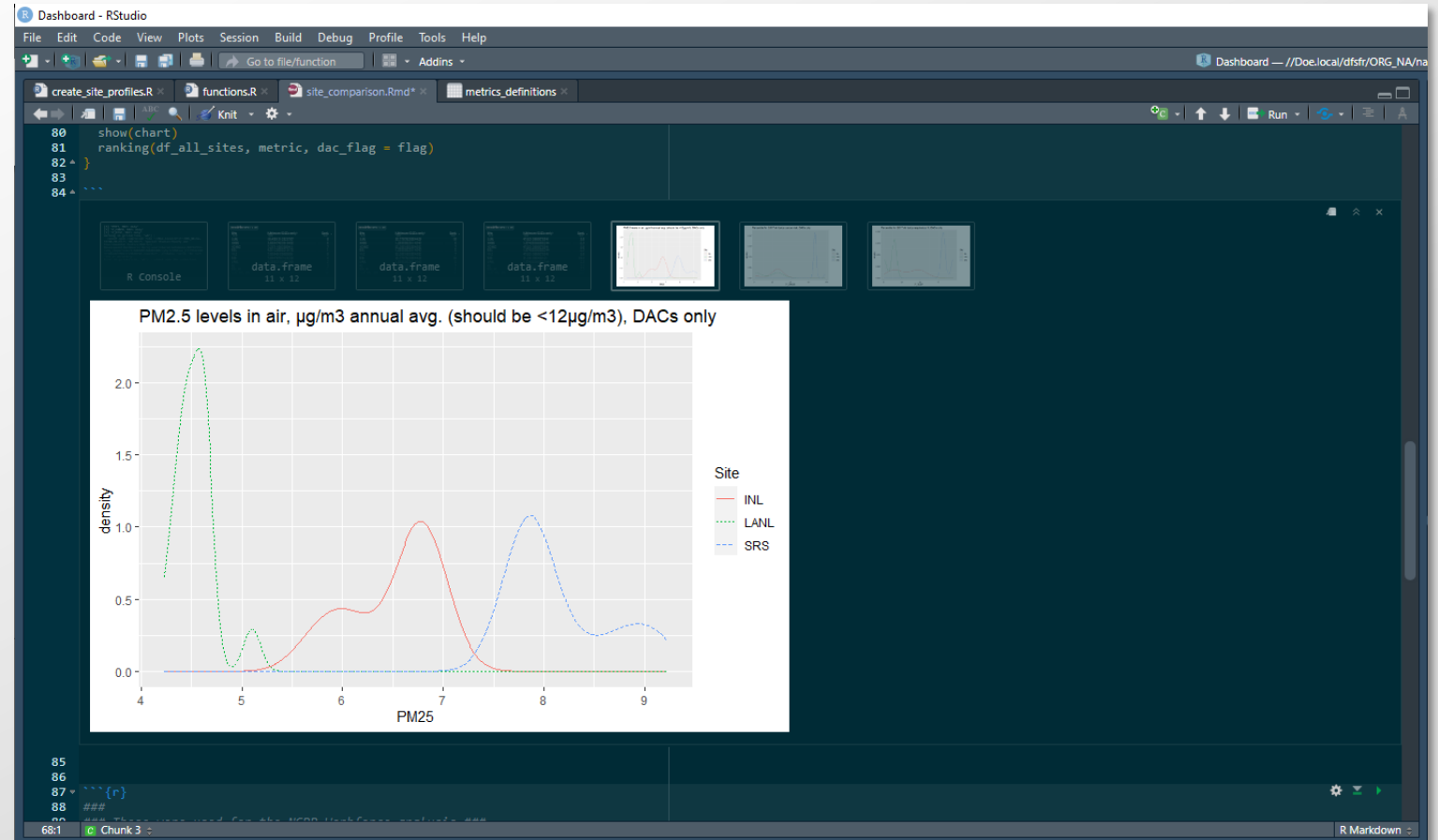
- [US EPA's EnviroAtlas](#)
- [US EPA's EJScreen](#)
- [Climate and Economic Justice Screening Tool \(CEJST\)](#)
- [DOE Justice40 Dashboard](#)
- [CDC/ATSDR: SVI Data and Documentation](#)



Site Comparison Dashboard

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- PA&E developed a dashboard to compare and rank sites for a given metric.
- For a given metric, the dashboard can show entire distributions of values over several regions, or rankings based on central tendency.



Project-Specific Questionnaire

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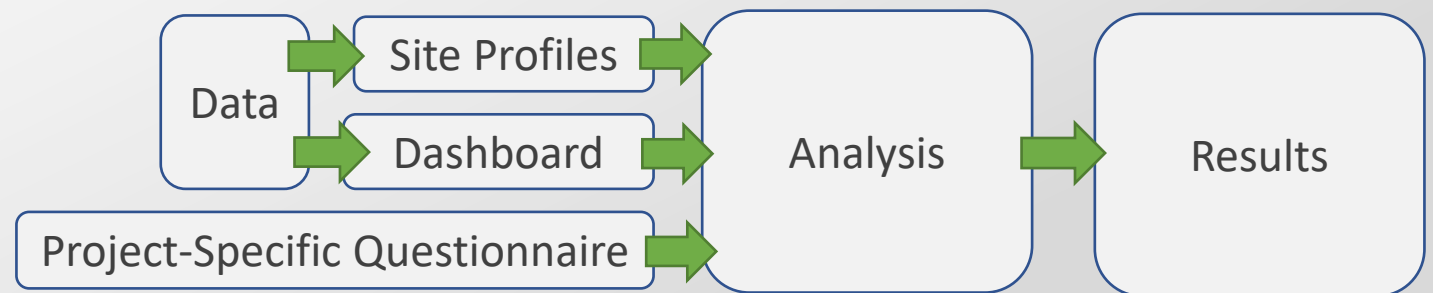
- For a specified project, analysts indicate whether each proposed alternative increases, decreases, or does not change the magnitude of some measurable quantity
- Responses can be quantitative or qualitative
 - Quantitative: “Compared to the status quo alternative, this alternative would increase the quantity of airborne PM2.5 by 0.2 micrograms”
 - Qualitative: “Compared to the status quo alternative, this alternative reduces the overall electricity demand *significantly*.”

Measurable	Category	Compared to the status quo alternative, this alternative			
		Effect - Alt1	Amount - Alt1	Effect - Alt2	Amount - Alt2
# FTEs (crafts)	Workforce	Does not change		Increases	slightly
# FTEs (eng. & sci.)	Workforce	Increases	by 120	Increases	by
# FTEs (prof. & admin.)	Workforce	Increases	by 20	Increases	by
# FTEs (unskilled)	Workforce	Increases	by 50	Increases	by
Average commute time/distance	Transit	Does not change		Does not change	
Project-related (non-commute) transportation emissions	Transit	Does not change		Does not change	
Public transportation infrastructure	Transit	Does not change		Does not change	
Required site infrastructure	Land use	Increases	significantly	Increases	
Archaeological/Historic Resources	Cultural significance	Does not change		Increases	
Chemical Storage and Use/Chemical Exposure	Legacy contamination	Does not change		Does not change	
Clearing or Excavation (indicate if greater than one acre)	Land use	Does not change		Does not change	
Dredge or Fill (under Clean Water Act, Section 404, indicate if	Water	Does not change		Does not change	
Electricity usage	Clean energy	Increases	slightly	Increases	significantly
Greenhouse Gas Emissions (carbon dioxide, methane, nitrous oxide)	Air	Increases	slightly	Increases	significantly
Hazardous Waste	Legacy contamination	N/A		N/A	
Hazardous, Toxic, or Criteria Pollutant Air Emissions	Air	N/A		N/A	
Health and safety-related accidents (quantity)	Health	Increases		Increases	
Health and safety-related accidents (severity)	Health	Does not change		Does not change	
High Energy Sources/Explosives Storage and Use	Legacy contamination	N/A		N/A	
Import, Manufacture, or Processing of Toxic Substances	Legacy contamination	N/A		N/A	
Important Farmland	Land use	Does not change		Does not change	

Methodology

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- PA&E integrates data from site-specific profiles, inter-site rankings, and responses to the project-specific questionnaire to inform its E&EJ analysis.
- PA&E's E&EJ analysis focuses on the following categories:
 - Air
 - Clean energy
 - Climate change
 - Health
 - Housing
 - Legacy pollution
 - Transit
 - Water
 - Workforce
 - Demographic



Sample Workforce and Electricity Analysis

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- To demonstrate the process, PA&E performed a sample analysis for a fictional facility intended to increase the scientific throughput of an existing science-based capability.
- Increasing scientific throughput will:
 - Increase the number of scientific and professional personnel required to support the capability;
 - Increase the overall site electricity demand;
 - Increase partnerships with local universities, provided office space for student interns can be made available.
- The analysis of alternatives seeks to determine:
 - Whether the project will involve a new construction or refurbishment of an existing facility (or a combination of both);
 - Whether the project will be sited at Sandia National Laboratory (SNL) in Albuquerque, New Mexico or Lawrence Livermore National Laboratory (LLNL) near San Francisco, California.

Sample Workforce and Electricity Analysis

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In this hypothetical study, suppose the analyst worked with site and program subject matter experts to fill out this [truncated] questionnaire:

E&J Impact Metric	Selected Alternative				
	New construction (SNL)	New Construction (LLNL)	Refurbishment (SNL)	Refurbishment (LLNL)	Refurb + small new construction (SNL)
# FTEs (crafts)	>	>	=	=	>>
# FTEs (unskilled)	>	>	=	=	>>
# FTEs (eng. & sci.)	>>	>>	>	>	>>
# FTEs (prof. & admin.)	>>	>>	>	>	>>
Opportunities for minority-owned small business and DBE involvement	>	>	=	=	>
Opportunities for open science	>	>	=	=	=
Opportunities for underserved/MSI students	>	>	=	=	=
Electricity usage	>>>	>>>	>	>	>
Key:					
>>> Significant increase >> Increase > Slight increase = Does not change < Slight decrease << Decrease <<< Significant decrease					

Sample Workforce and Electricity Analysis

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Workforce

- Unclear whether it is preferable to bring jobs to the place with the higher unemployment rate per capita, or the area with the larger pool of unemployed persons.
 - Metric: Unemployment data (overall numbers and rate per capita)
- If one considers the number of minorities living in an area as a proxy for the number of minority-owned businesses, then the region around LLNL is likely to provide more opportunities for minority-owned businesses and DBEs than SNL.
 - Metric: Demographic data about number of minorities (overall numbers and rate per capita)
- No difference in number of nearby MSIs.
 - Metric: Names and locations of nearby MSIs

From a job creation perspective, the refurb + new construction alternative is the most favorable since it likely creates the most jobs overall according to the questionnaire. By the same reasoning, the new construction alternatives come next, followed by the refurb alternatives.

Transit

New hires moving into the area would also increase traffic in the area.

Metric:

Job access score

National percentile for traffic

Overall, traffic and its impacts (such as accessibility of jobs) are worse near LLNL than near SNL.

Sample Workforce and Electricity Analysis

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Housing

- In the likely event that new hires move from other parts of the world, the result will be an increased demand for housing. In an area that is already stressed for housing, this may lead to displacement of persons who are already disadvantaged.
 - Metric:
 - National percentile for multi-unit housing
 - National percentile for crowded living conditions
 - National percentile for housing burden

By these measures, there is a greater share of multi-unit housing and more crowded living conditions near LLNL than SNL.

High housing burden is overall a bigger problem for residents near SNL than LLNL; however, when considering DACs only, LLNL-area residents are hit harder than their SNL counterparts.

Electricity

On a statewide level:

- New Mexico generates 22% of its overall electricity footprint from renewables and 78% from hydrocarbons.
- California generates* 49% of its overall electricity footprint from renewables, 10% from nuclear power, and 40% from hydrocarbons.

Alternatives which require a smaller increase in overall electricity footprint rank more favorably than those with a larger footprint.

* Note: California is a net importer of electricity, the source of which is not included in this analysis

Sample Workforce and Electricity Analysis - Results

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Results are summarized in the following table. The best alternative (column) within a given category (row) is highlighted in green, while the worst is typically highlighted in goldenrod. Red highlights are reserved for major drawbacks that could cause significant harm to health, the environment, or the project.

	New construction (SNL)	New Construction (LLNL)	Refurbishment (SNL)	Refurbishment (LLNL)	Refurb + small new construction (SNL)
Professional opportunities	<ul style="list-style-type: none"> Unclear how to prioritize high unemployment rate vs. high unemployment # Unclear whether current unemployed in area would be affected 	<ul style="list-style-type: none"> Would likely create the most opportunities for minority-owned businesses and DBEs 	<ul style="list-style-type: none"> Would likely create fewest jobs Would likely create fewest opportunities for minority-owned businesses and DBEs 	<ul style="list-style-type: none"> Unclear how to prioritize high unemployment rate vs. high unemployment # Unclear whether current unemployed in area would be affected 	<ul style="list-style-type: none"> Would likely create the most jobs
Housing	<ul style="list-style-type: none"> Medium strain on a slightly stressed housing market 	<ul style="list-style-type: none"> Largest strain on a stressed housing market 	<ul style="list-style-type: none"> Least strain on a slightly stressed housing market 	<ul style="list-style-type: none"> Relatively-low impact on a stressed housing market Unclear how to rank compared to SNL New Constr and SNL Refurb + New Constr alts 	<ul style="list-style-type: none"> Medium-to-large strain on a slightly stressed housing market
Transit	<ul style="list-style-type: none"> Medium impact on a slightly stressed environment 	<ul style="list-style-type: none"> Largest negative impact in an already-stressed environment 	<ul style="list-style-type: none"> Smallest impact in a slightly stressed environment 	<ul style="list-style-type: none"> Small impact in an already stressed environment Unclear how to rank compared to SNL New Constr and SNL Refurb + New Constr alts 	<ul style="list-style-type: none"> Medium-to-large impact on a slightly stressed environment
Electricity	<ul style="list-style-type: none"> Largest increase in electricity footprint and relatively low usage of renewable sources of electricity 	<ul style="list-style-type: none"> Large increase in electricity footprint, but relatively high usage of renewable sources of electricity 	<ul style="list-style-type: none"> Small increase in electricity footprint, but relatively low usage of renewable sources of electricity 	<ul style="list-style-type: none"> Smallest increase in electricity footprint and relatively high usage of renewable sources of electricity 	<ul style="list-style-type: none"> Small increase in electricity footprint, but relatively low usage of renewable sources of electricity

Next Steps

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- Community Engagement planning
- Improved sustainability metrics (such as estimating greenhouse gas emissions based on project characteristics)
- Testing and additional development based on pilot efforts



Backups



Simplified AoA Process

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- Understand the mission need. ***What do we need to be able to do?***
- Further refine the mission requirements. ***How many of what needs to be delivered? By when?***
- Develop process and support function requirements. ***What does it take to do that?***
- Develop metrics. ***How will we identify success? Cost, schedule, and risk are always included.***
- Develop alternatives. ***What are some possible ways to get this done?***
- Narrow down the alternatives. ***Are some alternatives incapable of meeting requirements? Are others patently stupid?***
- Perform the analysis. For each remaining alternative
 - Estimate cost and schedule
 - Assess risk
 - Evaluate performance metrics or benefits
- Explain the results. ***Typically, there is no one “best” choice. The decision usually involves explaining the tradeoffs between cost, schedule, risk and effectiveness.***

Background and Purpose of Study

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- Executive Order 13985 “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” called upon federal agencies to:
“assess whether, and to what extent, its programs and policies perpetuate systemic barriers to opportunities and benefits for people of color and other underserved groups.”
- Executive Orders 13990 “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis” and 14008 “Tackling the Climate Crisis at Home and Abroad” require all federal agencies to:
“prioritize environmental justice,” which the EPA defines as *“the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.”*
- A 2001 EPA study titled “Improving alternatives for environmental impact assessment” found that environmental impact assessments are often conducted too late in the decision-making process to significantly affect the outcome:
“Alternatives are foreclosed because the EIA typically starts after an agency has already proposed, and become attached to, a particular project” (Steinemann, 2001)

Key Takeaways: Tribal and Stakeholder Engagement

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- If possible, convene stakeholders before alternatives are identified.
- The earlier the public can be informed, the better they will likely react to a program/project.
- Special attention must be directed toward tribal governments, which are not just stakeholders but rather sovereign bodies.
- Eliminate language barriers by ensuring press releases and public fora are accessible in multiple languages.
- The NNSA Office of Congressional and Intergovernmental Affairs has dealt with public backlash from NNSA projects before and has offered to be a continued resource on how to interface with the public in the future.

Key Takeaways: Data Collection and Metrics Development

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- Plans to address E&EJ require supporting data.
- Metrics should tie into the available data.
- It is important to consider public health, environmental, and economic impacts for each alternative over the product's full lifecycle.
- It is important to weigh an area's history when making decision about its future.
- Metrics should be applicable to policy solutions in addition to construction-based solutions.
- Comparisons need not be detailed – or even quantitative – to be useful.
- The Council on Environmental Quality's Climate and Economic Justice Screening Tool should be used to identify underrepresented groups.
- The NEPA compliance officers have provided guidance documents, site-wide environmental impact statements, and checklists that can be used for early metric development.
- DOE released a racial equity implementation plan with five pillars related to metric development. The first two pillars were identified to be most influential in the AoA process: "Addressing gaps in data collection to facilitate data-informed decision-making" and "Increasing opportunities for new applicants to DOE funding opportunities."

Key Takeaways: Management and Governance

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- E&EJ efforts should work to both prevent future problems and to remedy past ones.
- To improve quality and reproducibility, a standard approach should be developed and documented, if possible.
- PA&E's E&EJ efforts should comply with NEPA and avoid duplication of effort.
- PA&E might consider hiring an analyst specific to this part of the AoA analysis, and who would liaise with the NEPA officers.
- NEPA compliance officers should be included in all key project meetings.
- NNSA has a unique advantage in planning studies, which is that most projects are sited at known anchor locations (the NNSA labs, plants, and sites). This allows PA&E to develop detailed profiles of each site that can be reused across various planning studies.
- The Justice40 initiative is the most developed plan within greater DOE to address current E&EJ gaps. Staying connected with this group will be imperative to downstream metric development.
- There are multiple DOE working groups with parallel efforts that should be monitored, such as the one sponsored by the Office of Scientific Workforce Diversity, Equity, and Inclusion.

Acronyms

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AoA	Analysis of Alternatives
CD	Critical Decision
DOE	Department of Energy
EC	Equipment Complexity
NNSA	National Nuclear Security Administration
EO	Executive Order
SNL	Sandia National Lab
LANL	Los Alamos National Lab
KCNCS	Kansas City National Security Campus
NNSS	Nevada National Security Site
PX	Pantex
SRS	Savannah River Site
Y-12	Y-12 National Security Complex
LLNL	Lawrence Livermore National Lab
PA&E	Programming, Analysis, and Evaluation