CITY OF TUCSON

Commission on Climate, Energy and Sustainability
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Thursday, August 13, 2026, 4-6pm
Hybrid meeting, in person and Microsoft Teams
City Council Ward 6
3202 E 1st Street
Tucson, AZ 85716

Legal Action Report

1) Call to order/Roll call

Quorum achieved and meeting called to order by Chair Stormont at 4:01 pm.

Members present

Dan Stormont (in person)	Representative, City Manager, Chairperson
Katy Brown (online)	Environmental Org Rep, City Manager
Camila Martins-Bekat (online)	Utility Representative, City Manager
Garrett Weaver (in person)	Representative, City Manager
Moises Gomez (on line)	Representative, Mayor
Cassandra Becerra (in person)	Representative, Ward 1
Joseph Rocky Rivera (online)	Representative, Ward 5
Natalie Shepp (in person)	Representative, Ward 6

Members absent

Adriana Bachmann	Representative, Ward 2, Vice-Chairperson

Staff Present

Michael Catanzaro (in person)	Energy Manager, Environmental & General Services Department (EGSD)

2) Call to the audience

None -

3) Los Reales Sustainability Campus Update by Environmental Services Administrator Frank Bonillas

Slide Presentation by Frank Bonillas - Environmental Services Administrator, Sustainability Campus

Discussion about the current area use, future plans, monitoring, compliance and goals

No action taken.

4) Public power options by Daniel Newgarden with Public Power for Tucson

None - no presentation

5) **Approval of minutes from previous commission meeting**

Motion was made by Commission Chair Stormont to approve the minutes of July 9, 2026, duly seconded by Commissioner Shepp. No corrections or suggestions. The motion was passed by a voice vote of 8 to 0.

6) **Climate Resilience report**

No action taken

7) **Energy Manager report**

No action taken

8) **Report from the Chair**

Discussion of related topics mentioned at Mayor and Council meetings this month.
No action taken

9) **Discussion about Public Power Options (Mayor & Council tasking: March 3, 2026)**

- Update on Commissioner Weaver's research on the public power roadmap he had presented previously.
- Commissioner Weaver will send information to disseminate to the Commission about the Mayor and Council task for CCES feedback on public opinion.
- No actions taken

10) **Discussion about Energy Collaboration Agreement (Mayor & Council tasking: April 7, 2026) including discussion of ECA Implementation Strategy draft and Franchise Agreement**

- Reminder for Commissioners to send comments to Chief Resilience Officer Luna about the ECA Implementation Strategy.
- Discussion led by Commissioner Martins-Bekat about the Franchise Agreement purpose and coverage.
- No action taken

11) **Data Center Report discussion**

- Discussion about the Draft report and its current relevance
- Motion was made by Commissioner Brown to send the Energy Use section only of the Draft Report with a cover note to Mayor and Council. In addition, a cover letter with attached recently published *Data Centers and the Climate Landscape: An Actionable Resource for US Mayors* would also be sent to Mayor and Council. This was seconded by Commissioner Shepp.

  The motion passed by voice vote, 6-2.

12) **Subcommittee reports**

none

13) **Future agenda items and discussion about potential venue and time change**

Future meeting time discussion next meeting

14) **Adjournment**

Adjournment called at 6:04 by Commission Chair Stormont

Energy Collaboration Agreement (ECA) Implementation Strategy

DRAFT

June 2026

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1. Introduction and Purpose

The Energy Collaboration Agreement (ECA) between the City of Tucson and Tucson Electric Power (TEP) establishes a long-term framework to advance shared goals related to climate resilience, energy affordability, workforce development, greenhouse gas emissions reduction, and reliable electric service. The agreement supports implementation of Tucson Resilient Together (TRT), the City's climate action and adaptation plan, and reflects priorities identified through the Tucson's Energy Future community engagement process. The ECA will become effective upon voter approval of a new Franchise Agreement in November 2026.

If approved, the agreement would provide annual funding beginning at $2 million per year and increasing by 2% annually over the term of the agreement, totaling approximately $64 million over 25 years. These funds would support projects and initiatives consistent with the goals of the agreement and would not be recovered through customer electric rates.

Tucson faces increasing climate and affordability challenges, including extreme heat, aging housing stock, rising energy burden, and the need for resilient community infrastructure. This Implementation Strategy establishes the City's framework for strategically investing ECA funds in ways that reduce household energy burden, strengthen community resilience, advance greenhouse gas emissions reductions, and support long-term community benefit. The strategy is intended to support transparent, accountable, and adaptable implementation of the ECA while providing an investment framework that can inform broader climate resilience efforts over time.

2. Community Priorities, Implementation Approach, and Desired Outcomes

This section describes the community priorities reflected in the Energy Collaboration Agreement and the framework intended to guide investments and achieve long-term community outcomes.

2.1 Community Priorities Reflected in the ECA

The ECA identifies six community energy objectives that inform this implementation strategy:

- **Clean Energy Transition-** Support progress toward a 100% clean, renewable citywide energy supply by 2045 and promote continued transparency regarding interim targets and progress.
- **Resilience and Infrastructure Upgrades -** Strengthen community resilience to extreme heat and other emergencies.
- **Affordability and Ratepayer Protection -** Promote affordable energy solutions and support low-income residents facing rising energy costs.
- **Equity-Centered Climate Action -** Prioritize historically underserved areas through programs and investments.

- **Transparency and Accountability -** Promote regular public reporting, data sharing, and community education regarding energy programs and services.
- **Workforce and Economic Development -** Support pathways to future energy careers and economic opportunities, prioritizing economically disadvantaged residents.

These priorities establish the foundation for the agreement and provide direction on the types of outcomes the community seeks to achieve. Translating these priorities into action requires a framework for making investment decisions over time.

2.2 Implementation Approach

To translate these community priorities into action, the City intends to apply the following considerations across ECA investments and programs. These considerations are intended to be applied together and are not listed in priority order. Depending on the type of investment or program, different considerations may carry different weight.

- **Reduce Energy Burden -** Prioritize investments that help households save energy, lower costs, strengthen resilience, and provide broad community benefits, particularly for low-income households and vulnerable communities.
- **Maximize Impact per Dollar -** Prioritize investments that deliver multiple benefits and maximize long-term impact through strategic, phased investment pathways. Whenever feasible, investments should emphasize energy efficiency and weatherization before electrification, and electrification before solar and battery storage. Investments should also seek to leverage additional resources (such as existing TEP programs as well as other state and federal programs) to maximize community benefits and expand the impact of ECA funding.
- **Prioritize Vulnerable Communities -** Focus investments where needs are greatest and opportunities for lasting community benefit are highest, considering factors such as energy burden, heat vulnerability, housing conditions, and other indicators of need.
- **Build Local Capacity and Partnerships** - Support workforce development, implementation capacity, and partnerships that strengthen Tucson's long-term ability to deliver climate and resilience investments.
- **Ensure Transparent and Adaptive Implementation -** Support public reporting, measurable outcomes, community engagement, and flexible implementation that can adapt to changing technologies, funding opportunities, community needs, and lessons learned over time.

Together, these considerations are intended to help ensure that investments remain aligned with community priorities while providing flexibility to respond to changing needs and opportunities over time. They also provide a framework for strategically accelerating implementation of Tucson Resilient Together.

2.3 Advancing Tucson Resilient Together

Tucson Resilient Together (TRT) includes 24 strategies and 122 actions across five focus areas. While the ECA does not fund every action, it provides an opportunity to accelerate implementation of approximately 50 actions and supports progress across all five focus areas. **Appendix A** provides a crosswalk between ECA

commitments and related TRT actions, demonstrating how this strategy organizes and prioritizes investments to advance existing commitments rather than create a new agenda.

2.4 Desired Outcomes

Together, the community priorities and implementation approach are intended to support three broad outcomes:

- **Affordable, Clean, and Efficient Energy –** Support lower household energy burden, improve access to energy efficiency and clean energy resources, and reduce greenhouse gas emissions.
- **Resilient Communities -** Strengthen Tucson's ability to prepare for and respond to extreme heat, emergencies, and other climate-related risks, with a focus on vulnerable communities.
- **Economic Opportunity and Community Benefit -** Support workforce development, leverage additional investments, and ensure that ECA funds deliver broad and lasting benefits for Tucson residents.

3. Adaptive Investment Framework

The Energy Collaboration Agreement contains a broad range of commitments related to greenhouse gas emissions reduction, community resilience, energy affordability, workforce development, and reliable electric service. While all commitments remain important components of the City's long-term approach, the investment framework below is intended to guide annual investments during the **initial years of implementation**.

Consistent with community priorities identified through Tucson's Energy Future Townhalls and subsequent discussions with City staff, the Climate Action Team, and the Commission on Climate, Energy, and Sustainability (CCES), the City intends to prioritize investments that provide direct and lasting benefits to residents while building the partnerships, workforce, and institutional capacity necessary to support long-term implementation.

This emphasis on household and community investments is also supported by technical analysis. The Pima County Comprehensive Climate Action Plan identified buildings as one of the largest sources of community greenhouse gas emissions, accounting for approximately 41 percent of regional emissions. Regional analysis further demonstrates that investments in weatherization, energy efficiency, rooftop solar, and battery storage provide multiple benefits, including reduced utility costs, improved indoor comfort during extreme heat, enhanced public health, lower greenhouse gas emissions, and increased community resilience. In addition, the City's cost-benefit analysis found that many household-focused investments provide some of the strongest economic returns while delivering significant community benefits. Together, these analyses support prioritizing investments that directly benefit residents and address the underlying causes of high energy burden.

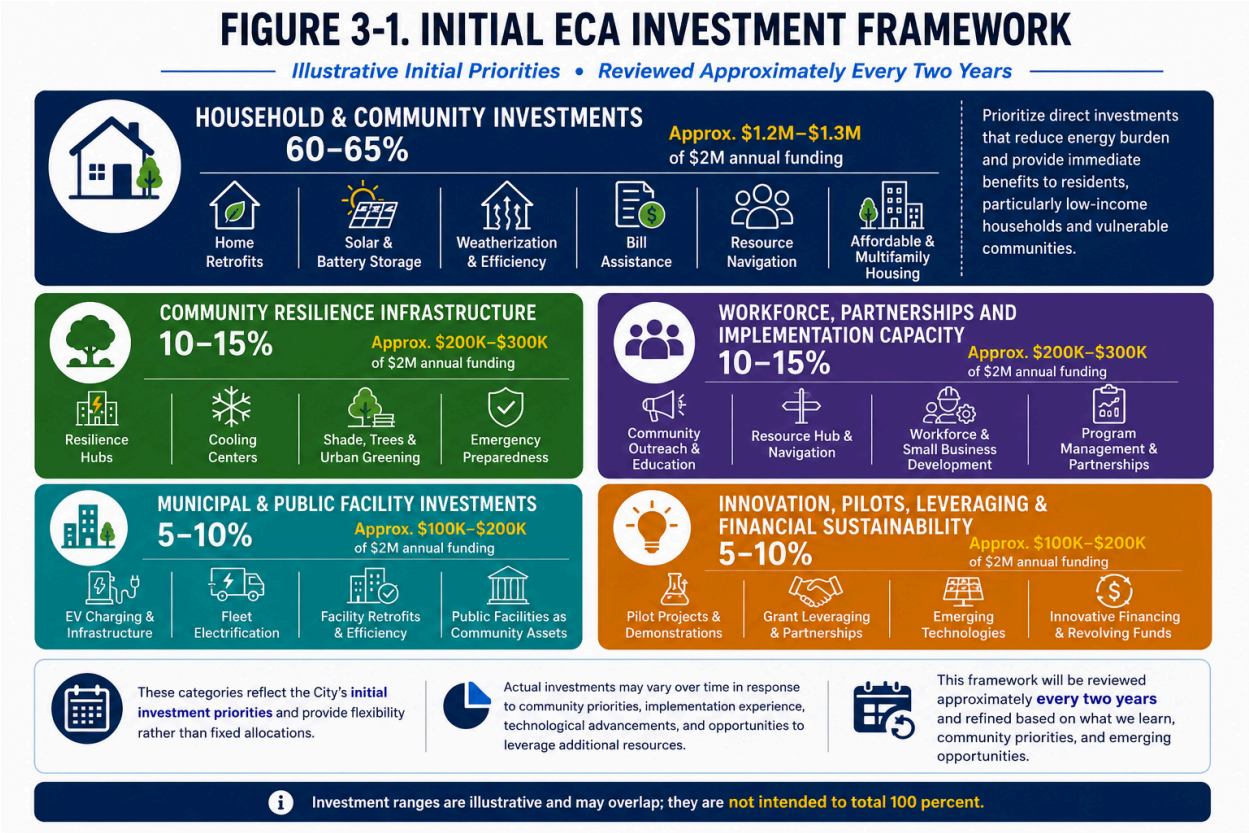
Accordingly, the City proposes directing a majority of ECA resources toward household and community-scale investments during the initial years of implementation while maintaining flexibility to adapt investments over time.

Consistent with principles of adaptive management, the framework should be reviewed approximately every two years and may evolve in response to community priorities, implementation experience, technological advancements, and opportunities to leverage additional resources.

Some ECA commitments are expected to be ongoing, opportunity-driven, or implemented over longer time horizons. Appendix A provides a detailed inventory of ECA commitments, related Tucson Resilient Together actions, timing, and implementation emphasis.

3.1 Initial Annual Investment Framework

The ranges shown below are intended to guide annual investments and are not intended to establish fixed or permanent allocations[1]. Actual investments may vary over time in response to community priorities, implementation experience, technological advancements, and opportunities to leverage additional resources.



Household and Community Investments (60-65%)

Early implementation is anticipated to prioritize direct household and community investments that reduce energy burden, improve housing conditions, strengthen resilience, and support long-term affordability outcomes.

Potential investments may include:

- Home energy audits and retrofits;
- Weatherization and HVAC retrofits;
- Building electrification and distributed energy resources;
- Solar and battery storage systems;
- Expansion of the Solar Empowerment Program;

[1] Ranges are illustrative and may overlap; they are not intended to sum to 100%

- Utility bill assistance tied to long-term energy burden reduction strategies;
- Resource navigation and connections to existing programs and incentives;
- Investments benefiting manufactured homes and affordable housing; and
- Other programs that improve affordability, resilience, and household energy security.

Utility bill assistance is intended to provide short-term stabilization support and should generally be paired with efforts that reduce long-term energy burden, including weatherization, energy efficiency, and resource navigation programs.

Community Resilience Infrastructure (10-15%)
Support investments that strengthen Tucson's ability to prepare for and respond to extreme heat and other emergencies.

Potential investments may include:

- Resilience hubs and backup power systems;
- Critical infrastructure planning and assessments;
- Cooling centers and cooling infrastructure;
- Shade structures and urban greening;
- Tucson Million Trees and nature-based solutions;
- Emergency preparedness and resource coordination.

Workforce, Partnerships, and Implementation Capacity (10-15%)
Investments in workforce and implementation capacity are intended to build the people, partnerships, and systems necessary for successful implementation of the ECA.

Potential investments may include:

<u>Community Access and Education</u>

- Community navigation and multilingual outreach;
- Centralized resource hubs and customer support services;
- Energy literacy and public education programs; and
- Community engagement and biennial (every two years) framework reviews.

<u>Workforce and Small Business Development</u>

- Energy auditor training and workforce development initiatives;
- Internships, apprenticeships, and career pathways that prepare residents for careers in energy and climate-related sectors;
- Contractor development and technical assistance for local businesses;
- Partnerships with educational institutions, workforce organizations, and utilities;
- Business coaching, certifications, and support services that help local firms participate in energy efficiency and electrification markets; and

- Exploration of an Energy Workforce Accelerator or similar initiative designed to strengthen Tucson's residential energy workforce and contractor ecosystem.

Program Delivery and Coordination

- Program administration, staffing, and implementation support capacity;
- Greenhouse gas inventories, reporting, and performance monitoring; and
- Coordination with utilities, community organizations, educational institutions, and other partners to support successful implementation.

Municipal and Public Facility Investments (5-10%)
Lead by example and support investments that reduce emissions, improve resilience, and create long-term operational savings.

Potential investments may include:

- Energy efficiency improvements in City facilities;
- Municipal electrification projects;
- Fleet electrification;
- EV charging infrastructure and EV readiness;
- Public-facing infrastructure and community facilities;
- Projects that generate operational savings that can be reinvested over time.

Innovation, Pilots and Leveraging (5-10%)
Maintain flexibility to pursue emerging opportunities and maximize the impact of ECA resources.

Potential opportunities may include:

- Pilot projects and demonstration programs;
- Emerging clean energy technologies;
- Solar street lighting;
- Matching funds for grants and partnerships;
- Public-private collaborations;
- Exploration of revolving fund models; and
- Innovative financing mechanisms that reinvest savings and leverage additional resources over time.

Not all activities within a category are expected to receive the same level of funding. Some activities, such as reporting, coordination, and community engagement, are expected to require relatively modest investments while providing essential support for successful implementation.

3.2 Looking Beyond the Initial Years

The framework presented in this section is intended to guide investments during the initial years of implementation and is not intended to establish fixed or permanent allocations. Major investments in

community resilience infrastructure, emerging technologies, workforce programs, and other opportunities may evolve over time as implementation experience grows and additional funding sources become available.

Consistent with principles of adaptive management, the framework should be reviewed approximately every two years to ensure continued alignment with community priorities and the goals of the Energy Collaboration Agreement.

4. Household and Community Investments

This section supports implementation of the household-related commitments contained in the Energy Collaboration Agreement. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

4.1 Purpose

Household and community investments are intended to reduce energy burden, improve resilience, expand access to clean energy technologies, and provide direct and lasting benefits to Tucson residents. Consistent with community feedback and technical analysis, these investments represent the highest priority during the initial years of implementation.

Investments in homes and buildings provide multiple benefits, including lower utility costs, improved indoor comfort during extreme heat, reduced greenhouse gas emissions, improved indoor air quality and public health, and increased community resilience. As a result, household and community investments are expected to receive the largest share of ECA resources.

4.2 Strategic Priorities

Household and community investments should seek to:

- Reduce energy burden and address the underlying causes of high utility costs;
- Maximize long-term affordability, resilience, and community benefits;
- Prioritize investments that provide lasting benefits rather than one-time assistance whenever feasible;
- Coordinate with existing programs and incentives to maximize impact; and
- Support equitable access to energy efficiency, electrification, and distributed energy resources.
- Improve health, safety, indoor comfort, and indoor air quality, particularly for vulnerable residents.

4.3 Priority Populations

Because ECA resources are limited, investments should prioritize households and communities experiencing the greatest need and opportunity for impact. During the initial years of implementation, priority should generally be given to:

- Low-income households;
- Households experiencing high energy burden;
- Older adults and individuals with disabilities;
- Residents located in areas with elevated heat vulnerability;
- Owner-occupied homes;

- Manufactured homes and mobile home communities; and
- Communities that have historically experienced disproportionate environmental and economic burdens.

Investments benefiting moderate-income households may also be considered when projects leverage additional resources, provide broader community benefits, or support overall program participation and effectiveness.

4.4 Household Readiness Framework

Rather than viewing investments as one-time projects, the City intends to support phased pathways toward resilient, energy-efficient, lower-emission, and healthy homes and buildings. Depending on the condition of the home, households may require different types of investments and may progress through readiness levels over time.

Readiness Level	Example Focus
Stabilization	Health, safety, accessibility, indoor environmental quality, or structural improvements needed before energy upgrades
Efficiency	Weatherization, insulation, HVAC retrofits, and other energy efficiency improvements
Electrification Readiness	Electrical upgrades and/or improvements supporting future electrification
Distributed Energy Resources	Solar, battery storage, and other distributed energy technologies
Resilience and Backup Power	Battery storage and backup resilience systems

This framework is intended to maximize long-term affordability, resilience, and investment impact. Whenever feasible, investments should seek to address energy efficiency opportunities before electrification, and electrification opportunities before solar and battery storage. Whenever replacement equipment is supported through the ECA, investments should prioritize high-efficiency, non-fossil fuel technologies that reduce greenhouse gas emissions, lower household energy costs, and improve long-term resilience.

4.5 Utility Bill Assistance

Utility bill assistance can provide important short-term relief to vulnerable households during periods of financial hardship and extreme weather. However, bill assistance alone does not address the underlying causes of high energy burden.

Accordingly, utility bill assistance should generally complement—not replace—investments in weatherization, energy efficiency, electrification, resource navigation, and other measures that provide lasting reductions in household energy costs.

4.6 Multifamily and Rental Housing Considerations

The City recognizes the importance of improving energy affordability and resilience in multifamily and rental housing while ensuring investments support broad public benefit.

Investments in multifamily and rental housing may also provide important health and resilience benefits by improving indoor comfort, reducing exposure to extreme heat, lowering energy costs, and supporting healthier living environments for residents.

Early implementation may prioritize:

- Publicly supported affordable housing;
- Income-restricted affordable housing;
- Properties serving low-income households; and
- Projects demonstrating clear and lasting benefits for tenants and the broader community.

Future implementation guidance may establish additional affordability, tenant benefit, and community outcome considerations.

4.7 Leveraging Existing Resources and Public Benefit

Because ECA resources are limited, investments should seek to maximize community benefits by coordinating with existing programs, incentives, and funding opportunities whenever feasible.

Potential partners and resources may include:

- Tucson Electric Power programs and incentives;
- Tucson Water rebates and conservation programs;
- Housing and Community Development programs;
- The Solar Empowerment Program;
- Federal and state incentives;
- Philanthropic investments; and
- Other public and private funding opportunities.

Leveraging existing resources can expand the reach of ECA investments, reduce costs, and maximize benefits to residents. Implementation should consider long-term affordability outcomes, support owner-occupied and community-serving investments, encourage equitable geographic distribution of investments, and seek to maximize direct benefits to occupants whenever feasible. Implementation should also seek to ensure that investments do not unintentionally increase housing costs or contribute to displacement of vulnerable residents.

5. Community Resilience Infrastructure

This section supports implementation of community resilience infrastructure ECA commitments. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

5.1 Purpose

Community resilience infrastructure investments are intended to strengthen Tucson's ability to prepare for, withstand, and recover from extreme heat and other climate-related emergencies. These investments are designed to complement household investments by providing community-scale benefits that improve public health, increase emergency preparedness, and enhance quality of life.

Consistent with Tucson Resilient Together, resilience investments should seek to deliver multiple benefits whenever feasible, including reduced heat exposure, improved public health, stronger social connections, environmental benefits, and enhanced emergency response capabilities.

5.2 Strategic Priorities

Community resilience investments should seek to:

- Strengthen preparedness for extreme heat and other climate-related hazards;
- Support vulnerable populations and communities experiencing elevated heat risk;
- Deliver multiple benefits related to public health, environmental quality, and quality of life;
- Coordinate with existing City plans and partner organizations;
- Leverage nature-based solutions whenever feasible; and
- Build community capacity and social resilience alongside physical infrastructure.

5.3 Resilience Hubs and Critical Infrastructure

Resilience hubs are intended to serve as community assets that strengthen emergency preparedness and improve access to resources before, during, and after emergencies.

Investments may support:

- Resilience hubs and neighborhood resilience centers;
- Solar and battery storage systems;
- Backup power and energy reliability improvements;
- Critical infrastructure assessments and inventories;
- Facility retrofits supporting emergency operations; and
- Coordination with emergency management and community partners.

The City anticipates that resilience hubs will continue to evolve over time based on community needs, lessons learned, and available resources.

5.4 Cooling Infrastructure and Heat Resilience

Extreme heat represents one of Tucson's most significant climate risks. Investments intended to reduce heat exposure and improve community resilience may include:

- Cooling centers and cooling infrastructure;
- Shade structures;
- Drinking water access;
- Public space improvements;
- Heat preparedness resources and communication systems; and
- Other projects that reduce heat-related health risks.

These investments should seek to complement the City's Heat Action Roadmap and other existing heat mitigation and public health initiatives.

5.5 Urban Greening and Nature-Based Solutions

Nature-based solutions provide multiple environmental, health, and resilience benefits and represent an important component of Tucson's climate adaptation strategy.

Investments may support:

- Tucson Million Trees initiatives;
- Tree planting and maintenance;
- Green stormwater infrastructure;
- Landscape retrofits;
- Shade and cooling projects;
- Biodiversity and habitat improvements; and
- Other projects that provide ecosystem and community benefits.

Whenever feasible, nature-based solutions should prioritize areas experiencing elevated heat exposure and limited access to shade and green space.

5.6 Emergency Preparedness and Coordination

Community resilience depends not only on physical infrastructure, but also on strong partnerships and coordinated response systems.

Investments may support:

- Emergency preparedness planning;
- Resource sharing and coordination;
- Community-based organizations and trusted messengers;
- Partnerships with public agencies, utilities, and nonprofit organizations;
- Public education and preparedness efforts; and
- Strategies that strengthen social cohesion and community resilience.

6. Workforce, Partnerships, and Implementation Capacity

This section supports implementation of ECA commitments related to workforce development, partnerships, and implementation capacity. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

6.1 Purpose

Successful implementation of the Energy Collaboration Agreement will require more than investments in infrastructure and technology. It will require people, partnerships, and systems capable of supporting residents, coordinating programs, measuring progress, and adapting over time.

Accordingly, investments in workforce, partnerships, and implementation capacity are intended to build the institutional and community capacity necessary to maximize the long-term benefits of the ECA while ensuring programs remain accessible, accountable, and responsive to community needs.

These investments are intended to strengthen community access to resources, support workforce development, expand opportunities for local businesses, and provide the staffing, partnerships, and systems necessary to successfully implement the Energy Collaboration Agreement over the next 25 years.

6.2 Community Access, Outreach, and Education

Access to information and trusted support systems is critical to ensuring residents can benefit from available programs and resources.

Investments may support:

- Community navigation and multilingual outreach systems;
- Centralized resource hubs and customer support services;
- Energy literacy and public education programs;
- Community engagement activities;
- Partnerships with trusted messengers and community-based organizations; and
- Biennial (every two years) framework reviews and other opportunities for community feedback.

Whenever feasible, outreach and engagement efforts should be culturally responsive and designed to reduce barriers to participation.

6.3 Workforce Development and Small Business Capacity

Regional workforce efforts have traditionally focused on large industrial sectors and advanced manufacturing. However, achieving community-scale energy efficiency and electrification goals will also require strengthening the residential energy workforce.

Home retrofits, weatherization, HVAC replacement, electrification, solar installation, and related services are largely delivered by small and medium-sized businesses. While many local firms possess relevant skills, existing businesses often specialize in a single service and may face barriers related to training, certifications, financing, and scaling services.

The Urban Institute's analysis identified construction firms, electricians, HVAC contractors, and related trades as well positioned to contribute to building decarbonization and resilience efforts, while also highlighting opportunities to strengthen implementation capacity and participation in existing programs. Existing state and utility incentive programs already provide resources to support residential energy improvements, but maximizing these opportunities will require a broader network of qualified businesses and workers capable of delivering projects at scale.

Investments may support:

- Energy auditor training and workforce development initiatives;
- Contractor development and technical assistance for local businesses;

- Business coaching, certifications, and support services;
- Educational outreach and career awareness programs;
- Internships, apprenticeships, and workforce pathways that prepare residents for careers in energy and climate-related sectors;
- Youth engagement and career exploration opportunities;
- Partnerships with educational institutions including the University of Arizona, Pima Community College, and local school districts; workforce organizations; utilities; community organizations; financial institutions; and other public and private partners; and
- Other initiatives that expand economic opportunity and strengthen Tucson's residential energy workforce ecosystem.

The City should also explore partnerships and programs that strengthen Tucson's residential energy workforce and contractor ecosystem. One opportunity may include development of an Energy Workforce Accelerator or similar initiative designed to help local businesses and workers participate in emerging opportunities related to weatherization, electrification, and building decarbonization.

Particular emphasis should be placed on expanding the availability of qualified energy auditors, supporting contract participation in utility, state, and federal incentive programs, and strengthening the local capacity needed to deliver residential retrofit projects at scale.

Potential activities may include:

- Training and credentialing;
- Contractor networking and peer learning;
- Program navigation assistance;
- Connections to incentives and financing opportunities;
- Business development services; and
- Partnerships with utilities, educational institutions, and workforce organizations.

Such efforts are intended to strengthen the local ecosystem of businesses capable of delivering comprehensive residential energy improvements while maximizing the benefits of existing state, utility, and federal programs.

6.4 Program Administration and Implementation Support

Effective ECA implementation will require dedicated capacity to coordinate programs, manage partnerships, monitor progress, and support adaptive management.

Investments may support:

- Program administration and staffing;
- Technical assistance and program design;
- Data management and performance tracking;
- Community engagement and partnership development;
- Interdepartmental coordination;
- Adaptive management and biennial reviews; and
- Other activities necessary to support successful implementation.

6.5 Measurement, Reporting, and Accountability

Transparent reporting and continuous learning are essential to ensuring ECA investments remain aligned with community priorities and intended outcomes.

Investments may support:

- Greenhouse gas inventories and emissions reporting;
- Performance metrics and program evaluation;
- Public reporting and communication;
- Data collection and analysis;
- Community feedback processes; and
- Continuous improvement efforts.

These activities are intended to support accountability and provide information necessary to guide future investment decisions.

6.6 Partnerships and Coordination

Successful implementation of the Energy Collaboration Agreement will depend on collaboration across City departments and with a diverse network of public, private, educational, nonprofit, philanthropic, and utility partners.

Potential partners may include:

- Tucson Electric Power;
- Pima County;
- Educational institutions and workforce organizations (such as Pima Community College, University of Arizona, J-TED, local school districts, etc.);
- Community-based organizations and trusted messengers;
- Nonprofit organizations (such as AllThrive365, Sonoran Environmental Research Institute, etc.);
- Financial institutions, green banks, industrial development authorities, and other financing partners;
- Philanthropic partners;
- Small businesses and trade associations; and
- Other public and private entities.

Strong partnerships can help maximize resources, expand community benefits, and support long-term program sustainability.

7. Municipal and Public Facility Investments

This section supports implementation of ECA commitments related to municipal and public facility investments. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

7.1 Purpose

Municipal and public facility investments are intended to reduce greenhouse gas emissions, improve resilience, generate long-term operational savings, and demonstrate leadership in advancing Tucson Resilient Together goals. Household and community investments are expected to remain the highest priority during the initial years of implementation.

7.2 Strategic Priorities

Municipal and public facility investments should seek to:

- Reduce greenhouse gas emissions from municipal operations;
- Improve the efficiency and resilience of City facilities and assets;
- Generate long-term operational savings where feasible;
- Demonstrate emerging technologies and best practices;
- Support public-facing infrastructure and community facilities; and
- Maximize community benefits and opportunities to leverage additional resources.

Whenever feasible, investments should seek to complement existing capital improvement programs, grants, and departmental initiatives.

7.3 Public Facility Retrofits

The City operates a diverse portfolio of buildings and facilities that provide important services to residents. Strategic investments in these facilities can improve efficiency, reduce emissions, and strengthen resilience.

Investments may support:

- Energy efficiency retrofits;
- HVAC retrofits and building improvements;
- Electrification projects;
- Lighting upgrades;
- Building automation and energy management systems;
- Solar and battery storage systems;
- Backup power systems; and
- Other improvements that reduce emissions and operating costs.

Whenever feasible, projects should seek to maximize operational savings and community benefits.

7.4 Fleet Electrification and Transportation Infrastructure

Transportation represents an important component of municipal greenhouse gas emissions. Investments in fleet and transportation infrastructure can support cleaner operations while demonstrating leadership and creating opportunities for broader community adoption.

Investments may support:

- Fleet electrification;
- EV charging infrastructure;
- EV readiness improvements;
- Charging infrastructure at community facilities; and
- Other projects that reduce transportation-related emissions.

Whenever feasible, projects should seek to align with broader City transportation and mobility goals.

7.5 Public Facilities as Community Assets

Municipal facilities often serve broader community functions beyond their primary operations. Accordingly, investments should seek to maximize public benefit and may prioritize facilities that:

- Serve vulnerable populations;
- Provide community services;
- Support emergency response and resilience;
- Enhance public access to clean energy technologies; or
- Create educational and demonstration opportunities.

Projects that provide both operational and community benefits should be prioritized whenever feasible.

7.6 Leveraging Existing Resources

Municipal and public facility investments should seek to maximize the impact of ECA resources by coordinating with existing funding sources and programs.

Potential resources may include:

- Federal and state grants;
- Utility incentives;
- Capital improvement programs;
- Departmental budgets;
- Public-private partnerships; and
- Other external funding opportunities.

Leveraging additional resources can help extend the impact of ECA investments and preserve funding for direct community benefits. Opportunities may also include coordination with local development policies, incentive programs, and permitting processes that encourage higher levels of energy efficiency, electrification, and community resilience.

7.7 Reinvestment, Financial Sustainability, and Innovation

Whenever feasible, municipal and public facility investments should seek to generate long-term value, operational savings, and opportunities to leverage additional resources. Strategic investments that reduce energy consumption, improve efficiency, or lower operating costs may create opportunities to reinvest savings into future climate and resilience initiatives.

Over time, these savings and external resources may help support innovative financing approaches that expand the impact of ECA investments and improve long-term financial sustainability.

Implementation guidance should explore opportunities to:

- Reinvest operational savings into additional climate and resilience projects;
- Establish revolving fund models or similar mechanisms that create self-sustaining investment cycles;
- Leverage grants, utility incentives, and other external funding sources;
- Support public-private partnerships and innovative financing approaches; and
- Maximize the long-term impact of ECA resources.

The intent of these approaches is not to replace direct community investments, but rather to create self-reinforcing systems that allow ECA resources to generate benefits beyond the initial investment.

Consistent with principles of adaptive management, financing strategies and investment approaches may evolve over time in response to operational needs, technological advancements, lessons learned, and opportunities to maximize public benefit.

8. Innovation, Pilots, Leveraging, and Financial Sustainability

This section supports implementation of ECA commitments related to innovation, pilots, leveraging, and financial sustainability. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

8.1 Purpose

Innovation, pilot projects, leveraging strategies, and financial sustainability are intended to maximize the impact of ECA resources, preserve flexibility, and position the City to respond to evolving technologies, funding opportunities, and community needs. By fostering innovation, partnerships, and strategic leveraging, this category seeks to extend the benefits of ECA investments and support long-term financial sustainability.

8.2 Pilot Projects and Emerging Opportunities

Pilot projects and emerging opportunities can help the City test new approaches, evaluate performance, and reduce barriers to broader implementation. Investments may support:

- Demonstration projects;
- Emerging clean energy technologies;
- Solar street lighting;
- Innovative resilience solutions;
- Community-scale pilot programs;
- New service delivery models; and
- Other projects that provide opportunities for learning and replication.

Not all opportunities can be anticipated in advance. Some investments may be driven by emerging technologies, grant opportunities, partnerships, market conditions, or evolving community priorities. Accordingly, this

category is intended to preserve flexibility and enable the City to respond to opportunities that maximize community benefits and support the goals of the Energy Collaboration Agreement.

Pilot investments should emphasize learning, performance evaluation, and opportunities for scaling successful approaches over time. Successful pilot projects may also support public education by demonstrating effective approaches, communicating lessons learned, and encouraging broader community participation.

8.3 Leveraging and Financial Sustainability

Because ECA resources are limited, maximizing the impact of each dollar invested will be essential. Investments may support:

- Grant matching opportunities;
- Public-private partnerships;
- Philanthropic investments;
- Utility incentives;
- State and federal programs;
- Coordination with community organizations;
- Innovative financing approaches;
- Revolving fund models and other self-sustaining investment mechanisms; and
- Other strategies that expand long-term investment capacity.

Whenever feasible, ECA resources should seek to catalyze additional investments and expand community benefits beyond the initial funding. Future implementation guidance should explore opportunities to reinvest operational savings and leverage external resources to support continued climate and resilience investments over time.

8.4 Scaling Successful Approaches

Successful pilot projects, partnerships, and innovative financing approaches may inform future investments and, when appropriate, be expanded or incorporated into other investment categories. Over time, lessons learned can help improve program design, attract additional resources, and accelerate implementation of the Energy Collaboration Agreement.

9. Equity and Investment Prioritization Framework

This section supports implementation of ECA commitments related to equity and investment prioritization. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

9.1 Purpose

Because ECA resources are limited, investment decisions should seek to maximize community benefit while prioritizing households and communities experiencing the greatest need and opportunity for impact. The framework promotes transparent, consistent, and flexible decision-making aligned with the goals of the Energy Collaboration Agreement and Tucson Resilient Together.

9.2 Guiding Principles for Prioritization

Consistent with the Energy Collaboration Agreement and Tucson Resilient Together, investments should seek to:

- Reduce energy burden and improve affordability;
- Strengthen community resilience;
- Deliver multiple benefits whenever feasible;
- Support vulnerable communities and historically underserved populations;
- Improve public health and quality of life;
- Maximize community benefit;
- Leverage additional resources and partnerships;
- Promote long-term affordability and sustainability; and
- Advance the goals and actions contained in Tucson Resilient Together.

These considerations are intended to be applied together and are not listed in priority order. Depending on the investment type, different factors may carry different weight.

9.3 Priority Factors

When evaluating potential projects and investments, the City may consider a combination of factors, including:

- **Energy Burden** – Projects that reduce energy costs and address households experiencing disproportionately high utility costs may be prioritized.
- **Greenhouse Gas Reduction Potential** – Projects that reduce greenhouse gas emissions and support progress toward Tucson's climate goals may receive additional consideration, particularly when they also provide affordability, resilience, public health, or other community benefits.
- **Heat Vulnerability** – Areas experiencing elevated heat exposure and associated health risks may receive additional consideration.
- **Income and Economic Need** – Projects benefiting low-income households and economically disadvantaged communities may be prioritized.
- **Housing Characteristics** – Older homes, manufactured homes, and other housing types with significant opportunities for energy savings and resilience improvements may receive additional consideration.
- **Community Benefit and Health Outcomes** – Projects that serve multiple households, vulnerable populations, or provide broader benefits through improved indoor comfort, air quality, public health, and environmental quality may receive additional consideration.
- **Leveraging Opportunities** – Projects that attract grants, incentives, utility programs, or other external resources may be prioritized in order to maximize the impact of ECA resources.
- **Workforce and Economic Opportunity** – Projects that support local businesses, workforce development, and economic opportunity may receive additional consideration.

9.4 Geographic Considerations

The City intends to promote equitable access to ECA investments across Tucson while recognizing that some neighborhoods experience greater energy burdens, heat exposure, environmental challenges, and economic vulnerabilities.

Accordingly, investments may prioritize areas experiencing elevated need or opportunity for impact while seeking to ensure that the benefits of the ECA are distributed broadly throughout the community. Geographic priorities may evolve over time as conditions, data, and community priorities change.

9.5 Data-Informed Decision Making

The City intends to utilize data and performance information to support transparent and consistent investment decisions. Potential information sources may include:

- Energy burden indicators;
- Heat vulnerability and public health data;
- Income and socioeconomic indicators;
- Housing characteristics;
- Environmental and climate-related information;
- Community feedback and engagement processes;
- Program performance metrics; and
- Opportunities to leverage additional funding.

Implementation consideration may include development of a data-informed prioritization tool or **composite scoring framework** that incorporates multiple indicators of need and opportunity. Such tools are intended to improve transparency, consistency, and accountability while supporting adaptive management.

Figure 9-1. Example Factors for Future Prioritization Tools

Example Factor	Potential Information Sources
Energy Burden	Utility and Census Data
Heat Vulnerability	Heat Vulnerability Index and Tree Equity Score
Income and Economic Need	American Community Survey Data
Housing Characteristics	County Assessor and Housing Data
Environmental and Health Conditions	Public Health and Environmental Indicators
Community Benefit	Project Characteristics and Community Input
Leveraging Opportunities	Grants, Incentives, and Funding Commitments
Workforce and Economic Opportunity	Workforce and Business Development Indicators

The factors shown above are intended for illustrative purposes and are not intended to establish a fixed methodology.

9.6 Balancing Equity and Flexibility

While data and prioritization frameworks can help inform decision-making, no single metric or scoring system is intended to determine investments. Professional judgment, community priorities, available funding opportunities, implementation considerations, and emerging needs should continue to inform investment decisions.

The City recognizes that equity is not solely about distributing resources evenly. Rather, equitable investments seek to address disparities, remove barriers, and maximize benefits for residents and communities experiencing the greatest challenges.

10. Governance, Accountability, and Adaptive Management

This section supports implementation of Energy Collaboration Agreement (ECA) commitments related to governance, accountability, and adaptive management. Appendix A provides a crosswalk to related Tucson Resilient Together (TRT) actions.

10.1 Purpose

Effective implementation of the ECA requires transparent governance, clear accountability, and the ability to adapt to changing conditions over time. This section establishes the framework for managing ECA investments, measuring progress, engaging stakeholders, and ensuring that implementation remains aligned with the goals of the ECA and Tucson Resilient Together.

10.2 City Authority and Responsibilities

Consistent with the ECA, the City retains authority over the administration and allocation of ECA resources. The City is responsible for:

- Establishing investment priorities and implementation guidance;
- Administering programs and investments;
- Coordinating with departments, partners, and stakeholders;
- Tracking performance and outcomes;
- Providing public reporting and updates; and
- Ensuring that ECA resources are used in a manner consistent with the agreement and the goals of Tucson Resilient Together.

Implementation of the ECA is intended to leverage existing programs and partnerships while supporting new opportunities and approaches as needed to advance the goals of the agreement.

10.3 Recommended Implementation Structure

Successful implementation of the ECA will require dedicated coordination, long-term stewardship, and sustained organizational capacity. Given the long-term nature of the agreement, implementation should be integrated into the City's existing climate and resilience functions whenever feasible to promote continuity, strengthen coordination, and build long-term institutional capacity.

To support implementation, the City should consider establishing a dedicated implementation capacity such as an ECA Program Manager or similar coordination role, to support:

- Program coordination and administration;
- Partnership development;
- Performance measurement and reporting;
- Community engagement;
- Interdepartmental coordination;
- Biennial reviews; and
- Identification and pursuit of opportunities to leverage additional resources.

Dedicated implementation capacity will help ensure continuity, preserve institutional knowledge, strengthen coordination across City departments and community partners, and support effective implementation of the ECA throughout its 25-year term.

10.4 Role of Tucson Electric Power

Tucson Electric Power remains an important partner in implementation of the Energy Collaboration Agreement. Consistent with the agreement, collaboration between the City and Tucson Electric Power may include:

- Data sharing and coordination;
- Identification of opportunities to improve program effectiveness;
- Identification of opportunities to expand participation in energy affordability, energy efficiency, electrification, and resilience programs;
- Joint communication and education efforts;
- Participation in annual updates; and
- Exploration of opportunities to leverage additional resources.

Nothing in this strategy is intended to modify the roles and responsibilities established in the Energy Collaboration Agreement.

10.5 Community Engagement and Advisory Roles

Community engagement played a central role in development of the Energy Collaboration Agreement and will continue to be important throughout implementation. The Commission on Climate, Energy, and Sustainability (CCES) serves in an advisory capacity to Mayor and Council and may provide input regarding implementation priorities, progress, and opportunities to strengthen outcomes.

Additional engagement opportunities may include:

- Public meetings and presentations;
- Community-based engagement activities;
- Stakeholder conversations;
- Surveys and feedback mechanisms; and
- Partnerships with trusted messengers and community organizations.

10.6 Performance Measurement and Reporting

Transparent reporting is essential to ensuring accountability and maintaining public trust. Performance measurement activities may include:

- Greenhouse gas inventories and emissions reporting;
- Tracking investments and expenditures;
- Program participation and performance metrics;
- Community benefit indicators;
- Leveraging and partnership outcomes;
- Workforce and economic development indicators; and
- Other measures that support continuous improvement.

Whenever feasible, performance metrics should emphasize outcomes and community benefits rather than outputs alone.

10.7 Annual Reporting and Public Transparency

Consistent with the Energy Collaboration Agreement, the City and Tucson Electric Power intend to provide at least one annual update to Mayor and Council.

Annual reporting may include:

- Investments and expenditures;
- Program accomplishments and outcomes;
- Greenhouse gas and resilience indicators;
- Leveraged funding and partnerships;
- Lessons learned and implementation challenges; and
- Emerging opportunities and recommendations.

The City may also provide additional updates and communication materials to support transparency and public awareness.

10.8 Coordination with Existing Plans and Processes

Implementation of the Energy Collaboration Agreement is intended to complement existing City priorities and processes. Whenever feasible, ECA investments and reporting should be coordinated with Tucson Resilient Together, greenhouse gas inventories, departmental work plans, resilience initiatives, and other City efforts that advance community resilience and sustainability.

10.9 Adaptive Management and Biennial Reviews

Because community conditions, technologies, and funding opportunities will continue to evolve, the City intends to utilize an adaptive management approach to guide implementation of the ECA. This strategy is intended to evolve over time rather than establish fixed investment priorities for the life of the agreement. Approximately every two years, the City should review implementation experience, community feedback, investment priorities, and emerging opportunities to determine whether updates to this framework are appropriate.

Approximately every two years, the City should evaluate:

- Investment priorities and allocation ranges;
- Program performance and lessons learned;
- Emerging technologies and best practices;
- Community priorities and feedback;
- Opportunities to leverage additional resources; and
- Potential refinements to implementation guidance.

These reviews are intended to support continuous improvement while ensuring the implementation strategy remains responsive to changing conditions and community priorities, and the principles of adaptive management.

Appendices

Appendix A. ECA Commitment Crosswalk with Tucson Resilient Together

This appendix illustrates how the Energy Collaboration Agreement (ECA) commitments are translated into the implementation strategy and aligned with Tucson Resilient Together (TRT). The crosswalk demonstrates that the implementation strategy is not creating a new agenda, but rather organizing, sequencing, and prioritizing investments that advance adopted ECA commitments and support implementation of TRT.

Implementation emphasis categories are intended to provide general guidance and do not represent funding commitments or fixed priorities. Consistent with principles of adaptive management, timing and emphasis may evolve over time.

ECA Ref	ECA Commitment	Strategy Sections	Related TRT Actions	Timing	Implementation Emphasis
5a	GHG inventories and emissions reporting	6, 10	G-4.1-G-4.5	Ongoing	Continuous
5b	Distributed energy resources, solar, battery storage, and microgrids	4, 5	E-4.1-E-4.7, CR-1.1	Years 1-5	High
5c	Expand participation in the Solar Empowerment Program	4	E-4.4, E-4.7	Years 1-5	Supporting
5d	EV charging infrastructure and EV readiness	7	T-4.3-T-4.8	Years 3-5	Supporting
5e	Fleet electrification	7	T-5.1-T-5.5	Years 1-5	High
5f	Home energy audits and retrofit programs prioritizing low-income families and homeowners	4	E-2.1, E-2.4, E-2.5	Years 1-2	High
5g	Reduce GHG emissions from City buildings and facilities	7	E-1.1-E-1.7	Years 1-5	Supporting
5h	Emerging technologies and solar street lighting	8	E-1.6, E-5.2, E-5.3	Opportunity-Driven	Opportunity-Driven
5i	Tucson Million Trees and urban greening	5	CR-3.1, CR-3.2	Years 1-5	Supporting
6a	Critical infrastructure inventory and planning	5	CR-1.2, CR-1.3	Years 1-2	High

6b	Resilience hubs with solar and battery storage systems	5	CR-1.1-CR-1.4, E-4.2	Years 1-2	High
6c	Cooling centers, shade structures, and tree canopy expansion	5	CR-2.1-CR-2.9, CR-3.1	Years 1-5	High
6d	Emergency preparedness coordination and resource sharing	5	CR-4.1-CR-4.6	Ongoing	Continuous
7a	Utility bill payment assistance for qualifying low-income residents	4	E-2.1, G-2.1	Years 1-2	Supporting
7b	Inclusive, multilingual outreach campaigns	6	G-3.1, G-3.3	Ongoing	Continuous
7c	Central resource hub for energy programs and incentives	6	G-2.1, G-3.1	Years 1-2	Foundational
7d	Energy literacy and customer education	6	G-3.1, G-3.3	Ongoing	Continuous
8a	Educational outreach and career-day events	6	G-2.4, G-3.5	Years 3-5	Supporting
8b	Internship and apprenticeship programs	6	G-2.3, G-2.4	Years 3-5	Supporting
9a-9f	Safe, reliable, and affordable energy coordination and utility partnership provisions	10	G-1.1, G-2.5, G-4.4	Ongoing	Continuous

Implementation Emphasis Categories

15) **Foundational -** Investments or activities that establish essential systems, partnerships, or infrastructure needed to support successful implementation.
16) **High -** Investments expected to receive significant attention during the initial years of implementation because they address priority community needs and provide substantial opportunities for impact.
17) **Supporting -** Investments that complement and strengthen other priorities while contributing to the overall goals of the ECA and Tucson Resilient Together.
18) **Continuous -** Activities that are expected to occur throughout the life of the agreement and support ongoing implementation, coordination, reporting, and community engagement.

19) **Opportunity-Driven -** Investments that may occur in response to emerging technologies, partnerships, funding opportunities, lessons learned, or changing community priorities and are intended to preserve flexibility and support adaptive management.

Appendix B. Glossary of Terms

The following definitions are provided to promote consistency, transparency, and a shared understanding of key terms used throughout this implementation strategy. These definitions are intended for purposes of this strategy and may evolve over time through future implementation guidance and adaptive management.

Adaptive Management - An approach to implementation that recognizes that technologies, funding opportunities, community priorities, and best practices will evolve over time. Adaptive management emphasizes continuous learning, periodic review, and the flexibility to adjust priorities and investment approaches based on experience and changing conditions.

Community Navigation - Services that help residents understand, access, and participate in available programs, incentives, and resources. Community navigation may include outreach, education, application assistance, and coordination among programs and partners.

Distributed Energy Resources (DERs) - Small-scale energy resources located near where electricity is used. Examples include rooftop solar, battery storage systems, microgrids, and other technologies that improve energy resilience and reduce greenhouse gas emissions.

Electrification - The process of replacing equipment or systems powered by fossil fuels with technologies powered by electricity. Examples may include heat pumps, electric water heaters, induction stoves, and electric vehicles.

Energy Burden - The percentage of household income spent on energy costs. High energy burden generally refers to households that spend a disproportionate share of their income on utility bills.

Energy Efficiency - Actions or technologies that reduce the amount of energy needed to provide the same level of service or comfort. Examples include insulation, air sealing, efficient HVAC systems, lighting upgrades, and energy-efficient appliances.

Energy Literacy - Knowledge and understanding that enables residents and organizations to make informed decisions regarding energy use, energy efficiency, electrification, renewable energy, and available programs and incentives.

Energy Workforce Accelerator - A potential program or partnership model intended to strengthen Tucson's residential energy workforce ecosystem by supporting training, contractor development, business assistance, certifications, and connections to incentive programs and financing opportunities.

Greenhouse Gas Emissions - Emissions of gases that contribute to climate change, including carbon dioxide, methane, nitrous oxide, and fluorinated gases.

Green Stormwater Infrastructure -Natural or engineered systems that capture, store, infiltrate, and reuse stormwater while providing environmental and community benefits. Examples include rain gardens, bioswales, and water-harvesting landscapes.

Heat Vulnerability - The combination of environmental, social, economic, and health-related factors that influence a community's susceptibility to heat-related impacts.

Implementation Capacity - The staffing, partnerships, systems, resources, and organizational capabilities necessary to successfully deliver programs, coordinate investments, and achieve desired outcomes.

Low-Income Household - A household meeting income eligibility requirements established through program guidelines or future implementation guidance. Specific thresholds may vary depending on the funding source or program.

Microgrid - A localized energy system capable of operating independently or in coordination with the electric grid. Microgrids may incorporate solar generation, battery storage, and other distributed energy resources to improve reliability and resilience.

Moderate-Income Household - A household that does not meet low-income eligibility requirements but may still experience affordability challenges or barriers to accessing energy improvements. Specific income thresholds may be established through future implementation guidance.

Multifamily Housing - Residential buildings containing multiple dwelling units, including apartments, condominiums, duplexes, and other forms of shared housing.

Nature-Based Solutions - Practices that utilize natural systems and ecological processes to address climate and environmental challenges while providing multiple community benefits. Examples include tree planting, green stormwater infrastructure, and habitat restoration.

Owner-Occupied Housing - Residential properties occupied by the owner rather than rented to tenants.

Public Benefit - The broad and measurable value generated by an investment for the Tucson community. Public benefits may include economic, environmental, health, resilience, and quality-of-life outcomes.

Resilience - The ability of individuals, communities, infrastructure systems, and institutions to prepare for, withstand, recover from, and adapt to disruptions and changing conditions.

Resilience Hub - A community-serving facility designed to support residents before, during, and after emergencies and extreme weather events. Resilience hubs may provide access to cooling, backup power, communications, information, and other essential resources.

Revolving Fund - A financing mechanism that reinvests savings or repayments from completed projects into future projects, creating a self-sustaining cycle of investment over time.

Trusted Messengers - Community organizations, institutions, and individuals that have established relationships and credibility within the communities they serve and can help improve awareness and access to programs and resources.

Tucson Resilient Together (TRT) - The City of Tucson's climate action and adaptation plan, adopted in 2023, which establishes goals, strategies, and actions to reduce greenhouse gas emissions and strengthen community resilience.

Vulnerable Communities - Communities and populations that may experience disproportionate impacts from climate change, extreme heat, economic hardship, environmental burdens, or barriers to accessing resources and opportunities. Vulnerability may be influenced by factors such as income, age, disability, health conditions, housing characteristics, language access, and historical inequities.

Weatherization - Improvements that increase the energy efficiency, comfort, and resilience of homes and buildings. Examples may include insulation, air sealing, duct repair, window improvements, and other measures that reduce energy use and utility costs.

Appendix C. Metrics and Performance Indicators

This appendix provides examples of metrics and performance indicators that may be used to monitor implementation of the Energy Collaboration Agreement (ECA). These indicators are intended to support transparency, accountability, and adaptive management.

Not all metrics are expected to be tracked immediately, and the City may refine indicators over time based on data availability, lessons learned, community priorities, and evolving best practices. Whenever feasible, performance measurement should emphasize outcomes and community benefits rather than outputs alone.

Household and Community Investments

Program Participation - Potential indicators may include:

- Number of households served;
- Number of home energy audits completed;
- Number of weatherization projects completed;
- Number of electrification projects completed;
- Number of solar and battery installations supported;
- Number of households receiving bill assistance; and
- Number of households participating in the Solar Empowerment Program.

Community Outcomes - Potential indicators may include:

- Estimated household energy savings;
- Estimated utility bill reductions;
- Reduction in household energy burden;
- Greenhouse gas emissions reductions;
- Improvements in indoor comfort and resilience; and
- Leveraged funding per dollar invested.

Community Resilience Infrastructure

Infrastructure and Assets - Potential indicators may include:

- Number of resilience hubs established or supported;
- Number of critical facilities assessed;
- Number of cooling centers supported;
- Number of shade structures installed;
- Trees planted and maintained;
- Projects utilizing nature-based solutions; and
- Emergency preparedness initiatives supported.

Community Outcomes - Potential indicators may include:

- Residents benefiting from resilience investments;
- Increased access to cooling and emergency resources;
- Heat exposure reduction benefits;
- Greenhouse gas reductions; and
- Public health and quality-of-life benefits.

Workforce, Partnerships, and Implementation Capacity

Community Access and Outreach - Potential indicators may include:

- Outreach events and workshops conducted;
- Residents reached through education and outreach;
- Resource hub utilization;
- Community navigation services provided;
- Languages supported; and
- Community organizations engaged.

Workforce and Economic Opportunity - Potential indicators may include:

- Individuals trained;
- Apprenticeships and internships supported;
- Contractors and small businesses assisted;
- Certifications obtained;
- Educational partnerships established; and
- Businesses participating in energy programs and incentives.

Implementation Capacity - Potential indicators may include:

- Greenhouse gas inventories completed;

- Annual reports produced;
- Community engagement activities conducted;
- Partnerships established; and
- Leveraged funding and resources.

Municipal and Public Facility Investments

Infrastructure and Operations - Potential indicators may include:

- Buildings retrofitted;
- Fleet vehicles electrified;
- EV charging stations installed;
- Renewable energy systems installed;
- Battery storage capacity added; and
- Public facilities benefiting from resilience improvements.

Operational Outcomes - Potential indicators may include:

- Energy savings achieved;
- Operational cost savings;
- Greenhouse gas emissions reductions;
- Utility cost reductions; and
- External funding leveraged.

Innovation, Pilots, Leveraging, and Financial Sustainability

Innovation and Pilots - Potential indicators may include:

- Pilot projects initiated;
- Demonstration projects completed;
- Emerging technologies evaluated;
- Successful pilot projects scaled or replicated; and
- Lessons learned documented.

Leveraging and Financial Sustainability - Potential indicators may include:

- Grants secured;
- Matching funds leveraged;
- Public-private partnerships established;
- External funding attracted;
- Operational savings reinvested; and
- Revolving fund or other innovative financing mechanisms explored or implemented.

Equity and Community Benefits - Potential indicators may include:

- Investments benefiting vulnerable communities;
- Investments in areas experiencing elevated heat vulnerability;
- Investments benefiting low-income households;
- Investments benefiting manufactured homes and affordable housing;
- Geographic distribution of investments;
- Workforce and economic opportunities created;
- Public health and quality-of-life benefits; and
- Community satisfaction and feedback.

Overall Outcomes

Climate and Resilience - Potential indicators may include:

- Greenhouse gas emissions reductions;
- Energy burden reduction;
- Community resilience improvements;
- Access to cooling and emergency resources; and
- Tree canopy and shade benefits.

Economic and Community Benefits - Potential indicators may include:

- Total ECA investments;
- Leveraged funding and partnerships;
- Operational savings;
- Local businesses supported;
- Workforce pathways created;
- Community organizations engaged; and
- Residents benefiting from ECA-supported programs.

Adaptive Management - Potential indicators may include:

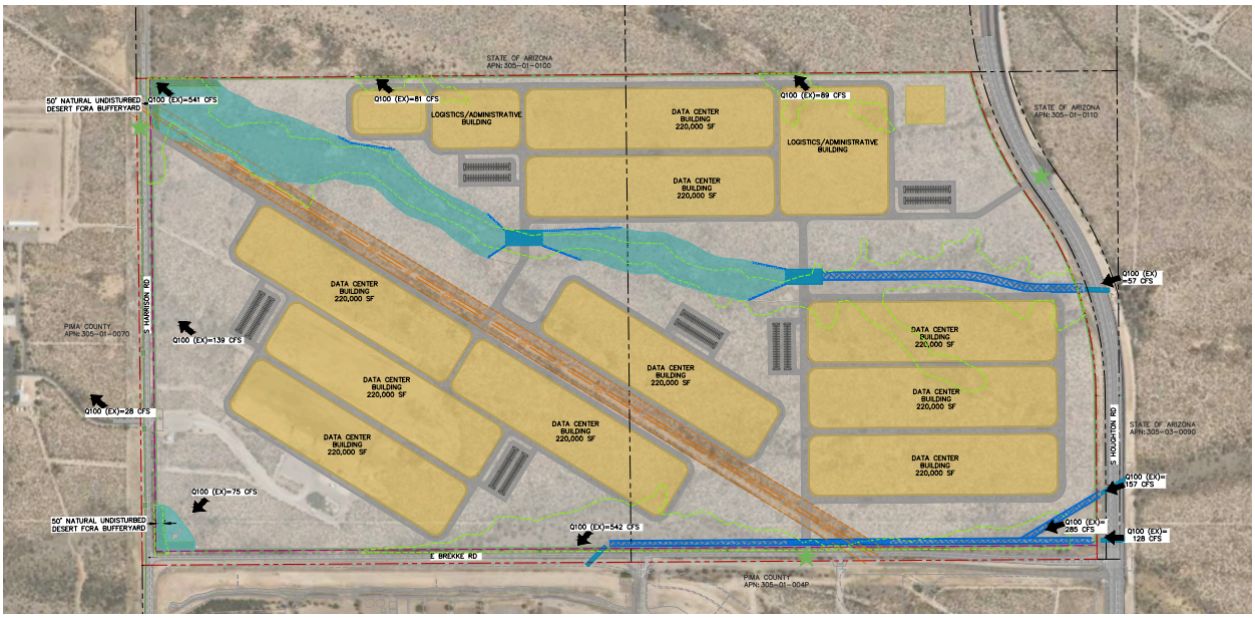
- Annual reports completed;
- Biennial reviews conducted;
- Program improvements implemented;
- New partnerships established; and
- Emerging opportunities incorporated into future investments.

Table C-1. Example Metrics by Time Horizon

Time Horizon	Example Indicators

Short-Term (1-2 Years)	Households served, energy audits completed, outreach events conducted, trees planted, resilience projects initiated
Medium-Term (3-5 Years)	Energy savings, utility bill reductions, workforce participation, leveraged funding, program participation
Long-Term (5+ Years)	Reduced energy burden, greenhouse gas emissions reductions, improved resilience, expanded tree canopy, operational savings, community health and quality-of-life benefits

Different outcomes occur over different timeframes. Accordingly, evaluation of ECA investments should recognize that some benefits may take years to fully materialize.



Data Centers in the Desert

A Report by the
Commission on Climate, Energy, and Sustainability

August 2026

CITY OF TUCSON

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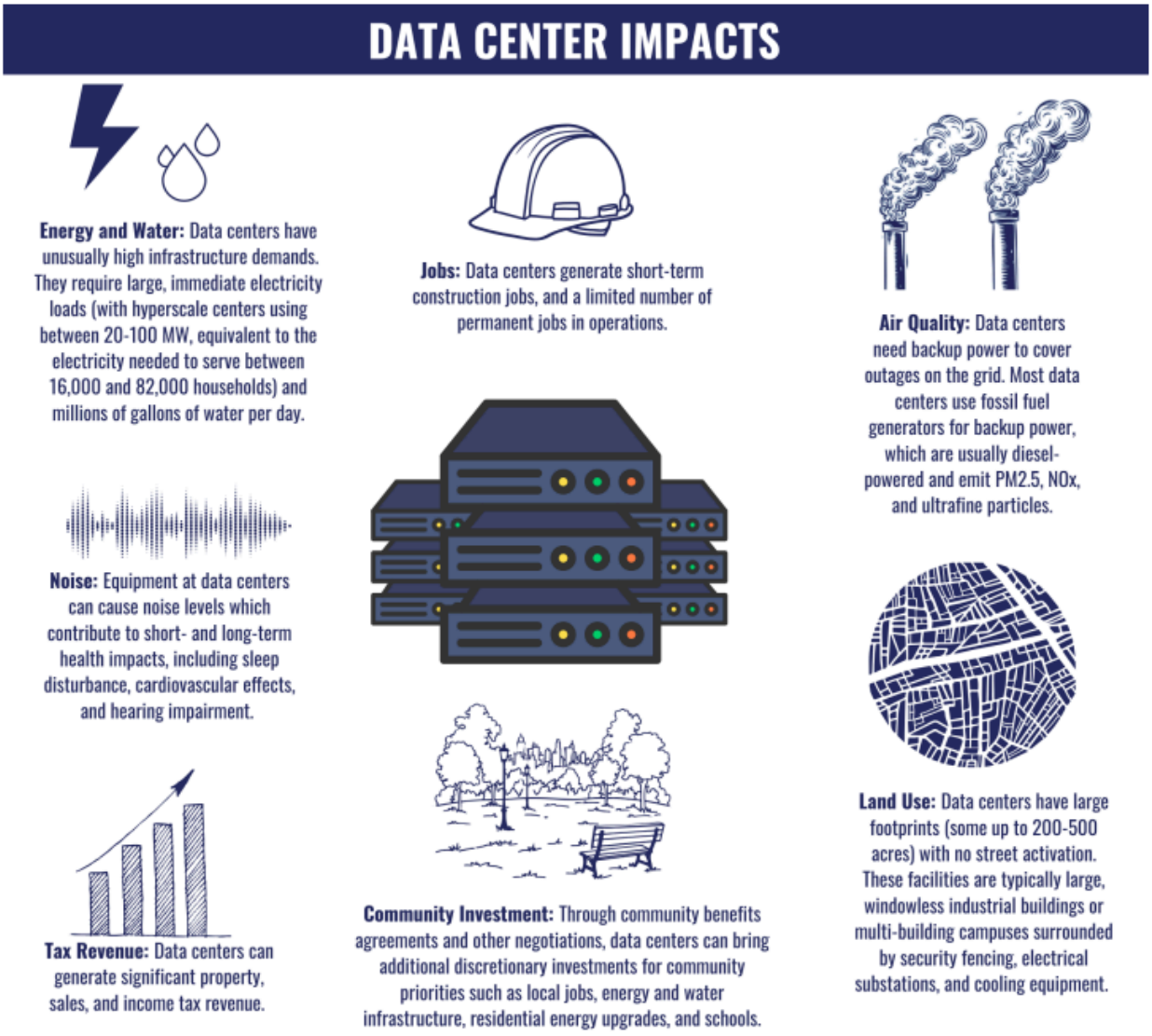
Executive Summary

The recently published *Data Centers and the Climate Landscape: An Actionable Resource for US Mayors*[1] contains the following graphic that highlights the challenges, impacts, and opportunities of data center projects.



This report by the Commission on Climate, Energy, and Sustainability (CCES) addresses a number of these issues, especially what is possible within the political landscape of the State of Arizona, energy use considerations and how those can affect the City of Tucson's climate goals, and water impacts in this time of long-term regional drought.

Policy

Significant action by municipalities in Arizona is typically limited by legislation at the State level that prohibits restrictions more stringent than Federal or State law - especially in regards to limitations on business or climate action.

In addition to State law, current policies from the Executive Branch of the US Government heavily promote the development of AI data centers, often with a bias to using fossil-fuel generators to power them and little concern about pollution or excessive water consumption.

After researching the current policy landscape, the Commission on Climate, Energy, and Sustainability (CCES) appreciates that the City of Tucson has taken full advantage of the levers of policy available under Arizona law: specific zoning codes to ensure that Mayor and Council have the final decision in granting land-use authorizations to data center projects and that set specific guidelines to reduce heat emissions, noise pollution, and fossil fuel pollution. Also, the Large Water Users Ordinance, which is within the City's purview as the operator of our municipal water utility, ensures that any new development with significant potential water consumption must comply with strict guidelines to minimize impact on our stressed aquifer.

Energy

The CCES Data Center Energy Subcommittee analyzed the energy use and carbon emissions of the proposed Project Blue data center. The commission found that the 286 megawatt grid connection will lead to an increase of 1.72 terawatt hours of energy and 739 kilotonnes of additional Carbon Dioxide Equivalent (CO_2e) emissions in the region per year, based on Tucson Electric Power's (TEP) current resource mix. This amounts to a 12% increase in regional energy use, and a 9.2% increase in carbon emissions. This is in line with other large emitters in the region, such as the Cal Portland plant in Marana, and is equivalent to adding 160,000 new cars on the road. The commission analyzed mitigation strategies, including demand side management, grid scale storage, and installation of green energy. The commission found that installing 2.6 square miles of solar panels, and 4.2 Gigawatt hours of storage, at a capital cost of $767 million, would be sufficient to power the data center with 98.8% green energy and would provide this energy at a competitive rate of between $0.09 and $0.15 per kilowatt-hour. The commission recommends following recommendations outlined in [1].

Water

The City of Tucson has a long history of water conservation and, with our current per-capita water consumption of 72 gallons per day, we set the standard for low water use in the Desert Southwest. The Tucson Active Management Area (AMA) is also the only AMA in the State of Arizona to have met our goals under the Groundwater Management Act. Given this history of success, it is critical that any new development needs to contribute to our goals for water conservation.

Recommendations

Based on this research, the CCES makes the following recommendations.

1. Ensure that policies related to data centers are as strong as state and federal law allows.
2. Ensure that there are guardrails in place to shut down excessive energy and water use.
3. Allow ample time for public feedback on any new large-scale project in the city and ensure that all voices are able to be heard, not just the loudest.
4. Continual environmental monitoring at the fenceline of a data center site should be carried out by the City or a trusted third party at the expense of the data center operator.
5. Any data center must have a negotiated and enforced Community Benefit Agreement.
6. While data centers get the most attention, there are other potential negatively impacting industrial developments that also need policy guidelines.
7. Data centers should purchase or contract for new clean energy, on the same regional grid where consumption occurs,and with hourly matching of generation and consumption (24/7 carbon-free energy) if possible, rather than relying on Renewable Energy Certificates (RECs) from existing clean sources.
8. Coordinate with peer cities to create joint positions on rate and infrastructure issues, including Integrated Resource Plans, increasing influence in state-level proceedings.
9. Community outreach, involvement and information. Acknowledge and continue to support the community culture of water conservation and development of green infrastructure for climate resilience.
10. Stick with the programs that people have supported and enforce new users of water in Tucson to conform and support the goals of these programs.
11. Support the message that community members have not conserved and reduced in order to allow a new, larger user to put us over the limit again. Water is for the community - to alleviate heat island, to support the desert ecosystem, to provide an affordable water supply for residents. It is to support the local economy and business and industry, but this is not for a new, outside industry, to come and take advantage of a scarce resource.
12. Take time to research options for conservation and alternative technologies for cooling or other water using demand before saying yes or no to a project. Approach business and industry proposals with options to build a carbon neutral, water conserving future.

Policy Background

National

Executive Orders

Executive Order 14318 - Accelerating Federal Permitting of Data Center Infrastructure. This EO directs the Secretary of Commerce to provide financial support for large scale data center projects powered by natural gas, coal, nuclear, or geothermal power sources; minimizes environmental, Endangered Species Act, and other permitting reviews; and makes land on select military installations (including Davis-Monthan AFB) available for long-term leases to data center developers.

There have been multiple other EOs that promote government and civil use of AI, but they didn't explicitly direct policies to build data centers; however, they do establish policy encouraging the development of AI and, by extension, AI data centers. Note that the goals of some of these EOs are not necessarily a bad thing, but this does indicate how much the current administration has been promoting the use of AI and reducing restrictions on its development and deployment.

- **Executive Order 14179 - Removing Barriers to American Leadership in Artificial Intelligence.** Revoked EO 14110 - Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence, signed by President Biden, and directed the development of an *Artificial Intelligence Action Plan.*
- **Executive Order 14213 - Establishing the National Energy Dominance Council.** Established the National Energy Dominance Council to advise the President on producing more (fossil and nuclear) energy, reducing regulations, and reopening closed (coal) power plants to, among other things, lead the world in artificial intelligence.
- **Executive Order 14241 - Reinvigorating America's Beautiful Clean Coal Industry and Amending Executive Order 14241.** Directed all agencies within the Executive Branch to remove any regulations or restrictions on mining and using coal, identify Federal lands with coal reserves and open them to public or private mining, provide funding for mining and use of coal, expanding exclusions for coal under the National Environmental Policy Act, and classifying coal as a "mineral" under EO 14241 - Immediate Measures to Increase American Mineral Production. Section 10 of the order explicitly identifies powering artificial intelligence data centers as a priority use case for coal-powered infrastructure.
- **Executive Order 14262 - Strengthening the Reliability and Security of the United States Electric Grid.** Recognizes that the US is experiencing an unprecedented surge in electricity demand due to the expansion of artificial intelligence data centers and an increase in domestic manufacturing and grants the Secretary of Energy emergency powers to order energy generation resources (mostly coal plants) to be kept online and to prevent fuel switching of generators.
- **Executive Order 14277 - Advancing Artificial Intelligence Education for American Youth.** Promotes the integration of AI into K-12 education, provides comprehensive AI training for educators, and fosters early exposure to AI concepts and technology.
- **Executive Order 14299 - Deploying Advanced Nuclear Reactor Technologies for National Security.** Directs the deployment and use of advanced nuclear reactor technologies at domestic military installations and deployment and use of advanced nuclear reactor technologies at Department of Energy facilities to power AI data centers.
- **Executive Order 14300 - Ordering the Reform of the Nuclear Regulatory Commission.** Partly because of the need to power cutting-edge, energy-intensive industries such as artificial intelligence,

this EO directed the restructuring of the NRC to be less “risk averse,” reform regulations to reduce approval times for licenses, reopen closed nuclear facilities, and revise radiation exposure limits to allow more risk.

- **Executive Order 14302 - Reinvigorating the Nuclear Industrial Base.** Among other factors, dominating the global race in artificial intelligence has led to the policy in this EO of expediting and promoting to the fullest possible extent the production and operation of nuclear energy.
- **Executive Order 14320 - Promoting the Export of the American AI Technology Stack.** Directs planning and provides financial instruments for exporting AI technology, including software, hardware, and data center equipment.
- **Executive Order 14355 - Unlocking Cures for Pediatric Cancer With Artificial Intelligence.** Directs the MAHA Commission to utilize advanced technologies such as AI to unlock improved diagnoses, treatments, cures, and prevention strategies for pediatric cancer, starting with accelerating AI-driven solutions at the Childhood Cancer Data Initiative.
- **Executive Order 14363 - Launching the Genesis Mission.** Establishes the Genesis Mission, a national effort to accelerate the application of AI for transformative scientific discovery on pressing national challenges.
- **Executive Order 14365 - Ensuring a National Policy Framework for Artificial Intelligence.** Extends the loosening of controls on AI development started at the Federal level with EO 14179 to the State level by identifying states with “onerous laws” governing AI and restricting Federal funding to those states. Also directed the Chairman of the Federal Trade Commission to create policies to prohibit State laws that “require alterations to the truthful outputs of AI models.”
- **Executive Order 14409 - Promoting Advanced Artificial Intelligence Innovation and Security.** Directs the Committee on National Security Systems to prioritize cyber defense of National Security Systems and establishes the benchmarking process for designating “covered frontier models” for use in National Security.

Executive Agency Policies

Executive branch agencies have been developing policies to implement the Executive Orders listed above, especially in the Department of Energy and the Department of Defense.

State

ARS § 41-1519 - Computer data center tax relief. The primary statute related to data centers in the State of Arizona which provides tax relief in the form of deductions of the gross proceeds or gross income from the sale, use, installation, assembly, repair, or maintenance of computer data center equipment. The tax deduction is contingent on proven investment in land, buildings, improvements, modular data centers, and data center equipment over a five-year period. *A three-year moratorium implemented by the state budget agreement in June 2026 does not allow any new applications for tax relief during the period of the moratorium.*

ARS § 41-194.01 - Violations of state law by counties, cities and towns; attorney general investigation; report; withholding of state shared revenues; notice of violation. While there are a number of specific statutes that limit the ability of counties, cities, and towns to enact regulations more strict than state statutes, this is the catch-all that allows any member of the State Legislature to direct the State Attorney General to investigate rules or regulations passed at a local level for compliance with state statutes and to withhold state shared revenues from the governing body until the rule or regulation is repealed or resolved. This is the

statute, enacted by Senate Bill 1487 in 2016, that was used by State Senator Petersen to overturn the Bisbee single-use plastic bag ban.

ARS § 12-1134 - Diminution in value; just compensation. This statute was enacted as a result of the passage of Proposition 207 in 2006. It allows land owners to demand compensation if a newly enacted state, county, or municipal law reduces the fair market value of their real property. Some of the exceptions are protection of public health and safety; limiting use recognized as a public nuisance under common law; limiting use of land for housing sex offenders, selling illegal drugs, liquor control, or adult-oriented businesses; or establishing locations for utility facilities.

Conclusions

- The City of Tucson is limited by State law and Federal policies in the actions they can take to limit data center development.
- The primary levers available to Mayor and Council are their control over City utility services (like Tucson Water) and development codes.
- The recent Large Water User Ordinance and Zoning Code changes would appear to be the primary steps Mayor and Council can take without running afoul of State and Federal limitations and the CCES appreciates the actions taken to date.

Energy Use

Introduction

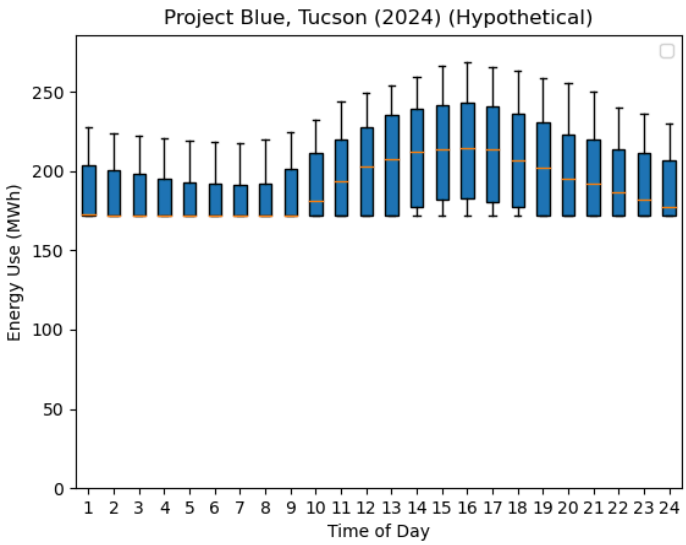
Arizona Corporation Commission (ACC) Docket E-01933A-25-0187 was submitted on August 25th, 2025. Humphreys Peak Power, an affiliate of Beale Infrastructure, requests approval of an Energy Supply Agreement (ESA) with Tucson Electric Power (TEP). The ESA with TEP will provide 286 MW to the Project Blue Data Center by 2028, with a “gradual increase in load over 18-months” starting in May 2026. The Data Center Energy Subcommittee had the goals of

1. Estimate greenhouse gas emissions resulting from the Data Center
2. Understand ways to reduce emissions

Methodology

The Data Center Energy Subcommittee built an hour-by-hour model of TEPs energy grid. Data resources used were Energy Information Administration for energy production and grid utilization; Open Access Technology International for pricing data; and UA Science Hydrology & Atmospheric Sciences for weather data. The subcommittee used 2024 as a test year to compare emissions as if the data center was running during that time and built a model, which was *validated* against a data center, among other referents. Please reference Appendix 2 for details.

Energy Use model of Project Blue:



Using this model, a set of scenarios were compared, including:

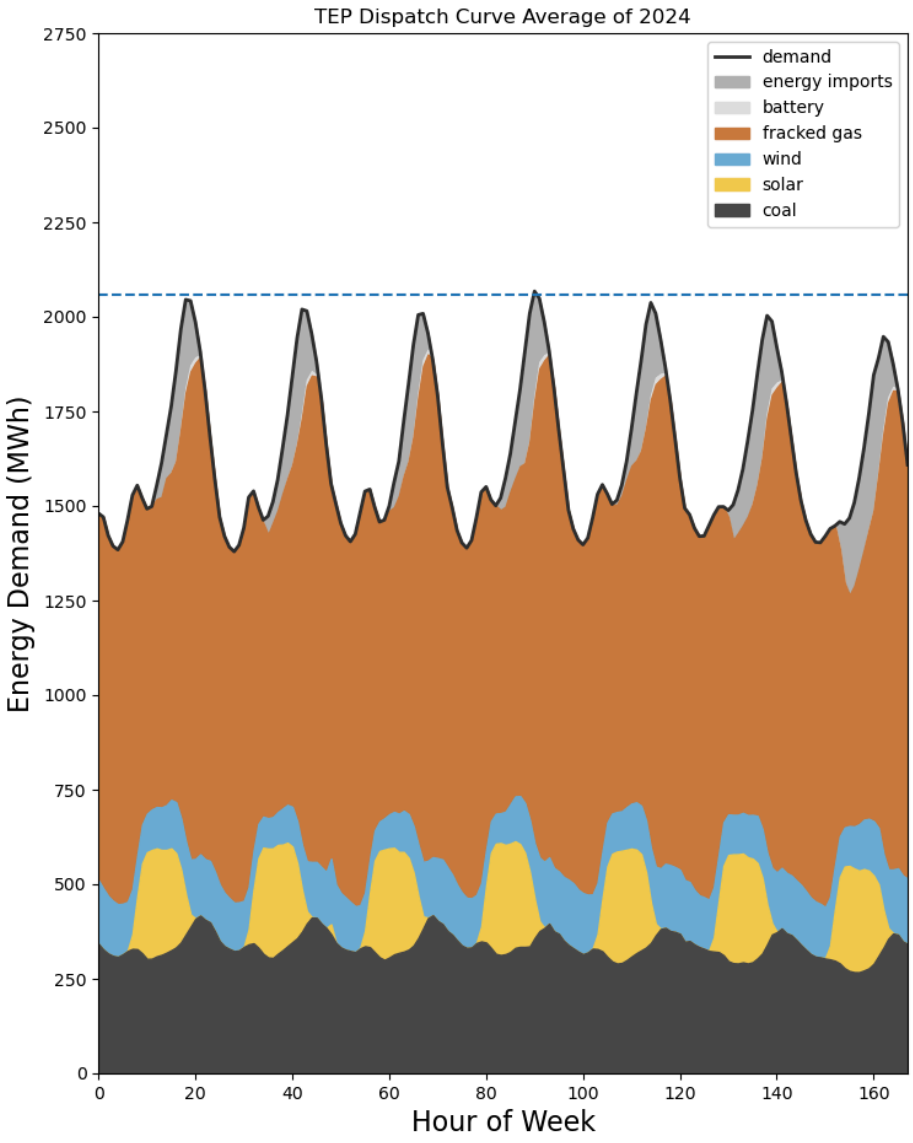
1. Default case, with no data center
2. No change in energy mix, with data center
3. Demand side management of data center, shutting off power between 6pm and 8pm (highest grid load) (Option 1)
4. Installing storage to cover shutoff period (Option 2)
5. Fully powering data center with green energy (Option 3)

Results

Dispatch curves were produced for each of the scenarios. These are plots of weekly energy use, sorted based on hours with the most intense energy use per hour.

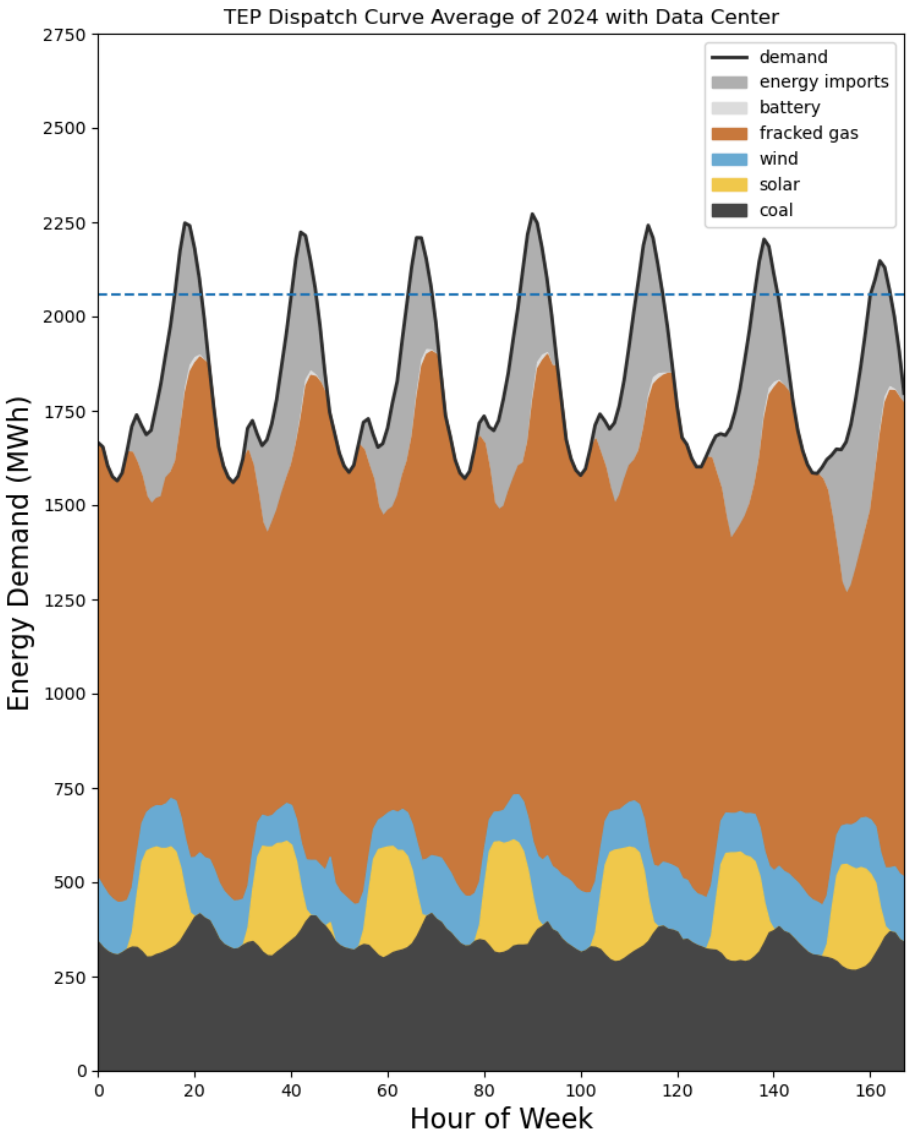
Default Case, 2024 with no data center

This load curve represents the default case, 2024 energy use with no data center.



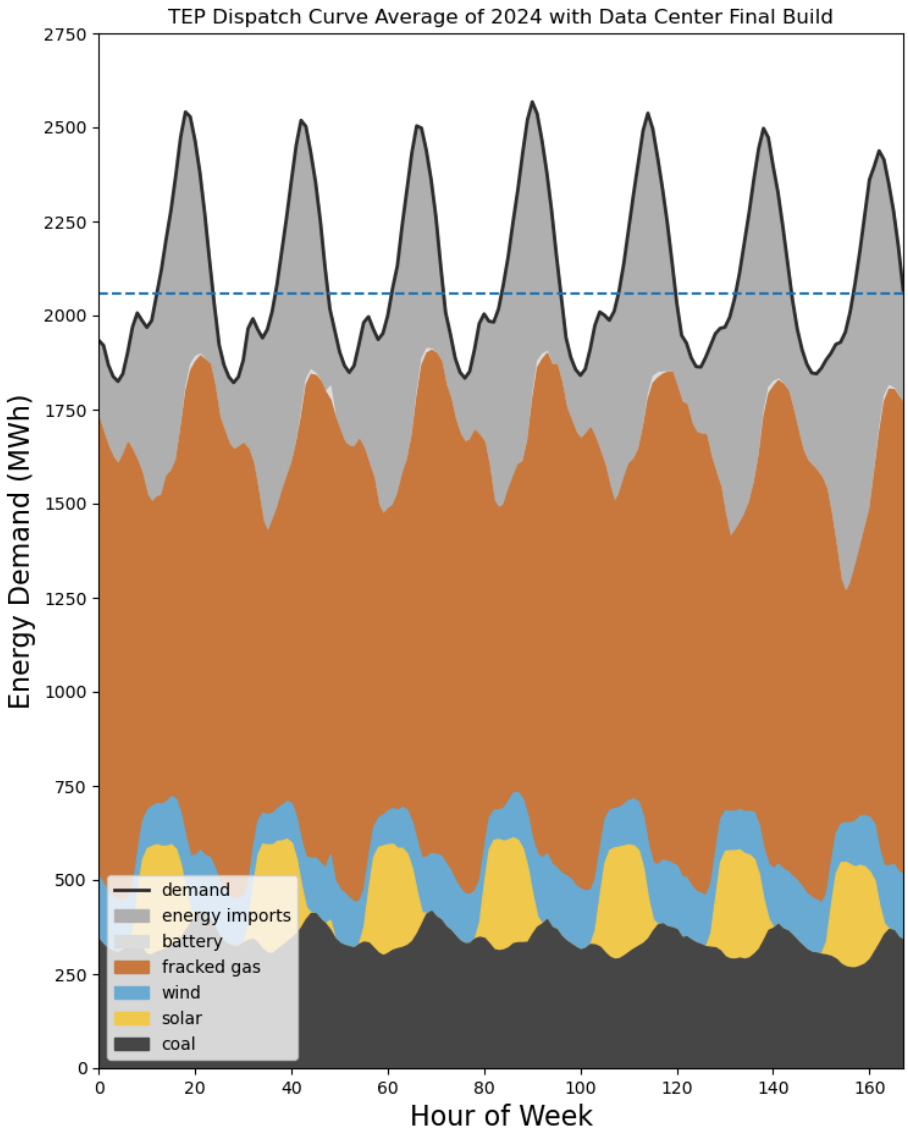
2024 TEP Dispatch Curve with Data Center (Initial Phase)

This load curve represents the completed phase I data center with a 286 GW grid hook up introduced into Tucson's power grid.



2024 TEP Dispatch Curve with Data Center (Secondary Project - Full Build

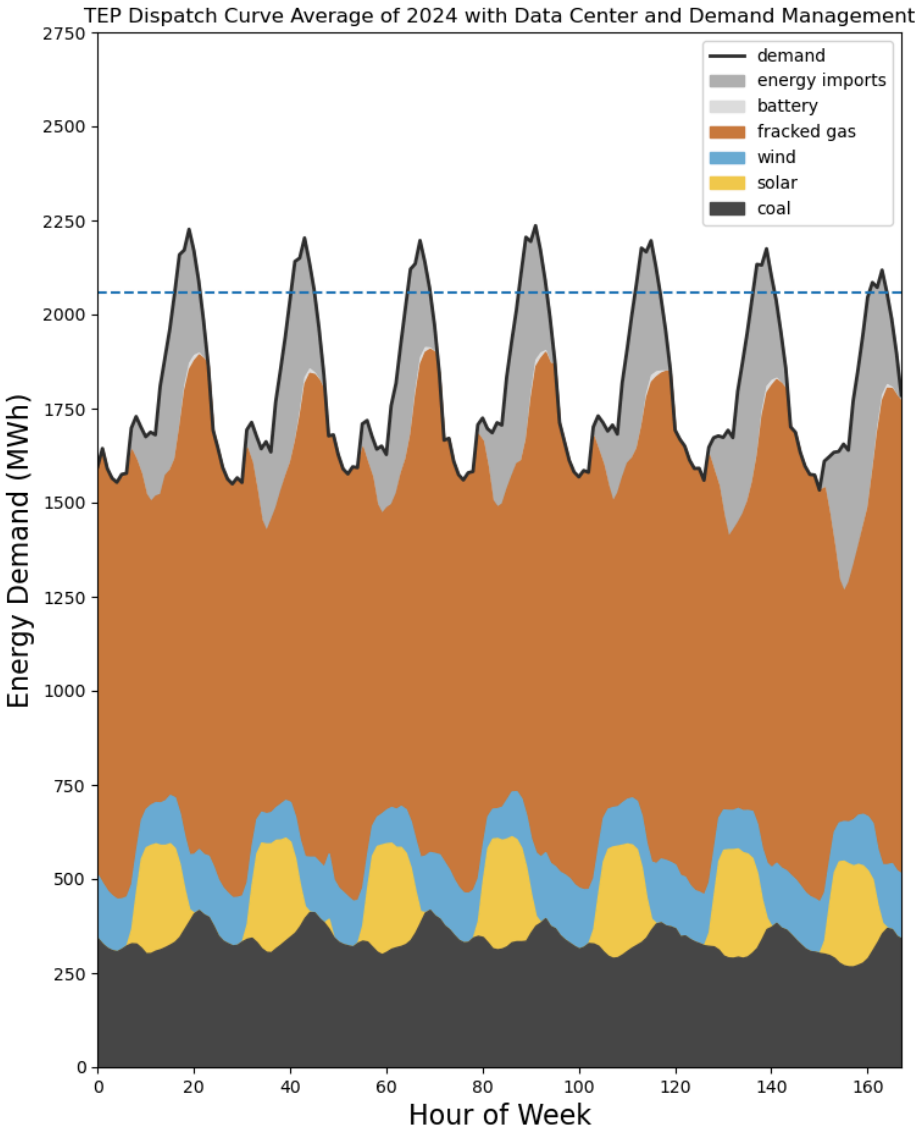
This load curve represents the completed Phase I and Phase II data center energy demand resulting from a projected 700 MW Secondary Project - Full Build.



The full build would result in 4,174 Gigawatt hours in energy use and 1.809 Megatons of CO2e emissions with the current electricity generation mix.

Option 1: 2024 Dispatch Curve with Data Center with Demand Side Management

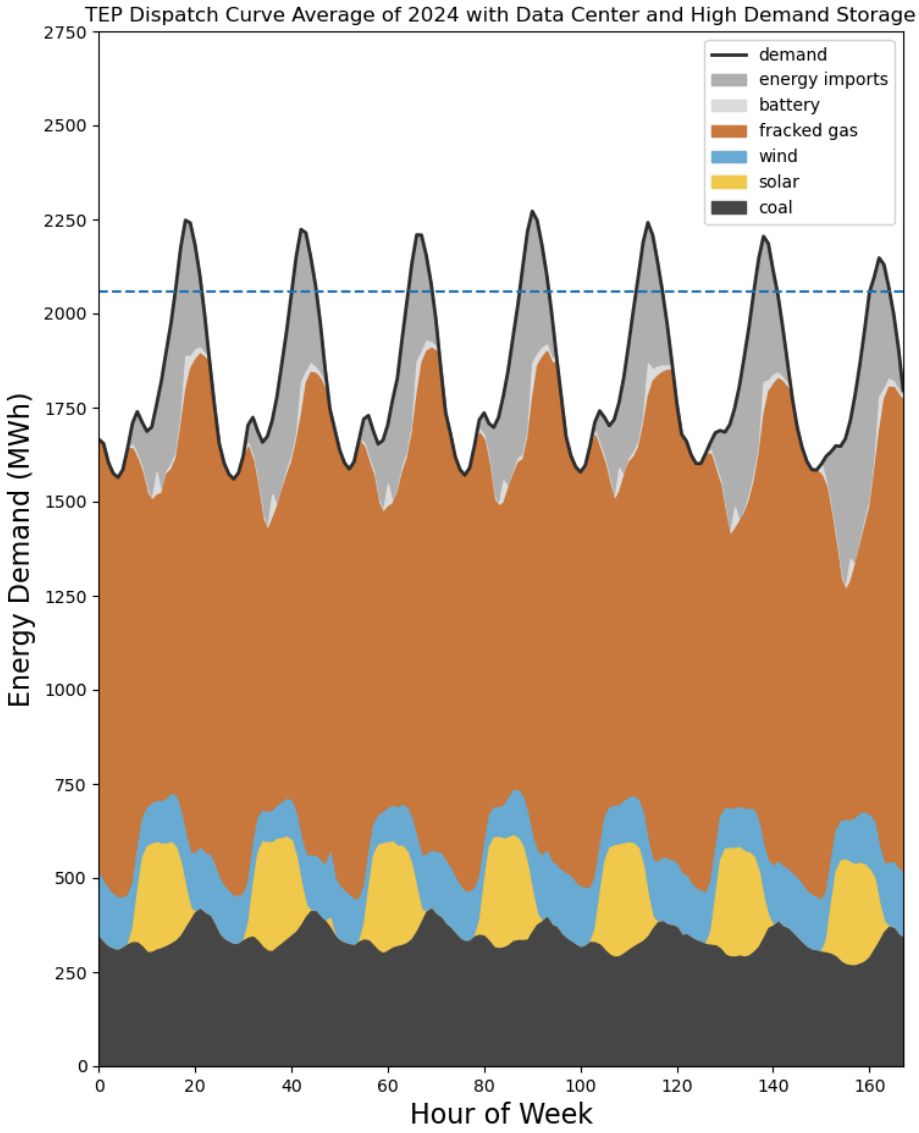
In this scenario, represented by the load curve below, the Phase I data center is turned off between the hours of 6 and 7pm, which are the highest demand periods of the day.



This downtime of 8% of the day saves 12% of emissions per year versus when the data center is present, without mitigations.

Option 2: 2024 Dispatch Curve with Data Center with High Demand Storage

In this scenario, if the data center is willing to pay 6.8 cents per kWh (this includes 10.5% profit for TEP), during 6:00-8:00pm to stay on throughout the day, this would be an option to shave off 12% of potential carbon emissions from the project without interrupting operations.



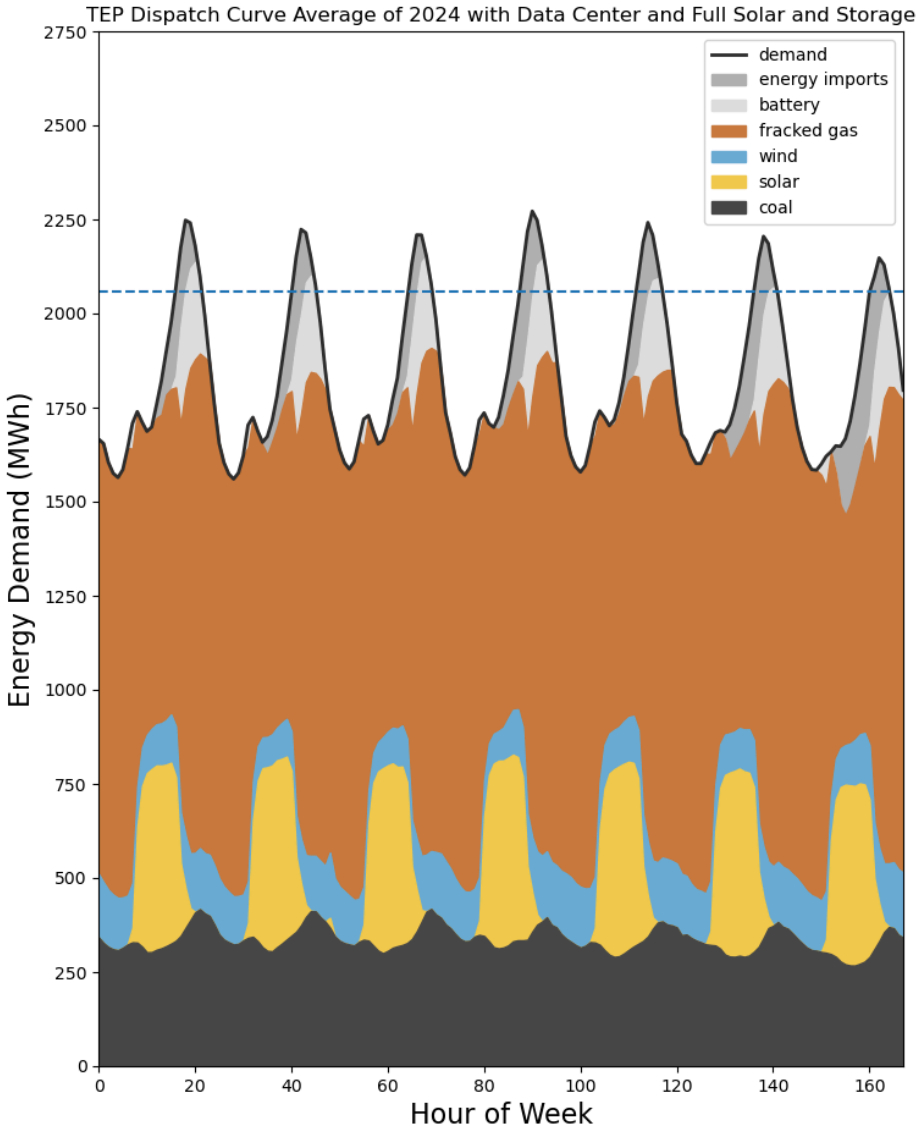
Net Present Value Calculation of Option 2:

Storage (MWh)	525	
Cost per MWh	$148,000	
Cost	$77,700,000	
Initial Battery Investment	1/1/2026	-$77,700,000
Income	12/31/26	$12,950,000
	12/31/27	$12,950,000
	12/31/28	$12,950,000

	12/31/29	$12,950,000
	12/31/30	$12,950,000
	12/31/31	$12,950,000
	12/31/32	$12,950,000
	12/31/33	$12,950,000
	12/31/34	$12,950,000
	12/31/35	$12,950,000
Desired Rate of Return		10.56%

Option 3: 2024 Dispatch Curve with Data Center and Solar and Storage

Under this scenario, capital investments are made, either by TEP or Beale Infrastructure, to mostly power the data center with green energy, sourced locally.



Net Present Value calculation for Option 3:

Storage (MWh)	4170	
Cost per MWh	$184,000	
Cost	$767,280,000	
Initial Battery Investment	1/1/2026	-$767,280,000
Income	12/31/26	$128,000,000
	12/31/27	$128,000,000
	12/31/28	$128,000,000
	12/31/29	$128,000,000
	12/31/30	$128,000,000
	12/31/31	$128,000,000
	12/31/32	$128,000,000
	12/31/33	$128,000,000
	12/31/34	$128,000,000
	12/31/35	$128,000,000
Desired Rate of Return		10.58%

A sensitivity analysis, based on Lazard data, shows what the cost per megawatt-hour is for the data center.

Total energy consumed over year (MWh)	1703372
Cost per MWh (Low)	$90
Cost per MWh (Avg)	$120
Cost per MWh (High)	$150

Modeling shows that, even though the upfront investment is considerable, powering the data center with solar and storage is cost competitive with market purchases.

Conclusion

The Commission on Climate, Energy, and Sustainability Data Center Energy Subcommittee found that nearly fully powering the Project Blue data center with green energy is the best option for emissions reductions and can be powered competitively. Other options include demand side management, which means turning off the data center during high demand periods for the grid, and powering the data center during that time with storage. The commission found that small interventions, such as demand side management, would have disproportionate benefit compared to the time the data center would be inactive, but emissions reductions would be limited to 12% per year. To address these impacts, the commission recommends that Tucson Mayor and Council follow the recommendations outlined in [1].

Future Work

The models used for this analysis could be generalized to fit more energy use situations than a data center. The models could be extended to analyze the emissions benefits for energy efficiency projects, and solar projects for the Tucson community.

Although attempts were made to look at other sources of pollution there isn't sufficient fidelity in the data used for the study to model the air quality impacts of small, short-term generators, such as peaker plants and diesel generators. This could be modeled by gathering the name plate capacity of all generators within the Western Energy Coordinating Council and modeling supply and demand based on the capacity of the most marginal producer at a given time.

Water Use

Tucson has a strong and longstanding culture of water conservation.

Introduction

In the summer of 2025, when a large data center, Project Blue, was requesting annexation to become part of the Tucson City community, residents spoke up and shouted the zoning proposal down. Proposed water usage for the facility was 440 acre-feet per year (AFY) for the initial phase up to 1040 AFY for the full buildout of the planned primary and secondary facilities (less than 1% of Tucson Water's annual water delivery to customers or 3-7% of Tucson Water's annual reclaimed water delivery). Proposed energy usage was 250-350 Megawatts (MW) up to 500-700 MW for the full buildout (roughly 24-67% of current TEP power delivery).

This reaction was a demonstration of the community' strong culture of water conservation and commitment to safeguard our Sonoran desert identity.

The community message was that they do not want to see their conservation work undone or reversed by use of one large water user. That is not why they have conserved.

With the decision to reject annexation, sending the message of rejection of the data center water and energy use, the community inevitably did not stop construction of the project, but did lose access to a voice and leverage as to how the construction and design could be adapted for minimal water and energy impact.

Narrative

Tucson has a strong and longstanding culture of water conservation. The community has embraced with pride its record of continuous lower per capita water use, effectively maintaining total community water use levels while continuing to grow in population.
Climate change has brought increasing challenges to the area with drought and higher, record breaking temperatures. This has increased community commitment to increasing green infrastructure (tree planting, native plant landscaping, shade structures, water harvesting, and water resource rebuilding). Our community needs a clean, sustainable, affordable water supply to maintain liveability.

The City of Tucson and Pima County lie within the unique Sonoran Desert region whose iconic flora and fauna are endangered by climate shifts, urban growth and threats to natural water resources.. This natural beauty draws businesses, students, seasonal residents, and tourists. The Desert Museum, Saguaro National Park, Ironwood National Monument, and Coronado National Forest are all here because of the native Sonoran desert ecosystem. Maintaining and restoring the natural water systems is an important focus of many Tucson businesses, non-profits and programs.

History of water

The Tucson area has a history of human settlement for thousands of years. The surrounding mountain range watersheds allowed both shallow and deep water tables, with ground water flows in the Santa Cruz and Rillito Rivers, now both reduced to intermittent, rainwater run washes. Groundwater pumping allowed the population to grow, but continued reliance upon the aquifer led to dropping well depths and ground subsidence. Reclaimed sewage water became a valuable resource for watering outdoor landscapes. Governmental agreements brought water from the Colorado River to the area in the early 1990's. The City of Tucson and Tucson Water have been stewards of these water resources. They have worked to both rebuild underground storage sources and supply the community. This stewardship has not come without challenges.

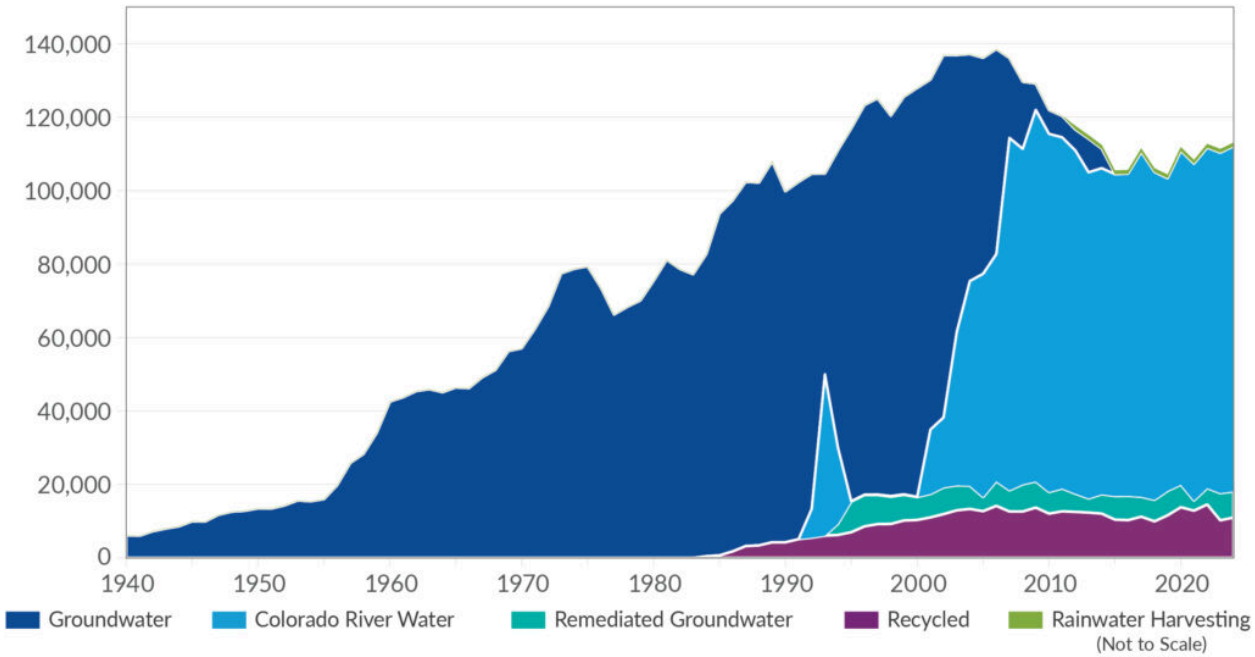


Image from One Water 2100 Plan[3]

Events that have shaped our water awareness, activism, and behavior

Water has been a passionate, galvanizing force in Tucson for 50 years. In the 1970's, when our underground aquifer was the community's main source of water, the Tucson City Council's decision to implement new tiered water rates resulted in the 1977 recall of three Tucson City Council members and the establishment of the Citizens Water Advisory Committee. Subsequent decisions by the Committee and the Council led to community education, increased water rates, and a significant decline in per capita water use. According to an article in the UA Campus repository, Changes in Water Rates and Water Consumption in Tucson, 1974 to 1978, by Adrian Griffin, et al, published in the journal of Hydrology and Water Resources in Arizona and the Southwest, gallons per capita daily (GPCD) water use in Tucson in FY75/76 was 185 GPCD. In FY76/77, after implementation of the new rates began to phase in, the rate was 150 GPCD. In FY 78/79 it was 140 GPCD, and today it is 72 GPCD.

Reliance on ground water alone was not sustainable. As water continued to be pumped from the aquifer, river flows stopped, shallow wells were no longer usable, and land subsidence began to affect homes in parts of residential Tucson as well as land outside of City limits.

In addition to declining water table levels and subsidence, in the 1980s the ground water used for drinking was discovered to contain polluting chemicals at levels that were adversely affecting people's health, causing cancers and deaths. Wells were closed, a Superfund site was established, clean-up efforts began, but without full success. TCE, dioxins and PFAS have heightened community awareness of water quality and have created an ongoing challenge and expense.

In the early 1990's (1994), as Central Arizona Project (CAP) water came to Tucson, the introduction of water directly to Tucson homes led immediately to problems. Aging infrastructure and different water chemistry were not compatible. Dirty water and broken pipes resulted. CAP water delivery to homes was stopped, and new methods of storing and cleaning the water was found before it could be delivered to homes.

Subsidence, health threatening pollutants, home infrastructure damage and rising utility bills have meant that there remains a level of community distrust and awareness where water is concerned.

Current topics in our daily news also continue to highlight the importance of water vigilance for the resilience and health of our community. Drought and record heat put a strain not only on our local comfort, trees and gardens, but result in lowered snowpack and volume in the reservoirs and Colorado River that gives us our share of CAP water. Federal water management plans will lower the share of CAP water that we have been receiving. So it is not surprising that planned consumption of water and energy by data centers raise strong concerns in the community.

Community water conservation success compared with other communities

All of this has led to successful water conservation practices and ethics in the Tucson community. Whereas the state average water consumption per capita is about 150 GPCD, the Tucson community has a rate closer to 72 GPCD. This is success.

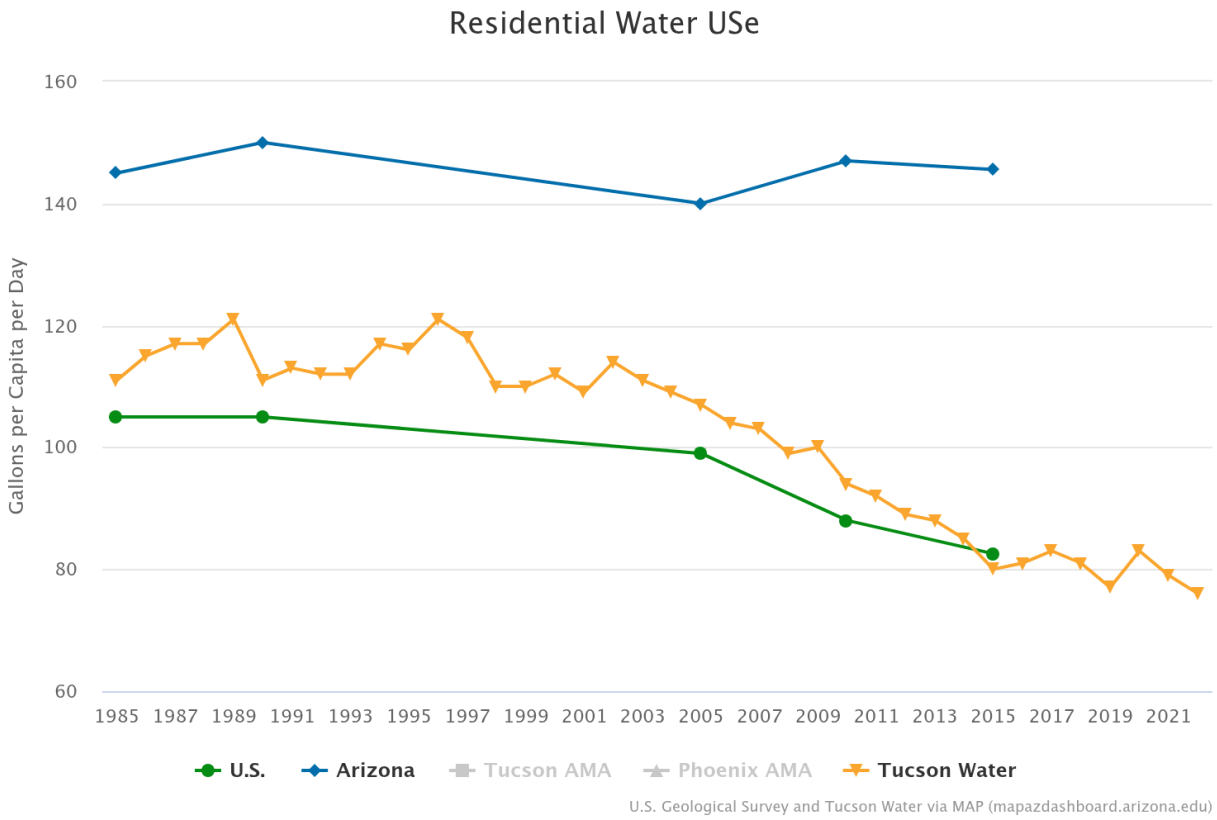


Image from MAP AZ Dashboard[4]

Conclusion

The community does not want to see their work undone or reversed by use of one (or more) large water users - that is not why they have conserved.

References

1. Climate Mayors, *Data Centers and the Climate Landscape: An Actionable Resource for US Mayors*, January 2026, [Online] Available: https://www.climatemayors.org/data-centers
2. “Project Blue Tucson Data Center Impact Dashboard”, Sky Island AI, Accessed July 16, 2026, [Online] Available: https://www.skyislandai.com/project-blue.
3. “Tucson’s One Water Approach”, Tucson Water, Accessed July 16, 2026, [Online] Available: https://tucsononewater.com/our-water-story/
4. “Residential Water Use”, MAP AZ Dashboard, Accessed July 16, 2026, [Online] Available: https://mapazdashboard.arizona.edu/infrastructure/residential-water-use

Appendix A - Additional Resources and Data

Policy

Memo from Jim Sell

Plan Tucson Climate and Energy

The overall goal of the Climate Action Plan (Tucson Resilient Together) is carbon neutrality by 2045. That means that greenhouse gas emissions in the Tucson area should be dropping on average 5% per year over the next 20 years. Any technology that adds more to that will affect the climate, which is also at record, megadrought levels.

Energy Use

Technologies in use should be based on a selection that is appropriate to a hot, water-scarce environment. Before proposal submission, there should be a vetting process where all possible technologies are assessed (cost-benefit). PT Cl 3, 8

The resident public should be included in the proposal assessment process in a valid public participation process.PT Cl 3, 6

The financial, health, safety condition of any resident should not be harmed by construction and operation of a data center, directly or indirectly. All residents must benefit from large scale industrial development. PT Cl 1, 2

Large scale industrial users (e.g. data centers) should be required to "pursue local sources of renewable energy, including solar, wind, resource recovery, and geothermal." PT Cl 8, CAAP E-4.5, E-5.2
And such users should be subject to strong local codes and contractual requirements to ensure transition to greenhouse gas neutrality." PL Cl 12, CAAP CR-2.5, 2.6

Data centers or other large scale energy users should be required to use design and technologies that do not increase heat risk and urban heat island impacts, such as through heat exhaust directly into the atmosphere. HAR CN- 1-3.

There is an opportunity to create a municipal "renewable portfolio standard" to require the data center to use an ascending level of non-fossil fuels energy, increasing over the next 5-10 years to zero greenhouse gas emissions. PT Goal 3, PT Cl 6.8.9,10,
CAAP E-3.1, E-3.2, E-4.5, E-5.2.

Note: the technology now available or ready to come on-line in the next few years enables near total use of renewable, non-fossil fuel energy. Such systems as geothermal cooling, fuel cell and battery storage, and more efficient solar and wind power, are not only viable, but are being put into place in other centers.

To trap a Tucson data center into exclusive use of, say, natural gas for decades of power supply, will break the Climate Action Plan goal of zero carbon by 2045. The community needs to reduce greenhouse gasses by 5% per year over the next 20 years to reach that goal,

Our CCES research shows that using the conventional fossil fuel power for the Beale data center would increase Tucson's greenhouse gas burden by 12%, year on year. That GHG increase threatens to break the Plan Tucson and Climate Action Plan Goals,

At the same time CCES modeling indicates that a data center of the proposed size can be 98.8% renewable (solar), with total battery storage, and produce a reasonable return on investment over ten years. This would not only maintain the plan goals, but provide an example for other industrial units in the metropolitan area.

Finally, serious consideration should be made of the creation of a publicly owned municipal utility dedicated to serve such data centers. CAAP E-3.3. This can be used to replace fossil fuel energy generated by the corporate agency the serves Tucson, and also perhaps develop a partnership with them (or not), to support conversion of Tucson's energy supply to 100% non-fossil fuel by 2045.

Water Use

Water is highly valued among Tucson residents — they see it as a precious resource and expect the resource to be carefully managed by local authorities.

Planning priority should be based upon protection of the aquifer and all sources of potable water. PT Goal 7.

New large scale users of water should only be allowed if it does not impede long-term reliability and quality of water infrastructure." PT Water 4.

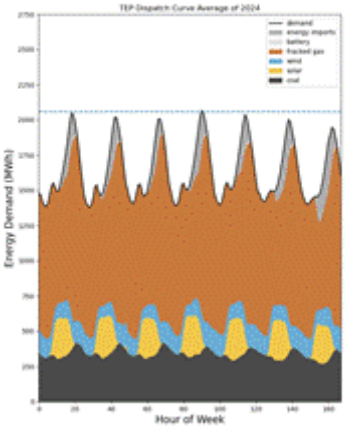
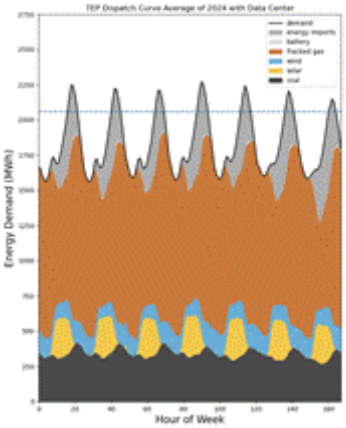
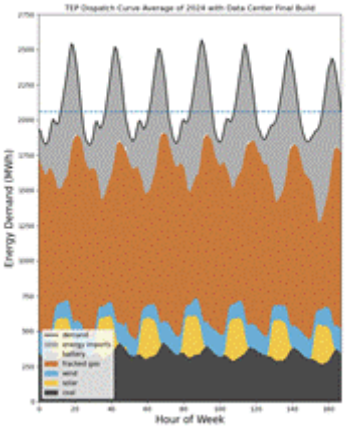
Priority should be given to reclaimed water for industrial use, potable water should not be allowed for data center cooling or other industrial operations. PT Water 3.

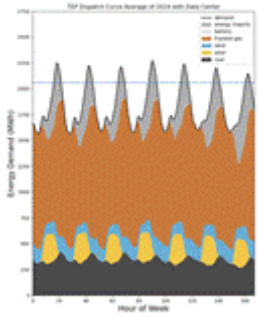
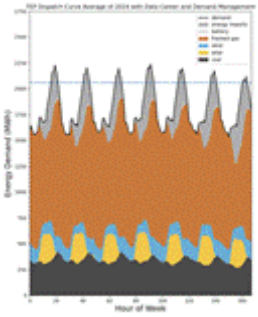
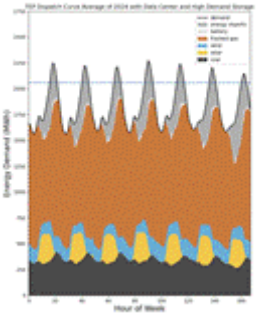
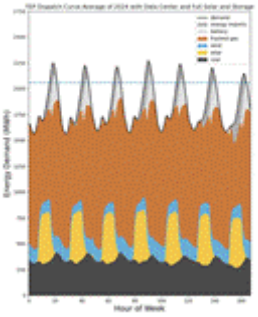
All regional water organizations and governments must coordinate water use requirements to ensure protection of the potable water supply and wise use of the reclaimed water resource PT Water 4. 7. OW GW-1, 3.

Energy

Project Blue Energy Options Study Appendices

Appendix 1: Plot Comparisons

		
No Data Center	Initial Phase	Final Phase

			
Secondary Phase	With Demand Management	With High Demand Storage	With Solar and Storage

Appendix 2: Energy Model Validation

The CCES Tucson Community Energy Model and Data Center Thermal Model are validated against a set of three *referents.* The Digital Engineering - Body of Knowledge (DEBoK), describes *referents* as “the information upon which development of the M&S [Modeling and Simulation] is based. That information determines the entities, processes, and interactions that should be included in the M&S to represent the simuland (the thing being simulated)” (Under Secretary of Defense for Research and Engineering, 3). This means that modeling and simulation is compared against referents that stakeholders of the models assume to represent the system being modeled to support the credibility of the simulation.

The DEBoK outlines *four* referent types:

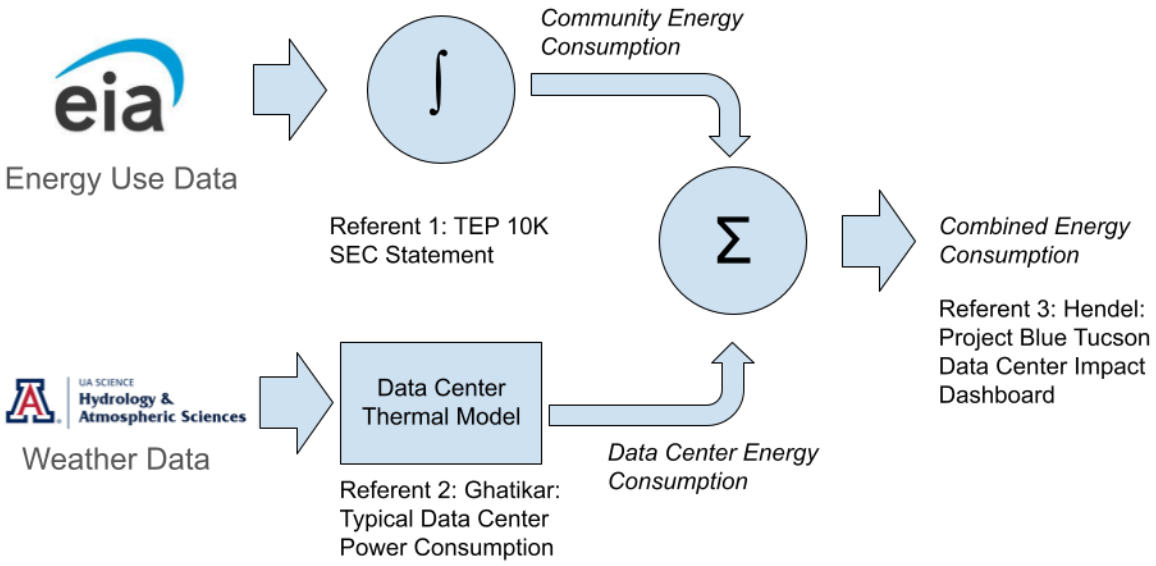
- Data: observations of the system being modeled.
- Theories: Algorithms that describe characteristics, behaviors and relationships i.e. physical natural laws.
- Simulation Results: Other simulations or models that have been objectively and qualitatively validated.
- Expert Human Knowledge: Assessment by Subject Matter Experts (SMEs).

Referent Selection

CCES selected three referents to compare its combined energy consumption model to validate its simulation of Tucson Community energy use in combination with proposed Data Center energy use:

1. TEP: Form 10K (2024) (*Data* referent)
2. Ghatkar: Typical Data Center Power Consumption (*Data* referent)
3. Hendel: Project Blue Tucson Data Center Impact Dashboard (*Simulation* referent)

A conceptual mental model of the CCES Tucson Community Energy Model and Data Center Thermal Model is presented below to show relationships between these models and their referents.



Multiple referents are used for the simulation so that each model is supported by a referent. Showing that these models agree is a demonstration of simulation credibility.

Assumptions and Limitations

The CCES Tucson Community Energy Model and Data Center Thermal Model are capable of estimating power consumption and aggregate emissions from the Tucson Community and proposed Data Center. The following limitations and assumptions are detailed below.

Limitations of the models:

- The simulation models the southwest region with *unlimited* generation capacity. Cost curves cannot take into account demand and therefore underestimate costs.
- No jurisdictional breakdown. Insufficient publicly published data for generation on a site-by-site basis. This is needed to break down emissions to a county level.
- Emissions numbers assume TEPs current energy mix across the southwest region.
- Source data doesn't differentiate gas generation by generator type, such as turbine or reciprocating internal combustion engine (RICE). Gas efficiency is a weighted average of the two based on TEP's ratio of available nameplate capacity of turbine vs. RICE sources.

Assumptions of the Validation:

- CCES attempts to get as close as possible to referent data, but prefers to *underestimate* where there is ambiguity. This increases confidence that stated numbers are at-least what this report states, but could be greater.

Referent Comparison

Referent 1: TEP FORM 10-K (2024)

The community energy consumption model was evaluated against the TEP FORM 10-K statement (Tucson Electric Power, 3).

The CCES Energy Model is publicly viewable at this URL:
https://github.com/eggsactly/TEP-Dispatch-2024
Scripts in that *repository* are leveraged for this referent comparison, detailed below.

Form 10-K showing TEPs total retail sales (in GWh, Gigawatt-Hours).

(sales in GWh)	2024	
Electric Sales		
Residential	3,964	27 %
Commercial	1,956	13 %
Industrial, non-Mining	1,952	13 %
Industrial, Mining	1,078	7 %
Other	14	— %
Total Retail Sales	8,964	60 %
Wholesale, Long-Term [1]	940	6 %
Wholesale, Short-Term	5,061	34 %
Total Electric Sales	14,965	100 %

Evaluating the model produces 14,569 GWh of total generation.

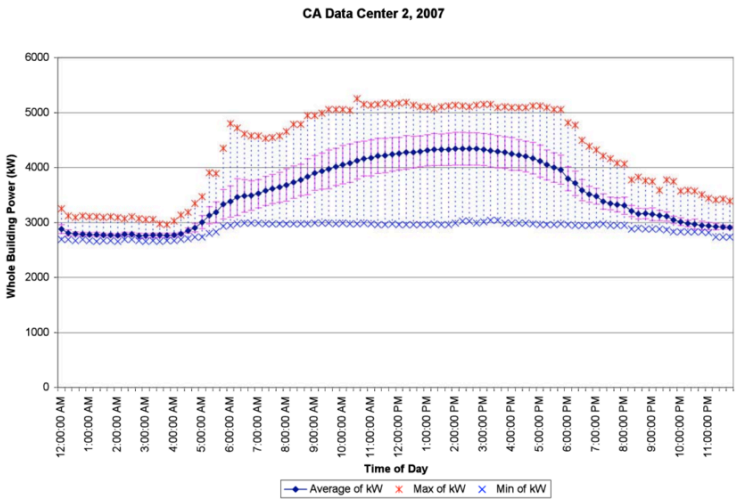
```
./plot-2024-ave.py
 14569.459 GWh of total genearation
 11080.69509702566 GWh of new Gas
```

This value agrees within 10% and underestimates versus TEPs stated numbers, of 14,965 GWh, in their regulatory filings.

Referent 2: Typical Data Center Power Consumption

The Data Center energy use was modeled based on temperature fluctuations and *validated* against the load curve of a California data center in 2007, and scaled based on the grid hookup. This was chosen because it was a complete data source. Hourly energy use for the Tucson data center model is based on outside temperatures, based on weather data in 2024.

Referent Data Source



The metric used for comparison between the CCES Data Center Thermal Model, and the data provided by Ghatikar is a *load factor.* Load factor is the ratio of average load, and maximum load in a given time period. To put into context, a 100% load factor means consistent utilization across all time periods, which means the lower the load factor, the more variability in utilization the load has. This is what is needed to be modeled in the data center thermal model.

Data center 2, pictured above, has a measured load factor of 81% (Ghatikar, 18). This agrees with modern data center projections. Duke Energy quotes projected load factors [for data centers] to be 80% (Ross, 5).

Finally, for the evaluation of the models load factor is performed
./plot-2024-dc-energy-use.py yields:

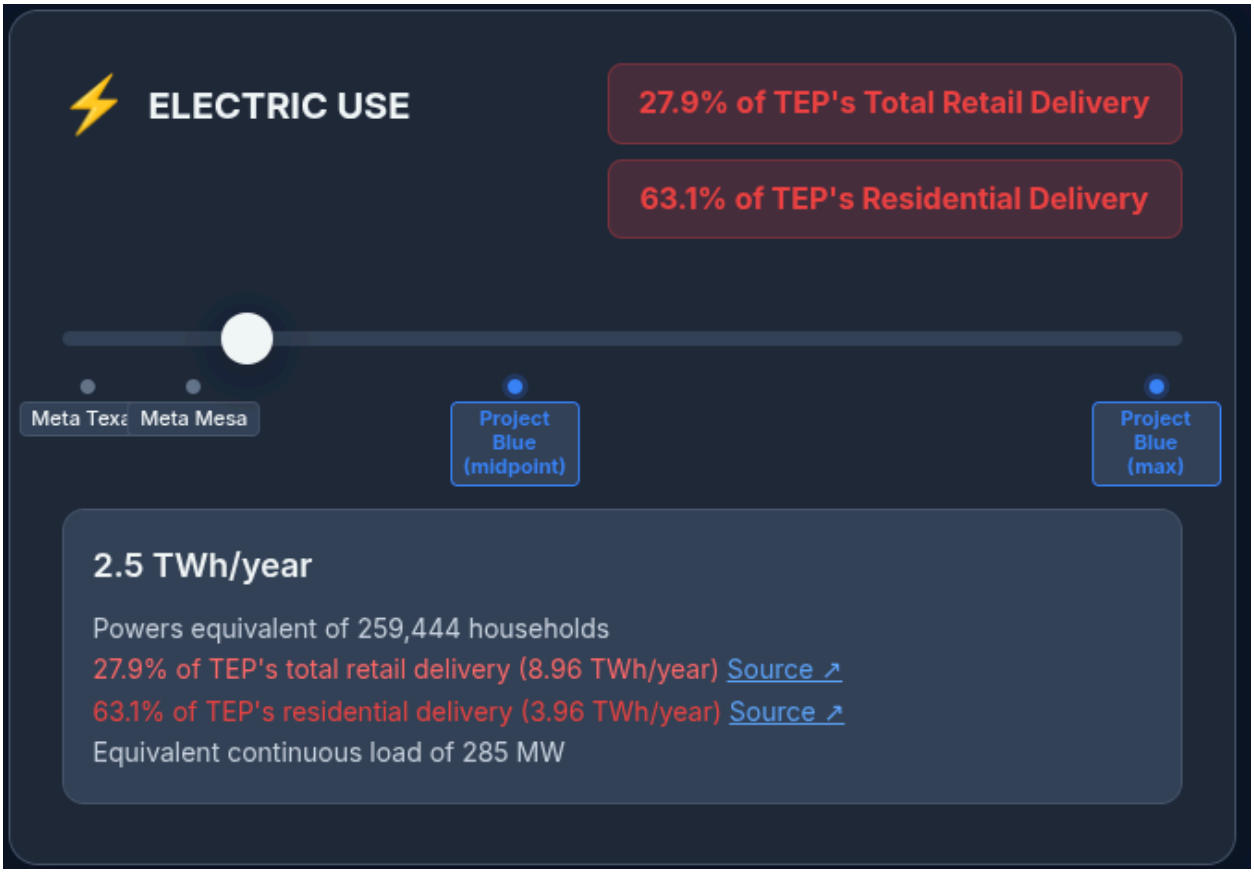
```
Weekly Ave Energy Use (MWh): 194.1458667490644
Weekly Load Factor: 0.9122173678147527
```

We find the CCES Data Center Thermal model *underestimates* the variability in load of data centers.

Referent 3: Project Blue Tucson Data Center Impact Dashboard

The Project Blue Tucson Data Center Impact Dashboard is a community resource estimating environmental and economic impacts from the proposed Project Blue data center. The model allows users to provide their own load utilization parameters. For the purposes of using this model as a simulation validation referent, the load parameter (286 MW) was matched between the CCES simulation and the Sky Island model.

Because Sky Island assumes a 100% load factor for the proposed data center, the CCES model will be an underestimate of total electricity consumed.



We see that at 286 MW load, the model predicts that the data center will use 2.5 TWh per year. This is an overestimate of the CCES Tucson Community Energy Model and Data Center Thermal Model result of 1.72 TWh per year. The CCES simulation underestimates energy consumption, compared to the referent, by 31%.

Validation Conclusion

The CCES Tucson Community Energy Model and Data Center Thermal Model is a credible simulation of the energy use and emissions that the Project Blue Data Center will have on the Tucson Community. CCES used three referents, TEP regulatory filings, other data center energy utilization, and other models that have similar use cases to validate the simulation. In every case, the CCES model was shown to *underestimate* against its referents. This means the numbers quoted by the CCES simulation is a *lower end* estimate of projected Project Blue Data Center impacts.

Works Cited

Climate Mayors. *Data Centers and The Climate Landscape: An Actionable Resource for US Mayors*. Jan 2026. https://www.climatemayors.org/data-centers

Ghatikar, Rish & Piette, M. & Fujita, K. Sydny & Mckane, Aimee & Han, Junqiao & Radspieler, Anthony & Mares, K. & Shroyer, Dave. (2010). *Demand Response and Open Automated Demand Response Opportunities for Data Centers*. 10.2172/981725.

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Under Secretary of Defense for Research and Engineering. *Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A) Recommended Practices Guide (RPG): Introduction*. Defense.gov. N.d. https://www.de-bok.org/asset/03663fa0de6769ec8e6a0b6c7387f9059bb70de9

Appendix B - Expert Presentations

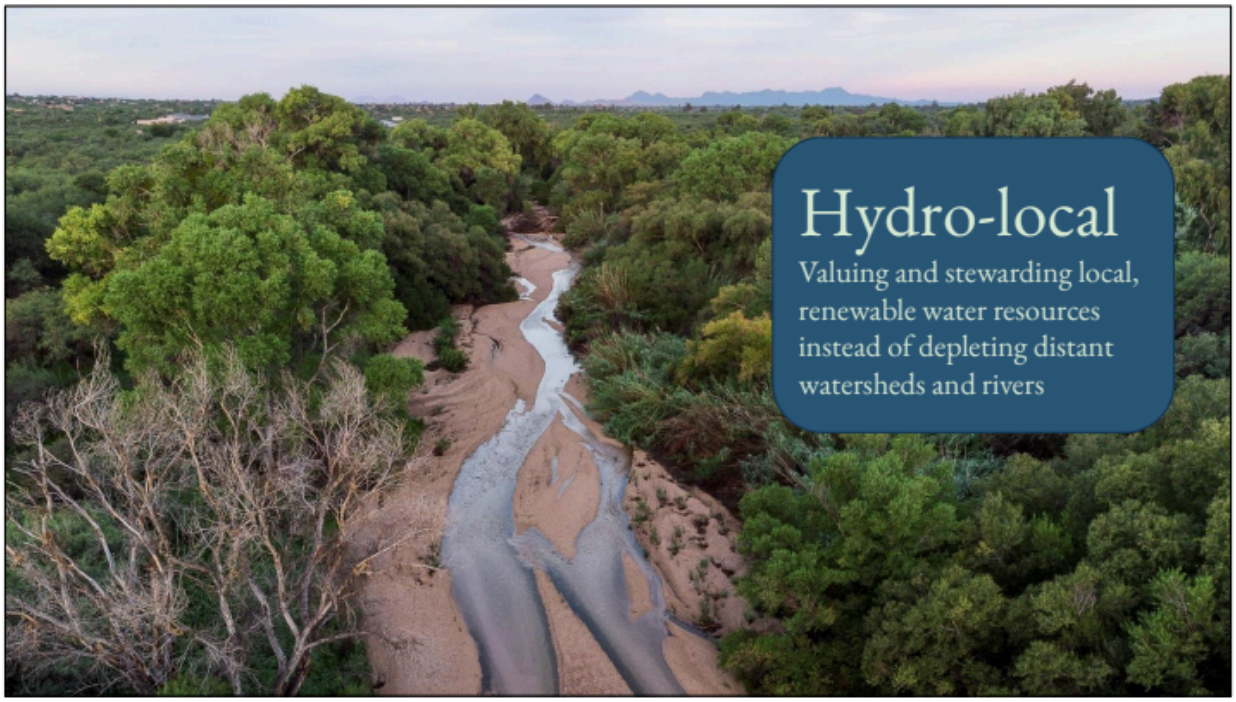
The following attachments are supporting materials provided by experts who presented to the Commission on Climate, Energy, and Sustainability.

WMG Policy on Project Blue

VERBAL LEGAL DISCLAIMERS:
We are not the city, we are not the developer. This is our professional opinion based 20+ years of water experience and on analyzing publicly-available information

The Project's Developer won't tell us their name but we'll tell you ours.

Ask how many people are watching with you – put in the chat



We know it's possible to live hydrolocally here in Tucson and to have a sustainable water future. That's why we know that PB & data centers aren't it.

FOR 2016-2023, we were on rainwater 74% of the time and city water 26% of the time. UNCERTAINTY AND RAINFALL

what is the Living Lab? year on rainwater – what is possible. A vision of living in alignment with the Sonoran desert – who we are and what we do

Lab – rainwater harvesting, greywater, composting toilets, low water use irrigation and fixtures, how many days using rainwater in 2024? We teach classes for Tucson Water's rainwater & greywater rebates and work with them and other partners throughout the region on river restoration, green infrastructure, and other water conservation projects to cool our cities & create a sustainable long-term water future for our region

Why Data Centers Concern WMG: Water Use

•Data centers require significant cooling, often using evaporative systems.

•Estimated use: 300,000 to 5,000,000 gallons of water per day.

•Equivalent to adding 12,000–200,000 residents' water demand.

•Groundwater depletion conflicts with aquifer recharge and river restoration goals.

Indigenous Perspective

- ~ 7 gallons of water a day
- 30% Still have no access to water
  - 51,000 Navajo
- 2,500 acre feet of water was removed from the Navajo Nation from 1988- 1990 (1 mine)

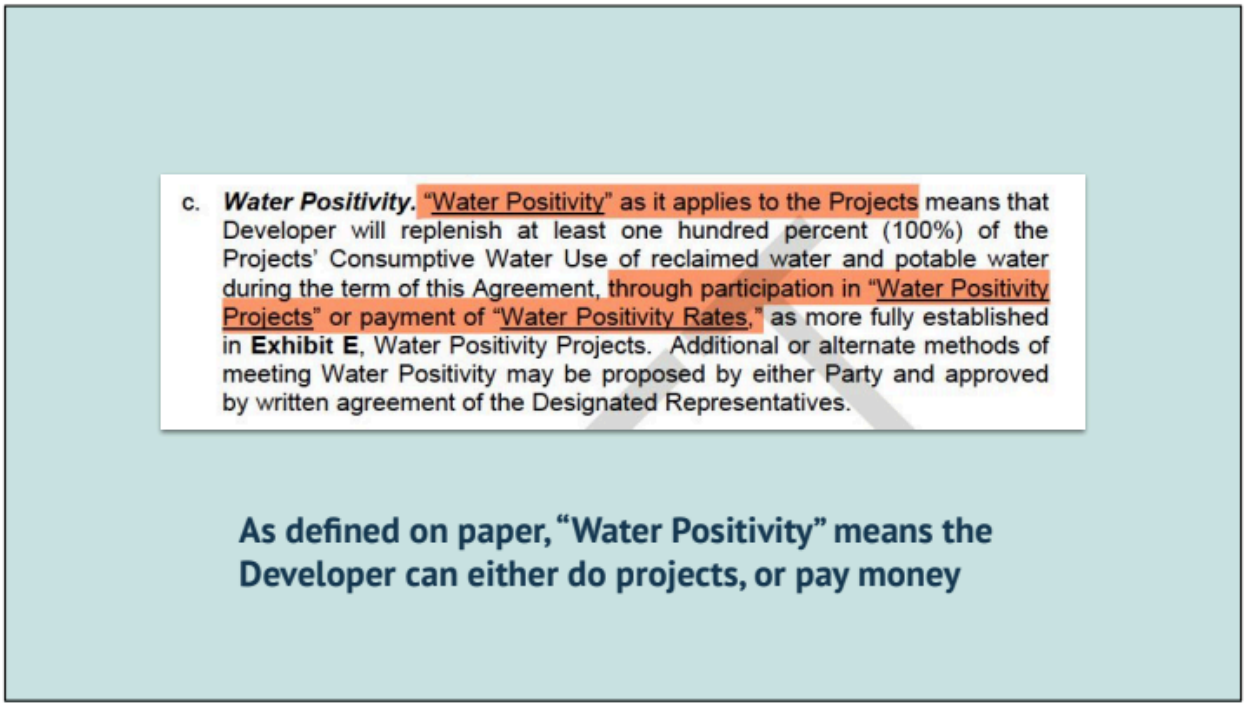
How much water Project Blue *claims* it will use annually

=

The annual residential water consumption of **23,000 Tucsonans**

Indigenous Perspective

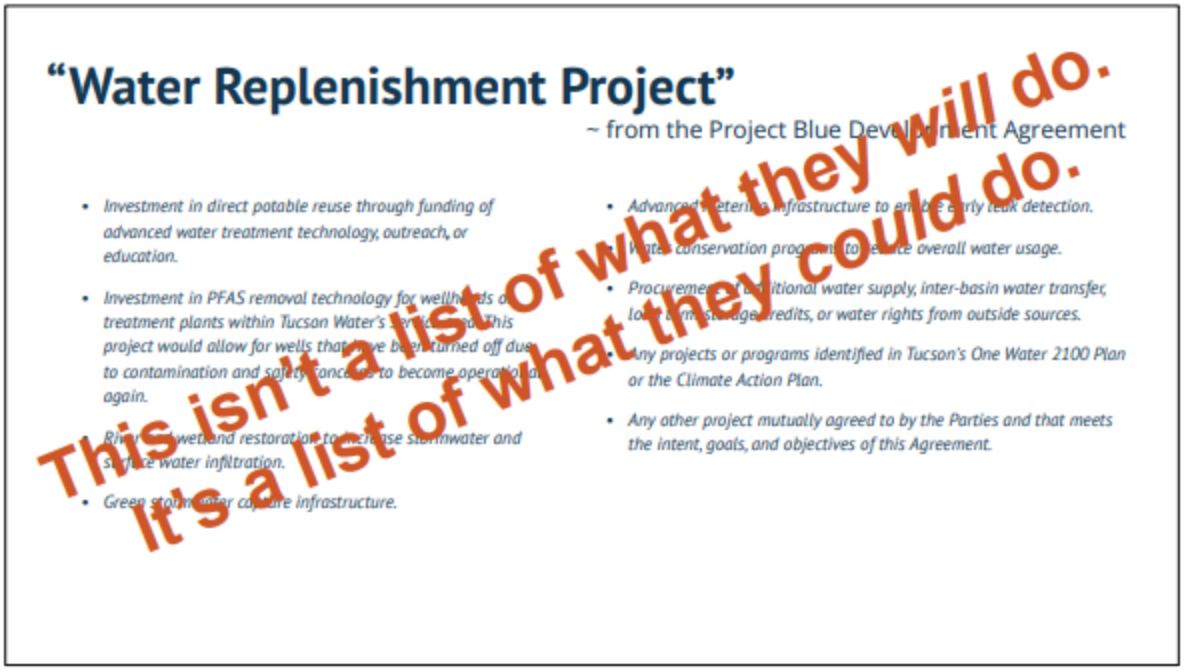
- Education
- Food Deserts
- Housing shortages
- Health Care Resources
- Built Infrastructure
- Economic Development
- Substance Abuse
- Violence
- Environment
- **Access to Water**



With that, let's turn to the claims that are currently being made in the Draft Development Agreement between Beale and the City of Tucson for Project Blue.

Over the next few slides, we will be quoting directly from the Draft Development Agreement (in italics) and unpacking what some of those things do and don't mean.

Draft Development Agreement:
https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/2025-7-14-project-blue-da-final-draft-for-mc-review-clean.pdf



NOTE that they can just throw money at us through Water Positivity Charge and through overuse fees instead of doing any of this. And do we have any guarantees that if they do just throw money at us it will be used to accomplish these things?

If it's a 1:1 offset, how many of these things would they have to do to meet their water positivity requirements? What if they just did the leak detectors and that offset five years of their use–then they could just do none of these other things? **This isn't a list of what they will do. It's what they *could* do. Big difference.**

- Investment in direct potable reuse through funding of advanced water treatment technology, **outreach, or education**.
  - Advanced purification: 1 gal dirty; 1 gal clean, but 6% loss
  - No guarantee real offset – in a traditional offset program wouldn't count
- Investment in PFAS removal technology for wellheads or treatment plants within Tucson Water's service area. This project would allow for wells that have been turned off due to contamination and safety concerns to become operational again.
  - This water is already in our bucket – no offset, making it potable – it's already in our portfolio, not new water
- River and wetland restoration to increase stormwater and surface water infiltration.
  - We are one of the major nonprofits working in this area–and we don't want the money. We want the water.

    - Intel had a corporate voluntary offset and funded WMG's work – the accounting gets really really fuzzy
    - No assurance that infiltration reaches groundwater, based on average rainfall and we haven't seen average in 5 years – important, but from accounting perspective, no guarantees – might do 1:4+ to account for that uncertainty
- Green stormwater capture infrastructure.
    - Based on rainfall
    - Kino is only large scale system we have – so it would have to be the new one on their property – high offset ratio needed
    - Small scale green infrastructure just supplies plants – not groundwater recharge
- Advanced Metering Infrastructure to enable early leak detection.
    - 6% of water "lost" to leaks vs. pb 1% – if you see water as a commodity within a human system, reducing those leaks could get you a net gain of 5% – but if you view water as a resource within a natural system, you are still losing 1% bec that 6% lost to leaks is sinking into the ground, where it bec available to trees and to the aquifer
    - 6% is unaccounted for water – from infrastructure of pumping to meter
    - Can help with savings on customer side – but high offset ratio bec no guarantees
- Water conservation programs to reduce overall water usage.
    - So they're going to encourage Tucsonans, who already have way below average per capita water use, to conserve even more while they are using massive quantities of water to cool data. That seems doomed to failure just by the galling hypocrisy of it
    - High offset
    - Water use can be driven down – so we can have secure local aquifer for water and climate resilience, not give it to some extractive industry
- Procurement of additional water supply, inter-basin water transfer, long term storage credits, or water rights from outside sources.
    - Subtext: Colorado River Allotment – but that allotment is already up for review and the river is under drought stress – there isn't realistically more of that pie to grab
    - Desalination plants and pumping water from the gulf? Farm to data center?
    - Good luck :)
- Any projects or programs identified in Tucson's One Water 2100 Plan or the Climate Action Plan.
    - Vague
- Any other project mutually agreed to by the Parties and that meets the intent, goals, and objectives of this Agreement.

"Developer shall be entitled to offset credits against the Water Positivity Charge for

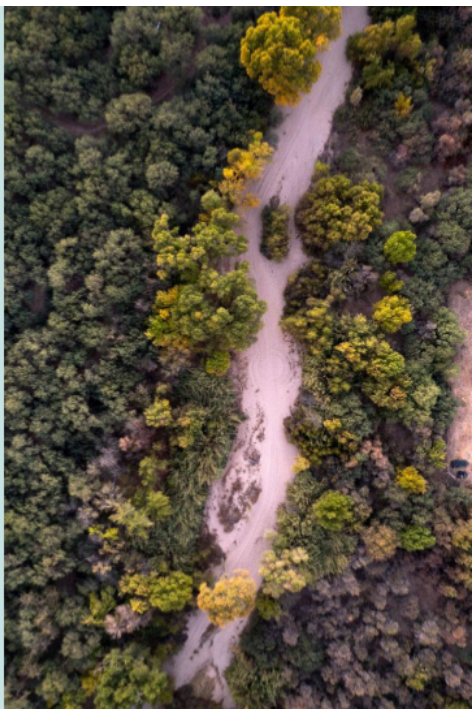
any of the following: 1) Developer's contributions to any Water Replenishment Project, as a proportionate share of the costs, calculated on per-acre foot basis; 2) Developer's acquisition of additional renewable water supplies as identified in Tucson's One Water 2100 Plan, including Central Arizona Project Water, Tucson AMA Long Term Storage Credits not generated by Tucson Water or effluent not allocated to the City of Tucson, if any or all of these supplies are not Tucson Water controlled resources as of July 1, 2025; and 3) Developer may obtain an effluent based offset against the Water Positivity Charge for metered or estimated sewer discharges to a Pima County Metropolitan-Area Treatment Plant as tracked by the City and according to the City's standard formula used to calculate effluent allocations for the Santa Cruz and Lower Santa Cruz Managed Recharge Projects, after deductions are made for the Pima County ten percent (10%) share and the Southern Arizona Water Rights Settlement Act (SAWRSA) allocations."

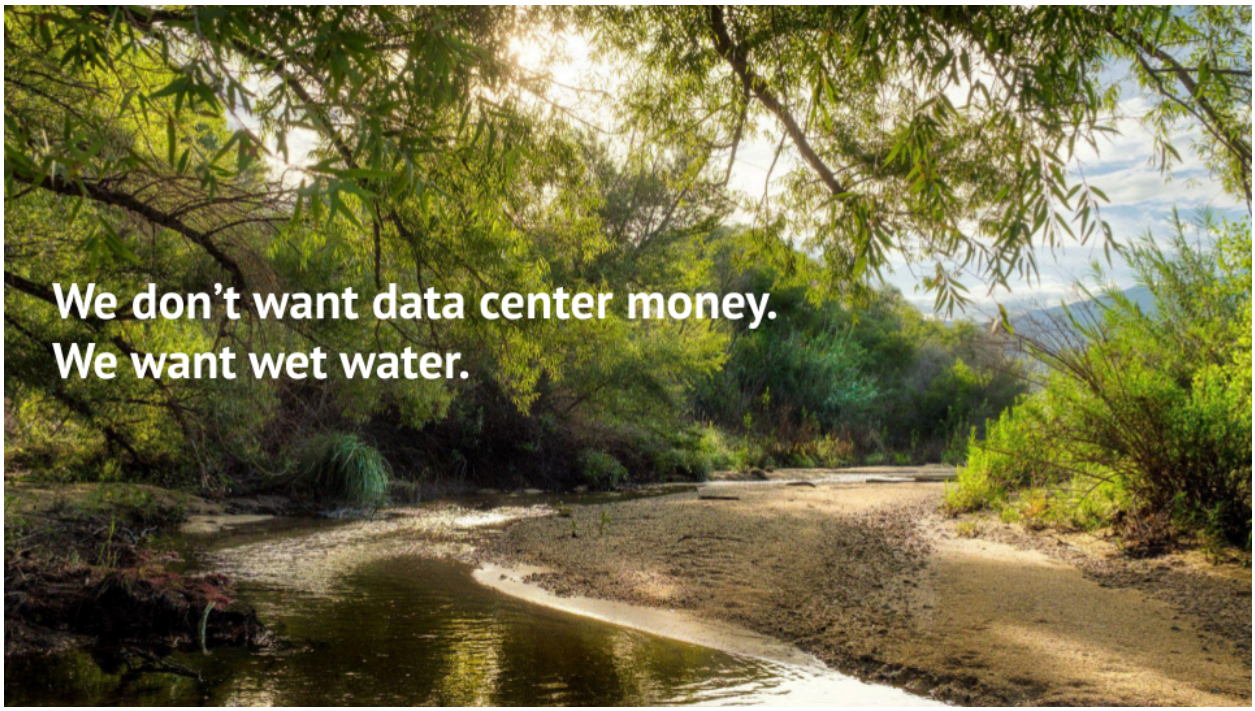
An acre-foot of water supply used to offset the Water Positivity Charge will fully offset on a one-to-one basis as long as Tucson Water does not incur substantial (more than ten dollars ($10) per acre-foot) administrative costs in transferring or reporting the water supply. If Tucson Water incurs substantial administrative costs (more than ten dollars ($10) per acre-foot), the Water Positivity Charge offset may account for these costs through the delivery of additional water on a cost per acre-foot basis, or through a cost-related reduction in offset percentage. For example, if an additional water supply has a ten percent (10%) administrative costs, Developer may deliver ten percent (10%) more water or pay ten percent (10%) of the Water Positivity Charge for each acre-foot.

WMG Recommendations

- Require Disclosure
- Public Engagement
- Transparency
- Policies that protect our wet water

History will repeat itself




We don’t want data center money.
We want wet water.

Project Blue Water & Energy by Russell Lowes

Project Blue Water and Energy Worksheet -- by Russell Lowes, 11/11/2025 Draft

Comparing the Project Blue Claimed Move from Water to Air Cooling, Double the Energy, Shifting and Increasing Water Usage from Direct On-Site to Less Efficient Indirect Off-Site Water Usage

Introduction

Project Blue mega-data center supposedly changed its cooling methodology in September 2025 to not include wet/evaporative cooling technology on-site, but to switch to dry HVAC and other cooling technologies. In July 2025 they had promoted the concept of wet cooling.

This paper covers both cooling systems, wet and dry cooling, and shows an **increased water usage** from the dry cooling system. The move from wet to dry cooling pushes off water usage to the Tucson Electric Power electricity mix. For an apples to apples comparison, the July and September Project Blue versions are assumed at the same power service size, with the mix being provided by Tucson Electric Power (TEP).

The purpose of this analysis is to show how much water and energy usage that the first two mega-data centers known as Project Blue would use. The total water usage is being erroneously underreported on the City website, at this webpage pdf:

pdf: https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf, pg 3

See a copy of this pdf on "COT pdf" tab, directly copied from the pdf onto the next tab, titled "COT pdf" in July of 2025 (just in case the URL gets modified or deleted).

Under the wet cooling method, when the indirect offsite water usage is added to the direct on-site water usage, the total water usage goes up typically by approximately 3.4 to 5.9 times. This is a huge difference between the Project Blue-reported direct usage and the total of that and the indirect usage. Under the section, below, where the dry cooling method is considered, the total water usage increases due to increased inefficiencies of shifting evaporative cooling at the data center to evaporatative cooling at the power plant.

Some might say that TEP could alter the energy source mix to be lower in water usage. However, they are now in a collaborative effort with the two largest Arizona utilities to potentially add nuclear plant capacity to their mix. Nuclear energy has the highest cooling needs of any major electric energy source in Arizona. This high water use is due to the non-supercritical temperatures of this thermal electric power source, with a thermal efficiency of just 32.5% (converting only 32.5% of the heat to electricity, versus about 60% thermal efficiency for combined cycle gas electric plants).

I encourage members of the Tucson community to look this over, and send any questions, comments, and suggested improvements regarding this analysis to me, at russlowes@gmail.com.

Analysis of Project Blue and Tucson Electric Power (TEP) Energy and Water Usage

Energy Data:

TEP Energy Production

			Notes & Sources	
Total Sales for TEP, 2024	15.492	TWh/yr	https://www.sec.gov/ix?doc=/Archives/edgar/data/100122/000010012225000004/tep-20241231.htm	Pg. 24
Retail Sales for TEP, 2024	9.207	TWh/yr	Same as above	
Total TEP's residential usage, 2024	3.964	TWh/yr	Same as above	Pg. 3

Project Blue Power Capacity

Project Blue Electric Power Capacity, Primary Project	400-600	MW	https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf	Pg. 4
Project Blue Electric Power Capacity, Secondary Project	500-700	MW	Same source as above	
Total of above:	900-1300	MW	Same source as above	
Restated in GW:				
Project Blue electric capacity, both projects	0.9-1.3	GW	https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf	Pg. 4
Average of the above range	1.1	GW	Calculated cell to obtain average	
High end of the range	1.3	GW	Hand-entered cell, high end	

Tucson Water Utility, Delivery, 2024	Billion Gals./Yr	AFY		Gals./Day
Potable Water Delivered by Tucson Water	28.70	88,077	https://www.tucsonaz.gov/News-articles/By-the-Numbers-2024	78,630,137
Reclaimed Water Delivered	4.75	14,577	Same source as above	13,013,699

Total Water Delivered by Tucson Water	33.45	**102,654**	Same source as above	91,643,836

PB Direct Water Use Data:	Gal./ Day	Acre Feet / Year*	Gallons per Year	% of Total Tucson Water Delivered	
Water Usage/PB First Phase	776,686	870	283,490,370		
Water Usage/PB Second Phase	928,452	1,040	338,885,040		
Water Usage/PB Primary&Secondary Phases	1,705,138	1,910	622,375,410	1.9%	Note: COT erroneously lists 1%. * pg. 3

*Source: https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf pg.4

Note: 1.9% above and to the right corrects the City of Tucson webpage states, "At full buildout of both the Primary and Secondary Projects water use won't exceed 6% of the reclaimed water portfolio, or 1% of the entirety of Tucson Water's portfolio." This 1% figure does not agree with the 1910 AFY divided by the 102,654 Tucson Water portfolio figure.

Source: https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf pg. 3

Reclaimed Water Recap	AFY		**% of PB Water Compared to Total TW Reclaimed Water**	
Total Access to Reclaimed Water for 2026	32,000	https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue_faq-responses_final.pdf	6.0%	Pg 2

Continued from far left 2 cols.:

Project Blue Energy and Water Usage, Wet Cooling	**Energy Use, TWh**	AFY for TEP Power Plant Cooling	**Indirect Water Usage Data, Based on TEP Energy Mix, Gals./Source:** Gallons of Water from TEP Power Plant Cooling at 2024 TEP Energy Source Mix	**Energy Usage as % of Various Sector Metrics:** % of Total TEP Energy Sales, 15.492 TWh	% of TEP Retail Sales, 9.207 TWh	% of Residential Sales, 3.964
Gross Electrical Output/Both PB Projects, at **50%** Capacity Utilization Rate of top figure	5.694	4,631	1,504,969,752	37%	62%	144%
Gross Electrical Output of Both PB Projects, at **80%** Capacity Utilization Rate of top figure	9.1104	7,409	2,407,951,603	59%	99%	230%
Gross Electrical Output of Both PB Projects, at **100%** Capacity Utilization Rate of top figure	11.388	9,261	3,009,939,504	74%	124%	287%

Project Blue Energy and Water Usage, Dry Cooling	**At Least Double the Energy**
Gross Electrical Output/Both PB Projects, at **50%** Capacity Utilization Rate of top figure	11.388
Gross Electrical Output of Both PB Projects, at **80%** Capacity Utilization Rate of top figure	18.22
Gross Electrical Output of Both PB Projects, at **100%** Capacity Utilization Rate of top figure	22.776

Notes on Projected Energy Increase

See next tab for sidebar on how energy use from dry cooling method increases from 2 to 5 times.

Sources on Water Use for Energy Sources:

Water use and production at PVNGS is at: https://www.neimagazine.com/features/featurean-oasis-filled-with-grey-water/ and https://www.eia.gov/nuclear/state/archive/2010/

Sources: Coal water use: U.S. Department of Interior, Bureau of Reclamation, "Proposed Modifications to the Four Corners Powerplant and Navajo Mine, Final Environmental Impact Statement," vol. 1, 1976, p. I.19; and Federal Power Commission, "Steam-Electric Plant Construction Cost and Annual Production Expenses," 1972-74.

Source for gas generator water use: https://www.ucsusa.org/resources/water-natural-gas

Solar water use: https://www.seia.org/initiatives/water-use-management

Calculation Information:

Equation of above three figures, 50% Util example = ((B21*0.224)*0.557)+((B21*0.636)*0.215)+((B21*0.14)*0.02))*100,000,000<to convert from TWh to kWh for energy aspect

In other words, the TWh portion of 22.4% coal, 63.6% gas and 14% RE, the 2024 TEP portions for 2024 energy mix, and .557 gal/kWh for coal, gas .215, and renewables 0.02 gal/kWh, with references to left for water use per source.

Source on above energy mix at page 24: https://www.sec.gov/ix?doc=/Archives/edgar/data/100122/000010012225000004/tep-20241231.htm

Direct and Indirect Water Use, Wet Cooling of Data Center

Acre-feet for TEP Electricity Generation for PB Primary and Secondary, both Direct & Indirect

	Gal./ Day	AFY, Direct and Indirect	Billions of Gallons per Year	% of Total Water Tucson Water Delivered
50% capacity utilization Rate	5,839,139	6,541	2.131	6.4%
80% capacity utilization Rate	8,319,540	9,319	3.037	9.1%
100% capacity utilization Rate	9,973,141	11,171	3.640	10.9%

Direct and Indirect Water Use Data, Dry Cooling of Data Center

Acre-feet for TEP Electricity Generation for PB Primary and Secondary, both Direct & Indirect

Here, only Indirect water consumption is counted and it is doubled due to the less efficient cooling of thermal generators, as opposed to on-site evaporative cooling.(a)

	Gal./ Day	AFY, Direct & Indirect (b)	Billions of Gallons per Year	% of Total Water Tucson Water Delivered
50% capacity utilization Rate	8,268,003	9,261	3.018	9.0%
80% capacity utilization Rate	13,228,804	14,818	4.829	14.4%
100% capacity utilization Rate	16,536,005	18,523	6.036	18.0%

Additional Total Water Use, by Switching from Wet Cooling to Dry Cooling

Acre-feet for TEP Electricity Generation for PB Primary and Secondary, both Direct & Indirect

	Gal./ Day	AFY, Direct and Indirect	Billions of Gallons per Year	Increase of Dry Cooling Over Wet
50% capacity utilization Rate	2,428,863	2,721	0.887	41.6%
80% capacity utilization Rate	4,909,264	5,499	1.792	59.0%
100% capacity utilization Rate	6,562,864	7,351	2.395	65.8%

Conclusion

In July of 2025, Project Blue mega-data center announced its plans to use 1910 acre-feet for two combined data centers, using wet/evaporative cooling.

In September of 2025 Project Blue announced a change in plans from an evaporative/wet cooling system to a dry/HVAC-C system. In doing so, they 1) have planned a shift in water use from on-site direct usage to off-site indirect water usage at power plants; and 2) have actually **increased the total planned water usage in Arizona by likely between 42 and 66%.** In the example below, I assume a 80% data center utilization factor, aka capacity factor.

This analysis uses a conservative approach, in that it gives the benefit of the doubt to Project Blue by only projecting a doubling of water usage for dry cooling, which translates to a doubling of energy and water usage for the more energy intensive dry cooling method.

If the evaporative cooling advantage range of 50-80% is used, for example, and put at the half way point between 50 and 80%, at 65%, the doubling would then become a multiplication of 2.86 instead of 2.0 times. This would increase the projected water consumption substantially. Instead of being, for example, 59% more water for dry systems than wet, it would increase to 127.4% over the wet cooling water usage levels. In terms of water usage compared to Tucson Water delivery, it would go from 14.4% to 20.6% of the water that Tucson Water delivers.

Clearly this is a major shift from on-site water usage to off-site water usage. It is a shift that the citizens of the city of Tucson and the state of Arizona need to consider, along with governments and businesses.

Glossary

AFY means acre feet per year. There are 325,851 U.S. gallons per acre-foot. All gallons here are U.S. gallons.

Direct water use is water that is used on the PB industrial site.
Indirect water is water that is used by Tucson Electric Power for cooling at its power plants. It is evaporated and released to the atmosphere. This water loss may occur with water withdrawn in Pima County Active Management Area (AMA), or elsewhere in the state. So it might be a mix of water from our watershed and from our state's watersheds. Either way, it is depleting our state's water resources.

Energy units come in kilowatt-hours, megawatt-hours, Gigawatt-hours and Terrawatt-hours. Each one of these is 1000 times higher as they go from left to right. The abbreviations are kWh, MWh, GWh and **TWh**.
Power Capacity: the units are similar, but do not have the element of time (h for hour): kW, MW, GW, TW. Power over time (or power times time) = energy.

Gals. is in U.S. gallons
Gal./kWh is gallons of use per kilowatt-hour of energy. In this table Gal./kWh refers to water for power plants that evaporates into the atmosphere. In other words, it is lost to the environment.

Reclaimed water is water that has gone through primary, and perhaps secondary, treatment. When it goes through secondary treatment, it is often cleaner than the bulk of our water supply in Tucson. Hence, reclaimed water that has gone through secondary treatment can be recharged into the groundwater table for future use as potable water.

Project Blue is a project under Beale Infrastructure, which is owned by Blue Owl Real Assets. They are managing the data center construction for Amazon.

Tucson Water is a department of the City of Tucson.
Tucson Electric Power, or TEP, is an investor-owned subsidiary of Fortis, a Canadian company.

Notes

a> Food for thought about efficiency of water cooling is in the next tab. Generally speaking, evaporative cooling in an arid climate like Tucson has an efficient reduction in electricity by 50-80%. Conversely, HVAC technology for this region is 2-5 time the water use for the same heat displacement. For futher explanation, see the EvapVsHVAC tab of this Excel workbook.

b> Water use of dry cooling would be expected to be 2-5 times the water use of wet cooling. Here the lower usage level is used. If a higher level is used, the water usage would go up linearly.

Search Results on AI Query

Query: What is the difference between water usage for evaporative and HVAC for cooling data center computers in Tucson, Arizona?

Query run on https://www.deepseek.com/en Sept. 2025

NOTE: I have **bolded** parts below that seem more significant. --Russell Lowes

Results:

This is an excellent question that gets to the heart of data center efficiency in arid climates. Here is a detailed comparison of electrical use for evaporative cooling versus traditional HVAC (vapor-compression) cooling for data centers in the Tucson, AZ area.

Executive Summary

For a data center in Tucson, **evaporative cooling will use significantly less electricity than traditional HVAC cooling—often **50-80% less** for the cooling system itself. The prim >>>>>> reason is that evaporative coolers use the natural process of water evaporation to cool the air, which requires only fans and small water pumps. HVAC systems use energy-intensive compressors to mechanically cool the air.**

However, this massive electrical savings comes with important trade-offs regarding water usage, humidity control, and maintenance.

Comment from Russell: My Conversion from Off-Site HVAC cooling to On-Site Evap Cooling Water Savings from 50-80% Less Water Use to multiples of Energy Use, HVAC over Evap	
% Range Evap Uses Less than HVAC Energy	<<This converts to HVAC Using this Times More Energy
0.5	2.0
0.8	5.0

Detailed Comparison

1. Evaporative Cooling (Direct or Indirect)

* **How it Works:** Uses the evaporation of water to cool the air. Tucson's low humidity is ideal for this process.
  * **Direct Evap (Swamp Cooler):** Air is pulled through water-saturated pads, cooling it through evaporation and adding humidity. This is rarely used **directly** for IT equipment due to the humidity addition.
  * **Indirect Evap:** A heat exchanger separates the evaporatively-cooled air from the data center air. **This cools the data center air without adding moisture, making it the standard for modern data centers.**
  * **Two-Stage Evap:** Often used as a supplement. The first stage uses indirect evap to pre-cool air before it enters a more efficient mechanical cooling stage.

* **Electrical Consumption:** **[OF INDIRECT EVAP]**
  * **Very Low.** The main electrical consumers are **fans** (to move large volumes of air) and **small water pumps**.
  * It completely avoids the largest energy consumer in a traditional system: the **compressor**.
* **Key Metric - Efficiency:** The efficiency of cooling systems is often measured by their **Coefficient of Performance (COP)**. A high COP means more cooling per unit of energy.
  * **Typical COP:** 10 - 40+ (depending on outside conditions). This means for every 1 kW of electricity used, it can remove 10-40 kW of heat.**
* **Pros for Tucson:**
  * **Extremely low energy use**, leading to massive operational cost savings.
  * Perfect for Tucson's long periods of hot, dry weather.
* **Cons for Tucson:**
  * **High Water Usage:** This is the major trade-off. Tucson is in a desert, and water is a precious resource. A large data center can use millions of gallons of water per year.
  * **Effectiveness Diminishes with Humidity:** During Tucson's brief "monsoon" season (July-August), the rise in humidity reduces the cooling efficiency, often requiring a backup mechanical system.
  * **Maintenance:** Pads need regular replacement, and water mineral deposits (scale) must be managed to maintain efficiency.

2. Traditional HVAC (Vapor-Compression Refrigeration)

* **How it Works:** The standard "air conditioner." It uses a refrigerant cycle involving a compressor, condenser, expansion valve, and evaporator coil to move heat from inside the building to the outside.
* **Electrical Consumption:**
  * **Very High.** The **compressor** is the largest energy consumer. Second are the **condenser fans** and **internal fans**.
  * **Energy use increases exponentially as the outside temperature rises.**

* **Key Metric - Efficiency:** Measured by **COP** or **EER (Energy Efficiency Ratio)**.
  * **Typical COP:** 3 - 6. This means for every 1 kW of electricity used, it can only remove 3-6 kW of heat. This is far less efficient than evaporative cooling in a dry climate.**
* **Pros for Tucson:**
  * **Precise Control:** Maintains exact temperature and humidity levels regardless of outside conditions.
  * **No Water Consumption:** Uses only electricity (a "dry" system).
* **Cons for Tucson:**
  * **Extremely High Energy Costs:** Electricity demand, especially during the summer peak, will be enormous.
  * **High Strain on Electrical Grid:** Contributes to peak demand charges and requires more robust electrical infrastructure.
  * **Higher Carbon Footprint:** If the grid electricity is generated from fossil fuels.

[Commnent from Russell: NO DIRECT WATER CONSUMPTION, HOWEVER, HIGH OFF-SITE POWER PLANT WATER USE, WHICH IS NOT COUNTED HERE.]

Head-to-Head Electrical Use Comparison Table

Factor	Evaporative Cooling	Traditional HVAC (DX)	Winner for Electricity
Primary Energy User	Fans & Water Pumps	Compressor & Fans	**Evaporative**
Typical COP	10 - 40+	3 - 6	**Evaporative**
Energy Use Relative	**Very Low**	**Very High**	**Evaporative**
Impact of Outside Temp	Low. Fans work slightly harder.	High. Efficiency drops as temp rises.	**Evaporative**
Impact of Outside Humidity	High. Efficiency drops as humidity rises.	Low. It works harder but can still cool.	**HVAC**
Water Usage	**Very High**	Negligible	**HVAC**

The Modern Hybrid Approach for Tucson

Most modern, efficient data centers in climates like Tucson use a **hybrid or multi-mode system** to get the best of both worlds and maximize overall efficiency (minimizing both energy and water).

1. **Evaporative Cooling (Primary):** The system runs on indirect evaporative cooling for **~85-90% of the year** when the air is dry enough. This saves massive amounts of electricity.**

2. **Mechanical Cooling (Backup):** During the humid monsoon season or on exceptionally hot days, the system automatically switches to (or supplements with) a highly efficient mechanical vapor-compression system to maintain precise conditions.

This approach optimizes the PUE (Power Usage Effectiveness – a key data center metric where lower is better). A well-designed hybrid data center in Tucson can achieve an annualized PUE of **1.1 to 1.3**, meaning almost all energy is going to the IT equipment, not the cooling. A data center relying solely on old HVAC might have a PUE of 1.5 or higher.

Conclusion

From a purely electrical perspective, evaporative cooling is the undisputed winner for a data center in Tucson. It will drastically reduce operating costs and strain on the electrical grid.

[Comment from Russell: AGAIN, THEY ARE ARE MISSING THE INDIRECT WATER USE HERE, FROM POWER PLANT COOLING, IF TYPICAL GRID MIX IS USED.]

However, the decision is not purely about electricity. The **critical trade-off is water**. In a desert community like Tucson, the significant water consumption of an evaporative system is a major environmental and potentially reputational concern. Therefore, the optimal solution is a **hybrid system** that uses water-efficient indirect evaporative cooling as the primary method and only uses energy-intensive mechanical cooling as a necessary backup, thus minimizing both total electricity and total water consumption.

The previous answer synthesizes established engineering principles and best practices within the data center industry, particularly for arid climates. Here are the key research citations, reports, and resources that support the analysis, categorized by topic.

1. General Superiority of Evaporative and Air-Side Economization in Arid Climates

The fundamental principle that using outside air for cooling is far more efficient than mechanical compression is well-documented by leading industry authorities.

* **American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):** ASHRAE's Thermal Guidelines for Data Processing Environments have progressively widened the recommended and allowable environmental ranges for IT equipment. This has directly enabled the use of economizers (both air-side and water-side) and evaporative cooling by proving that IT hardware can reliably operate

at higher temperatures and wider humidity ranges than traditionally believed.
    * **Citation:** ASHRAE Technical Committee (TC) 9.9. (2021). _Thermal Guidelines for Data Processing Environments_ (5th ed.). ASHRAE.
    * **Relevance:** This guideline is the bedrock of modern, efficient data center cooling design. It allows data centers in Tucson to use outside air for cooling for the vast majority of the year without risking equipment health.

* **U.S. Department of Energy - Lawrence Berkeley National Laboratory (LBNL):** Researchers at LBNL have published extensively on data center energy efficiency. Their work consistently shows that air-side economization (which includes evaporative cooling) is one of the most effective strategies for reducing cooling energy use.
    * **Citation:** Shehabi, A., Smith, S., Sartor, D., Brown, R., Herrlin, M., Koomey, J., Masanet, E., Horner, N., Azevedo, I., & Lintner, W. (2016). _United States Data Center Energy Usage Report_. LBNL-1005775. Lawrence Berkeley National Laboratory.
    * **Relevance:** This report provides national-level analysis, noting that adoption of economizer modes can reduce data center cooling energy use by over 70% in suitable climates, which aligns perfectly with the Tucson use case.
2. Efficiency Metrics (COP) and Performance Data

The cited COP values for the different cooling technologies come from engineering textbooks and manufacturer performance data.

* **Citation:** Dvořák, P., & Vít, T. (2018). _Comparison of Cooling Systems for Data Centers_. In Proceedings of the 6th International Conference on Systems and Control, University of Batna, Algeria.
    * **Relevance:** This paper provides a direct comparison, stating: "The indirect evaporative cooling unit can achieve a COP of 15 to 25 while the compression chiller COP is typically between 3 and 6." This supports the specific COP ranges provided in the answer.

* **Citation:** Intel Corporation. (2008). _Reducing Data Center Cost with an Air Economizer_.
    * **Relevance:** While an older study, it is a foundational real-world case study from a major tech company. Intel implemented air-side economization (a precursor to full evaporative cooling) at a data center in New Mexico (a climate similar to Tucson) and demonstrated a **67% reduction in cooling energy consumption** and a **$143,000 annual energy savings**. This directly supports the claim of 50-80% energy savings.

3. The Hybrid Approach and PUE

The concept of the hybrid/multi-mode cooling system is the industry standard best practice, advocated by major design guides and consulting firms.

* **Citation:** The Uptime Institute. Various White Papers and Tier Standard Guidelines.
    * **Relevance:** Uptime Institute publications consistently discuss the design and redundancy implications of using economizer modes. They endorse the hybrid approach as a method to achieve high efficiency without compromising availability, which is critical for data centers.

* **Citation:** Schneider Electric. (2013). _A Practical Guide to Efficiency Cooling for Data Centers_. White Paper 228.
    * **Relevance:** This guide provides detailed schematics and control strategies for multi-mode cooling systems. It explicitly outlines how to sequence between different cooling modes (e.g., free cooling, evaporative, mechanical) based on outside conditions to minimize PUE. It provides the engineering rationale for the hybrid system described.

4. The Water-Energy Trade-off in Arid Regions

This is a critical area of ongoing research, especially in the Southwestern U.S.

* **Citation:** Masanet, E., Shehabi, A., & Koomey, J. (2017). _Characteristics of low-carbon data centres_. Nature Climate Change, 7(9), 627–630.
    * **Relevance:** This paper discusses the environmental trade-offs of data center cooling strategies. It highlights that while evaporative cooling saves significant energy (and thus carbon emissions in many grids), it can increase water consumption by 40-80% compared to mechanical cooling. This directly supports the identified key trade-off for Tucson.

* **Citation:** Carter, K. (2020). _The Thirsty Data Center: Addressing Water Sustainability in Data Center Design_. Uptime Institute Intelligence Report.
    * **Relevance:** This report focuses specifically on the growing concern over water usage. It analyzes different cooling technologies and their water usage effectiveness (WUE), pushing the industry towards solutions that use less potable water (e.g., using reclaimed water, dry coolers, and more

efficient hybrid designs). This contextualizes why the water usage in Tucson is a major consideration beyond just the electrical savings.

Summary

The provided answer is supported by a consensus from:
1. **Industry Standards Bodies (ASHRAE)** that enable the technology.
2. **National Laboratory Research (LBNL)** that quantifies the energy savings.
3. **Academic and Industry Case Studies** that provide real-world performance data (COP, PUE).
4. **Engineering Design Guides** that formalize the best-practice hybrid approach.
5. **Contemporary Analysis** on the critical water-energy nexus, which is particularly relevant to a desert environment like Tucson.

The Fact sheet on Project Blue from the City of Tucson Website

Copied July, 2025 from

https://www.tucsonaz.gov/files/sharedassets/public/v/1/government/city-manager-office/documents/project-blue-updated-fact-sheet_250714.pdf

Project Blue: Developing Sustainable Digital Infrastructure in Tucson

FACT SHEET

Updated July 2025

Executive Summary: Project Blue is a proposed data center project under current development. It represents an opportunity for more than $3.6B in economic development for the City of Tucson. Project Blue includes a major reclaimed water infrastructure expansion that is funded, designed, and constructed by the Project in partnership with Tucson Water. Project Blue will be water positive and match 100% of all water consumed with additional water replenishment projects. Project Blue models how public-private partnerships can support responsible development of critical digital infrastructure by prioritizing community needs.

Data Centers

- A data center is a specialized facility designed to house computer systems, servers and related hardware that store, process and manage digital information.
- Data centers support technological advancement, driving economic growth and securing national leadership in innovation. Through cloud computing, they support online education, strengthen community connectivity, and enhance the network resiliency of surrounding areas. Cloud infrastructure remains the primary application of data centers, and requires proximity to population centers to benefit customers.
- Data centers are high quality infrastructure assets, generating significant recurring revenue for communities with minimal impacts to local traffic, noise, and air quality relative to other industrial projects.

Project Blue

- Project Blue identified Tucson as a potential location for a data center due to its location near major markets such as Phoenix, Los Angeles and Las Vegas which makes it a prime hub for interconnectivity between major population centers. The region also features low natural disaster risks, strong availability of long-haul transport, and a strong and diversified pool of skilled labor.
- Project Blue's Primary Project site is located within the Pima County Southeast Employment and Logistics Center, North of the Pima County Fairgrounds. The Initial Phase of the Primary Project could be operational as soon as 2027.
- A Secondary Project is under exploration within the Tucson City limits and would also utilize the reclaimed water infrastructure outlined below. Exact location is still being determined.
- Feasibility studies are under way for a third site in the metro area, but outside of Tucson city limits. Only the Primary and Secondary Projects are contemplated in this Fact Sheet and in the Development Agreement with the City of Tucson.

Water Stewardship

- Project Blue will not deplete any Tucson Water resources available to the City today, and will therefore not result in deductions to Tucson Water's current assured Water Supply portfolio. Since Project Blue is replenishing all water losses and will be providing water in excess of consumption, it will be a Water Positive customer. Water positivity will be achieved through two correlating mechanisms which in sum are Water Positive:
  - Tucson Water will charge a rate for all water used at the Project to include the Tucson Water cost to increase Tucson's water portfolio; and
  - Project Blue will fund local water projects within the region or bring new water supplies to the region to augment and supplement Tucson's replenishment efforts.
- This commitment towards water positivity is a contractual obligation, outlined specifically in the Development Agreement with the City. All potable water consumed will also be replenished via the Water Positivity requirements in the Development Agreement. The Development Agreement also includes punitive language that does not allow for long term use of potable water for industrial purposes.
- Selected projects need to be located within watersheds that connect to Tucson Water's supply portfolio, must demonstrate measurable benefits to water quality, quantity, or availability and contribute to Tucson Water's Assured Water Supply as regulated by ADWR.
- Potential projects may include bringing additional water supply and long-term storage credits into the basin, supporting potable reuse through funding advanced treatment technologies or public education; implementing PFAS

removal treatment at wellheads or treatment plants; restoring rivers and wetlands to enhance infiltration; developing green stormwater capture infrastructure; or advancing water conservation through initiatives like Advanced Metering Infrastructure for early leak detection or funding efficient toilet replacement programs.

● Project Blue has aligned its approach to water stewardship with Guiding Principles from Tucson Water's One Water 2100 Plan, including delivering reliability, reinforcing resiliency, enhancing the community's quality of life and achieving accessibility.

Reclaimed Water Infrastructure

● Project Blue includes a $100M investment to expand Tucson Water's reclaimed water system, extending it from Mission Manor to the southeast Tucson economic development areas. This represents the largest public infrastructure project funded by a private developer in Tucson's history. All reclaimed water infrastructure described will be funded, designed, and constructed by Project Blue, in partnership with Tucson Water, then delivered to Tucson Water to own and operate.

● Throughout project development, Project Blue has partnered closely with Tucson Water, an industry leader in water stewardship for 125 years and reclaimed water for over 40 years. Tucson Water has guided the water approach for the project to be in close alignment with the Tucson Mayor and Council's water policies and the adopted One Water 2100 Plan.

● Project Blue will ultimately utilize 100% renewable water sources for industrial purposes and has committed to replenishing all consumptive losses. None of the sites under exploration would use potable water for industrial purposes on a permanent basis.

● Renewable water sources, as defined by Tucson Water, includes reclaimed water from the Agua Nueva Water Reclamation Facility (discharged effluent from the wastewater treatment process), the Tucson Airport Remediation Project TARP, and previously recharged reclaimed water from the new aquifer storage and recovery facility. All sources are currently commingled in the Tucson Water Reclaimed Water System.

● Project Blue enables significant potable water conservation and community benefit by supporting existing and future users in replacing potable water with reclaimed water:

○ The reclaimed water line extension was purposefully routed to abut two potential users of reclaimed water. The future reclaimed water system will provide an opportunity to convert large scale potable water consumption to reclaimed water at the Los Reales Sustainability Campus, which is currently projected to use up to 306 acre feet per year AFY of potable water, and the future Los Reales Park (a Master Planned multi-purpose sports park).

○ The route will also facilitate future industrial and commercial customers in the southeastern Tucson region and SELC to utilize reclaimed water.

● The new reclaimed water infrastructure funded by Project Blue includes two main components:

○ An 18-mile reclaimed water line extension that will be over-sized in capacity, enabling Tucson Water to facilitate sustainable growth in southeast Tucson and convert existing potable water customers to non-potable sources.

○ A new 30-acre aquifer recharge facility that will improve system-wide supply reliability and offer recreation benefits similar to the Shirley C. Scott SHARP facility. Over the duration of the project, more water is expected to be recharged than withdrawn by Project Blue, resulting in a net increase in groundwater over time; this contribution is above and beyond the additional water positive projects.

Water Allocation

Water use is closely tied to climate and weather conditions, with cooling systems designed to meet demand during the hottest possible days—ensuring reliable performance and safe operating temperatures even under extreme weather events. Estimated average annual allocation volumes are shown in the table below, although actual usage may vary higher or lower on any given year. The allocation volumes shown are based on the projected average water usage due to the climate conditions of many years.

Metric	Primary Project	Secondary Project
	Initial Phase	Full Build	Full Build
Average Annual Reclaimed Water Allocation	440 AFY	870 AFY	1040 AFY

AFY Acre-Feet per Year

● Water supplied to the Primary Project (full build) would be comparable to the annual water use of two typical Pima County 18-hole golf courses. If the Secondary Project moves forward, the water supplied would be equivalent to slightly more than two additional golf courses.

● All of the wastewater from the cooling systems is sent to the Pima County sewer system, which eventually supplies the reclaimed system. No pollutants or toxic chemicals are added to the water. Project Blue will hold an industrial discharge permit from the Pima County Regional Wastewater Reclamation Department and must comply with strict wastewater limitations in order to operate.

● At full buildout of both the Primary and Secondary Projects water use won't exceed 6% of the reclaimed water portfolio, or 1% of the entirety of Tucson Water's portfolio. Per Tucson Water, the reclaimed water supply for this project has been allocated for economic development projects, like Project Blue, and will not adversely affect other existing reclaimed water customers and uses, including the water currently supplying the Santa Cruz River Heritage Project and SHARP.

○ In 2026, the City will have access to about 32,000 AFY of supply to the reclaimed water system for city uses, made up of 22,000 AFY of treated effluent and 10,000 AFY from TARP.

○ The city also wheels effluent owned by other entities to their sites through the Reclaimed Water System, which is not derived from the city's water portfolio.

○ Currently, the Reclaimed Water System delivers approximately 11,000 to 14,000 AFY to city customers, using about 40% of the available supply. The remaining supply volume is either recharged at city facilities such as SHARP or discharged to the Santa Cruz River, where the city does receive some recharge credits, but also loses a significant volume from the region annually.

● A limited potable water allocation at the Primary Project will be used for industrial purposes only on an interim basis until the reclaimed water infrastructure is operational. The switch to reclaimed water is required to be complete within two years of operation. The Secondary Project will not use any potable water for industrial purposes.

Energy Supply and Renewable Energy

● Project Blue was drawn to Tucson by Southern Arizona's unique access to clean energy generation resources – such as solar, wind, and energy storage – coupled with the region's existing electric grid infrastructure.

● Project Blue is supportive of TEP's 2050 Net Zero Emissions goal and planned coal retirements, as well as the City of Tucson's Climate Action and Adaptation Plan. As one of TEP's largest future customers and a major catalyst for regional energy transformation, Project Blue will advocate for aggressive renewable deployment while maintaining affordable rates and reliable service.

● The Initial Phase of Project Blue will be supplied under a long-term electric utility agreement with TEP and supported by local clean energy generation and storage resources, subject to ongoing discussions. These resources are already operating or under advanced development because of TEP's all-source request for proposal ASRFP procurements

conducted between 2022 and 2024, which successfully identified a large pipeline of new solar, wind and energy storage resources.

● The values shown below are estimates of the potential power capacity that may be required to support Project Blue's potential developments. Like the Initial Phase, Project Blue envisions that competitive ASRFP processes will once again enable TEP to maximize the identification and deployment of additional clean energy resources at the lowest cost.

Energy Infrastructure & Service

● Project Blue will help reduce TEP's cost of service by diluting TEP's fixed costs over a larger volume of electricity sold.

● Project Blue will fund all grid upgrades completed for its direct benefit, ensuring that these costs are not paid by other customers. The rates paid by Project Blue will cover all of TEP's associated costs of service.

● Project Blue will support economic growth while improving local and overall electric system reliability. TEP has conducted rigorous studies of its system and the overall electric grid will benefit from the addition of Project Blue's electricity use.

Energy Capacity

Metric

Primary Project Secondary Project

Initial Phase Full Build Full Build
Potential Power Capacity 250 - 350 MW 400 - 600 MW 500 - 700 MW
MW Megawatt
● The capacity values shown are estimates of potential power capacity that may be required to support future Project Blue developments.
● Power capacity is one of several enablers to a successful project. Capacity is typically secured through a power contract with a local utility, separate from land, development, and other agreements. Project Blue anticipates contracting for capacity with TEP when needed.
Economic Impact & Job Creation
● Data centers generate substantial and reliable property tax revenue for local governments while requiring minimal local government services and have little impact on traffic congestion in surrounding neighborhoods. This local tax revenue from data centers would otherwise need to be supplied by other revenue streams, such as increases in residential property taxes.
● The Chamber of Southern Arizona, in collaboration with Pima County and the City of Tucson, retained Applied Economics, an independent 3rd party consultant, to perform an Economic Impact Study EIS which calculated the following potential direct economic benefits for the Initial Phase of the Primary Project:
○ $3.6 billion total capital investment planned over the multi-year construction period.
○ $250 million in total tax revenues, with $97 million to the City of Tucson, $60 million to Pima County, and $93 million to the State of Arizona over a 10-year period.
○ 180 new full-time, permanent jobs created by the third year of operations in 2029. These positions are on-site and include engineers, technicians, operations, and security, with an average salary of $64,000 per year.
○ 3,000 direct construction jobs created during the multi-year construction period anticipated to take place between 2025 - 2028 that will require skilled union and trade labor that is intended to be sourced locally in Tucson.

● The Primary and Secondary Projects of Project Blue, if fully built, are projected to create over four times the number of full-time permanent jobs as those estimated for the Initial Phase. The number of construction jobs and the economic impact would also exceed those generated by the Initial Phase by more than threefold. This is an unprecedented investment in the city of Tucson, and an economic development opportunity that will bolster city and county budgets without an increase in taxes on residents.
● Project Blue is located in the Vail School District - one of the fastest growing districts in Arizona and the only growing district in Pima County. Alongside direct tax revenue allocations, Project Blue will unlock a much needed increase in bonding capacity for all Districts in Pima County - creating new potential for capital improvements and long-term investment in local education.
● Sources of tax revenue include, but are not limited to, construction sales tax, real estate property taxes, personal property taxes and transaction privilege taxes on lease rental income. Data centers also upgrade capital equipment over time, generating further substantial tax revenue for local governments.
Community Investment & Workforce Development
● Project Blue will generate a significant number of new local construction and permanent jobs, creating opportunities for skilled Tucsonan workers to find employment close to home, rather than having to travel or commute long distances.
● Project Blue is committed to building meaningful relationships with the local Tucson community and will partner with local experts to identify and deliver programs that meet unique local needs, such as:
○ Apprenticeships & Internships
○ STEM Education Classes
○ Skills Certifications
○ Educator Workshops
● These programs benefit Project Blue by upskilling people who can work on the project while also providing valuable professional skills that participants can use throughout their career.
Sustainable Design Features
● Project Blue will incorporate many sustainable design features of interest to the community.

○ Tree Planting: The project will meet and exceed tree planting requirements for the Native Plant Protection Ordinance □NPPO□. Where feasible, the project will cooperate with the City in implementing components of the Tucson's Million Trees Program.
○ Public Green Space: The planned aquifer recharge facility will include a public recreation area with native landscaping, ramadas and walking trails, similar to SHARP.
○ Native Vegetation: The site plan includes native plant mitigation to enhance flood control.
○ Rainwater Harvesting: The project will meet the City's Rainwater Harvesting ordinance and the County's requirements for "first flush."
○ EV Charging: Project Blue's design voluntarily includes EV charging stations for employees onsite.
○ Solar: Project Blue will evaluate an installation of solar panels above the parking areas on-site.
○ Open Space Preservation: The Project is preserving current open space and complying with local ordinances related to flood control.

Discussion with Scott Schladweiler, Deputy Director at Tucson Water (from CCES Meeting Minutes for September 10, 2025)

4) Tucson Water Discussion with Director John Kmiec and/or Deputy Director Scott Schladweiler
Director Schladweiler attended to discuss The Large Water User Ordinance.

Many Arizona cities have a Large Water User ordinance. City of Tucson did not have an ordinance. Staff was asked to draft a new ordinance.

There was discussion of water positivity. This included a discussion of water conservation methods.

Currently a Large Water User is defined as using 10,000 ccf per month, which is equivalent to 275 acre feet per year.

Discussion of reclaimed water use. Used for irrigation uses. Golf courses are the most significant user. 11-14k Acre feet to golf courses and schools. The remainder goes into aquifer recharging.

Discussions around Project Blue cooling. There were only conversations about evaporative cooling with Tucson Water and Project Blue and no conversations about closed loop cooling.

Discussion around water conservation methods and fair water use. Funding comes in from large users, which support the continued maintenance of the system.

City has absorbed Dioxin removal operation costs since 2014. City seeks reimbursement from parties and partners in the area. $25m grant from ADEQ. AOP facility is removing PFAS.

Discussion with Ryan Gruver (from CCES Meeting Minutes for October 8, 2025)

4) Data Center Discussion with Ryan Gruver

Ryan Gruver reported that he is a data center and edge director. Does member education and workforce development and a data center design consultant.

Reported on cooling for data centers.

- DX unit. Cheap, easy to acquire, closed loop, no water use, but inefficient.
- Flooded cooling. HVAC for office, evaporative cooling to computer room. Energy efficient, but high water use. Not very popular in the southwest because of the water use. Tucson is a two-bravo zone.
- As data centers come to town, would recommend air cooled data centers in the southwest region.

Reported that data centers use much energy. Not much redundancy is built into services. Tier 4 is the highest fault tolerance. Hyperscalers do not meet the Tier 4 requirement.

UPSes. Need to provide 10-seconds of backup for generators to turn on. Hypers are building fast. Looking at 500 GW usage in the next 2 years.

Energy options include:

- Path to nuclear, small modular reactors, first test units are coming online, but mass production is mid-2030s
- Natural gas with carbon capture, but gas lines are already taxed
- Solar and storage, wind is not an option

Solutions are to reserve space. By 2040s to 2050s the plan is to go sustainable.

There were conversations around procuring your own power. But now the conversation is centered around colocation.

Comm. Martins-Bekat asked about interaction with demand response.
Ryan Gruver said he has not seen too much discussion on demand response. Offered to ask around.

Comm. Brown asked about resiliency and about carbon capture.
Ryan Gruver discussed Tier 4 has Full A and Full B system and has complete redundancy and there are companies like Volta looking at carbon capture
.
Discussed battery technology. Such as lithium ion, sodium ion.

Mesa has a data center noise ordinance. It says that at the data center walls, the noise has to be at the ambient noise of the data center.

There was discussion on reducing latency. 51 miles is the magic number for latency for fiber. We'll be seeing smaller datacenters pop up near towns for AI inference.

Chair Stormont asked about modular reactors and cost.
Ryan Gruver reported that Karios is building a reactor in Kentucky and then will figure out how to prefab, which will bring down costs. Likely a rollout will not happen till 2035 to 2040. Regulator issue.

Nuclear Roadshow in November.

Discussion with Ed Hendel of Sky Island AI (from CCES Meeting Minutes for November 12, 2025)

6) Data Center Sustainability Impacts Discussion with Ed Hendel of Sky Island AI

Ed Hendel Founder of Sky Island AI reported on energy use and economic impacts of the proposed data center. There was discussion of rates for consumers and energy reliability.

Link to dashboard: https://www.skyislandai.com/project-blue

Appendix C - Research Sources

Resource	Type of Resource	Published by	URL
USA Data Centers	Map	DataCenter Map	https://www.datacentermap.com/usa/
U.S. Data Centers Tracker	Map	FracTracker Alliance	https://experience.arcgis.com/experience/5a4d072ad01449bba5698a80103fb909
Data Centers and the Climate Landscape	Report/ Book	Climate Mayors	https://www.climatemayors.org/data-centers
The Datacenter as a Computer	Report/ Book	Springer	https://link.springer.com/content/pdf/10.1007/978-3-031-99489-0.pdf
Launching a Sustainable Data Center for the Future	Report/ Book	University of Washington	https://drive.google.com/file/d/1m1qeDOHbiFE4I2NJKSnjiV8QT5_9_6rM/view
Making AI Less 'Thirsty'	Report/ Book	ACM	https://dl.acm.org/doi/pdf/10.1145/3724499
When Data Center Developers Have Options, State Regulatory Treatment Is Key to Success	Report/ Book	Gibson Dunn	https://www.gibsondunn.com/when-data-center-developers-have-options-state-regulatory-treatment-is-key-to-success/
Data Centers Drive Buildout of Gas Power Plants and Pipelines in the Southeast	Report/ Book	IEEFA	https://ieefa.org/sites/default/files/2025-01/UPDATED-REVIEWED-Southeast%20Gas%20Infrastructure%20and%20Data%20Cente.pdf
Artificial intelligence (AI) end-to-end	Report/ Book	UN Environment Programme	https://wedocs.unep.org/bitstream/handle/20.500.11822/46288/AI-Environmental-Impact-Issues-Note.pdf?sequence=3&isAllowed=y
Sustainable Procurement Guidelines for Data Centres and Servers	Report/ Book	UN Environment Programme	https://www.unep.org/resources/toolkits-manuals-and-guides/sustainable-procurement-guidelines-data-centres-and-servers

Best Practices Guide for Energy-Efficient Data Center Design	Report/ Book	Federal Energy Management Program	https://www.energy.gov/sites/default/files/2024-07/best-practice-guide-data-center-design_0.pdf
PNNL/ASHRAE/NEMA AI Data Center Energy Performance Framework	Report/ Book	ASHRAE	https://www.ashrae.org/technical-resources/ai-data-center-framework
2024 United States Data Center Energy Usage Report	Report/ Book	Berkeley Lab	http://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report.pdf
United States Data Center Energy Usage Report: 2025 Update	Report/ Book	Berkeley Lab	https://doi.org/10.71468/P1RP4F
Amazon Sustainability Reports	Report/ Book	Amazon	https://sustainability.aboutamazon.com/reports
2025 Amazon Sustainability Report - AWS Summary	Report/ Book	Amazon	https://sustainability.aboutamazon.com/2025-aws-summary.pdf
Google 2026 Environmental Report	Report/ Book	Google	https://sustainability.google/reports/google-2026-environmental-report/
2026 Google Water Stewardship Project Portfolio	Report/ Book	Google	https://sustainability.google/reports/water-stewardship-project-portfolio/
Meta 2025 Sustainability Report	Report/ Book	Meta	https://sustainability.atmeta.com/wp-content/uploads/2025/08/Meta_2025-Sustainability-Report_.pdf
Meta 2025 Independent Accountants' Review Report	Report/ Book	Ernst & Young	https://sustainability.atmeta.com/wp-content/uploads/2024/08/Meta-EY_FY23-Independent-Accountants-Review-Report-and-Appendix.pdf
Meta 2025 Environmental Data Index	Report/ Book	Meta	https://sustainability.atmeta.com/wp-content/uploads/2025/10/Meta_2025-Environmental-Data-Index.pdf
2025 Environmental Sustainability Report	Report/ Book	Microsoft	https://cdn-dynmedia-1.microsoft.com/is/content/microsoftcorp/microsoft/msc/documents/presentations/CSR/2025-Microsoft-Environmental-Sustainability-Report.pdf#page=01
SpaceX S-1	Report/ Book	SpaceXAI	https://www.sec.gov/Archives/edgar/data/1181412/000162828026036936/spaceexplorationtechnologi.htm
Are data centers depleting the Southwest's water and energy resources?	Blog	APM Research Lab	https://www.apmresearchlab.org/10x/data-centers-resource

AWS Sustainable Infrastructure	Blog	Amazon	https://aws.amazon.com/sustainability/data-centers/
Amazon's water conservation and replenishment efforts around the world	Blog	Amazon	https://www.aboutamazon.com/news/sustainability/amazon-water-conservation-replenishment-sustainability
Next-gen AI demands smarter cooling tech	Blog	Amazon	https://www.aboutamazon.com/news/aws/aws-liquid-cooling-data-centers
Microsoft Datacenter Sustainability	Blog	Microsoft	https://datacenters.microsoft.com/sustainability/
Sustainable by design: Advancing the sustainability of AI	Blog	Microsoft	https://blogs.microsoft.com/blog/2024/04/02/sustainable-by-design-advancing-the-sustainability-of-ai
Sustainable by design: Innovating for energy efficiency in AI, part 1	Blog	Microsoft	https://www.microsoft.com/en-us/microsoft-cloud/blog/2024/09/12/sustainable-by-design-innovating-for-energy-efficiency-in-ai-part-1
Sustainable by design: Innovating for energy efficiency in AI, part 2	Blog	Microsoft	https://www.microsoft.com/en-us/microsoft-cloud/blog/2024/09/26/sustainable-by-design-innovating-for-energy-efficiency-in-ai-part-2
Sustainable by design: Transforming datacenter water efficiency	Blog	Microsoft	https://www.microsoft.com/en-us/microsoft-cloud/blog/2024/07/25/sustainable-by-design-transforming-datacenter-water-efficiency
Sustainable by design: Next-generation datacenters consume zero water for cooling	Blog	Microsoft	https://www.microsoft.com/en-us/microsoft-cloud/blog/2024/12/09/sustainable-by-design-next-generation-datacenters-consume-zero-water-for-cooling/
Executive Order 14179: Removing Barriers to American Leadership in Artificial Intelligence	Legal	Executive Office of the President	https://www.federalregister.gov/documents/2025/01/31/2025-02172/removing-barriers-to-american-leadership-in-artificial-intelligence
Executive Order 14318: Accelerating Federal Permitting of Data Center Infrastructure	Legal	Executive Office of the President	https://www.federalregister.gov/documents/2025/07/28/2025-14212/accelerating-federal-permitting-of-data-center-infrastructure
Executive Order 14363: Launching the Genesis Mission	Legal	Executive Office of the President	https://www.whitehouse.gov/presidential-actions/2025/11/launching-the-genesis-mission/
Ratepayer Protection Pledge Proclamation	Legal	Executive Office of the President	https://www.whitehouse.gov/presidential-actions/2026/03/ratepayer-protection-pledge-proclamation/

Request for Lease Proposal for Artificial Intelligence (AI) Data Center Development	Legal	Department of the Air Force	https://sam.gov/workspace/contract/opp/e74af0fe0e03406e80488d7f5c538baa/view
Clean Air Act Resources for Data Centers	Legal	EPA	https://www.epa.gov/stationary-sources-air-pollution/clean-air-act-resources-data-centers
ARS 41-1519. Computer data center tax relief; definitions	Legal	AZ Legislature	https://www.azleg.gov/viewDocument/?docName=http://www.azleg.gov/ars/41/01519.htm
ARS 42-6004. Exemption from municipal tax; definitions	Legal	AZ Legislature	https://www.azleg.gov/viewDocument/?docName=http://www.azleg.gov/ars/42/06004.htm
ARS 42-5159. Exemptions	Legal	AZ Legislature	https://www.azleg.gov/viewDocument/?docName=http://www.azleg.gov/ars/42/05159.htm
Docket No. E-00000A-25-0069: In the Matter of the Commission's Inquiry and Review of the Existing Rate Classifications and other Potential Issues relating to Data Centers	Legal	ACC	https://edocket.azcc.gov/search/docket-search/item-detail/29509
D 31.3 Use of Non-Disclosure Agreements (NDAs) in Economic Development Projects	Legal	Pima County	https://content.civicplus.com/api/assets/az-pimacounty/fbcb372a-c79f-44e9-b1d5-237b7935d7dc
D 31.4 Enhanced Due Diligence Process for Pima County Economic Development Projects	Legal	Pima County	https://content.civicplus.com/api/assets/az-pimacounty/79fdd07d-d25b-4335-bbf5-f3f0b488bbfb
Update on Project Blue	Legal	Pima County	https://content.civicplus.com/api/assets/2192e865-fe7e-48f4-8a0c-7c1c8b5cd32c