Introduction to Data Centers

4/21/26

TEAM FLAGSTAFF

WE MAKE THE CITY BETTER

Background on Data Centers

A data center is a facility that houses computer systems and related components, such as telecommunications and storage systems. These centers service as the backbone for digital infrastructure, supporting data storage, processing, and connectivity for businesses and organizations.

Economic Development Process

Two paths forward:

1) Data Center wants to construct in City limits on land not owned by the City.

2) Data Center wants to construct on City-owned land.

Economic Development Process

First type:

1) Data Center wants to construct in City limits on land not owned by the City.

    - In some cases, staff from either Planning and Development Services or Econonic Development may be approached.

    - Project is guided into a pre-application meeting and goes through the development review process to ensure it meets development standards.
        - This could could include obtaining a conditional use permit or a zoning map amendmnet which are public processes

Economic Development Process

Second type:

1) Data Center inquires about constructing on City-owned land (inside or outside of City limits)

    - Economic Development will work to ensure all relevant City Divisions are aware of the prospect (Division responsible for land, Planning and Development Services, Engineering, Water Services, and any others as applicable).

    - Information is sought to understand project intention. Typically, a meeting will be scheduled.

Economic Development Process

Examples of information sought:

- Project scope, location, and size
- Technology and purpose
- Anticipated Capital Investment
- Potential revenue and jobs created
- Potential secondary economic or public benefits
- Potential resource requirements (water, power, land)
- Potential impacts, challenges, and required mitigations
- Other information relevant to assessing project costs and benefits

Economic Development Process

Economic Development's Intention:

- Ensuring the business understands if there are timeline, zoning, or other constraints that will impact a potential opportunity.

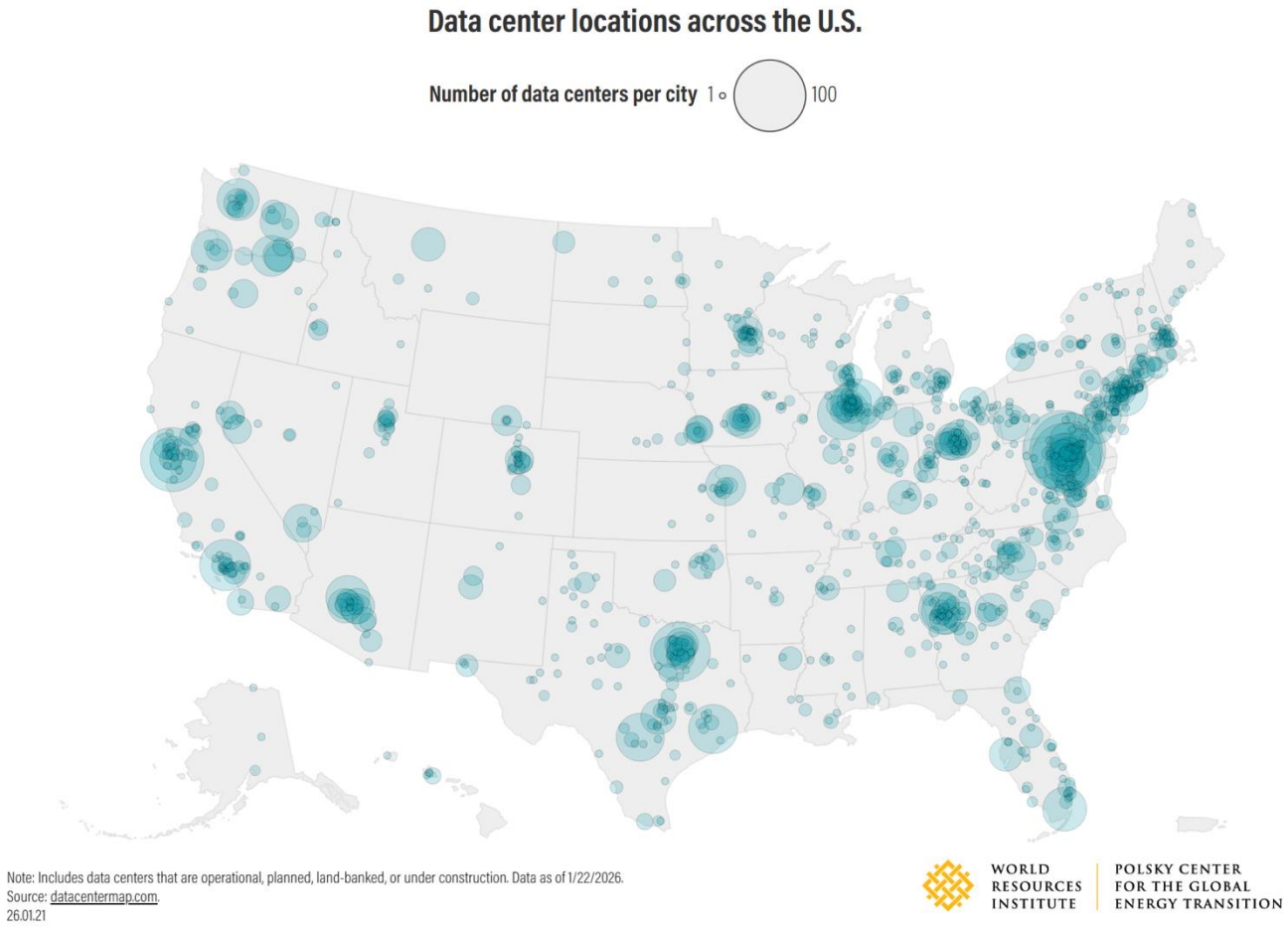
- Communicating with City colleagues real-time opportunities and provide details that will assist in policy discussions or understanding possible community benefits.

Potential Impacts of Data Centers

Sustainability Impacts

With over 3,900 data centers across the United States, we have much to learn from these existing facilities and the communities in which they are sited.

The most common sustainability related impacts are to water, energy, air quality, equity, noise, and land degradation.



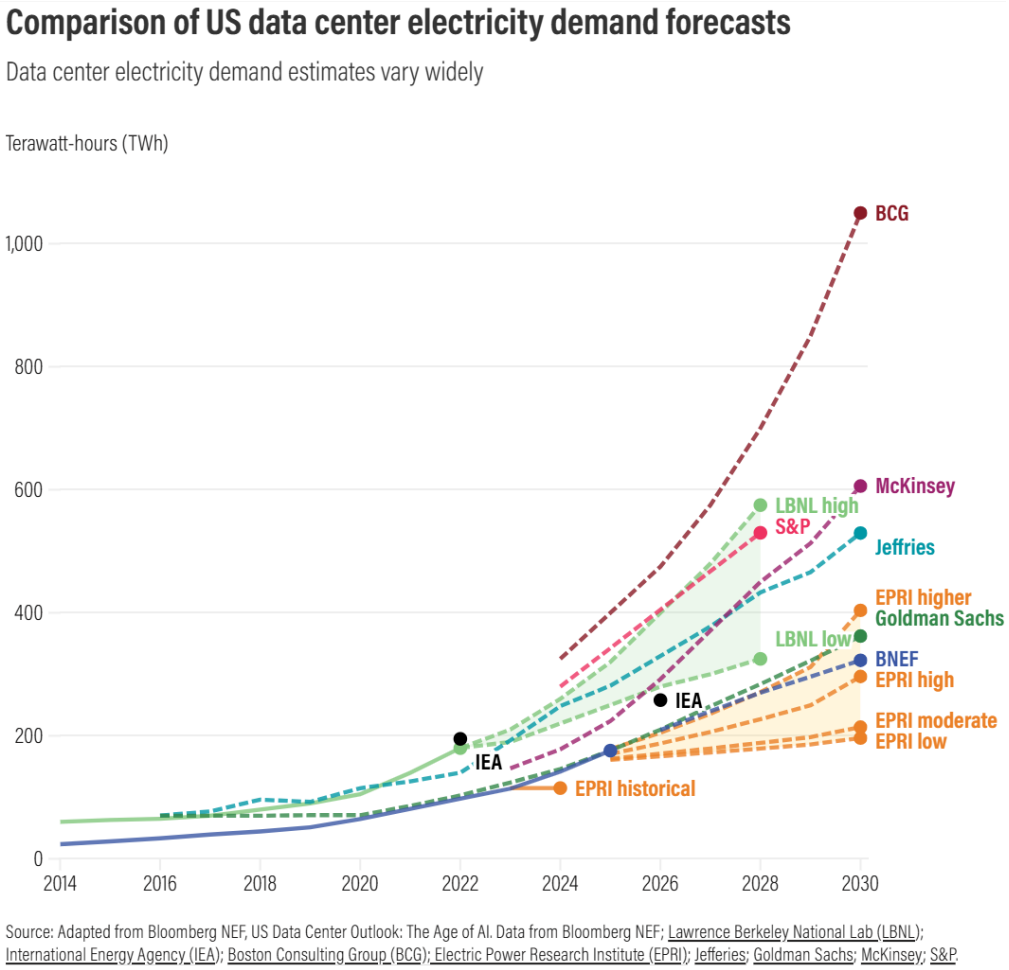
Potential Impacts of Data Centers

Energy Impacts

By 2028, data centers could represent up to 12% of all U.S. electricity consumption by 2028 *(Lawrence Berkeley National Laboratory)*.

The 2023 APS Integrated Resource Plan shows data centers as the #1 driver of growing energy demand on their service territory.

2025 saw over $60 billion in rate increases countrywide. Rate increases are complex and variable. There is evidence that the need to procure and build energy infrastructure for data centers contributes to rate increases *(World Resources Institute)*.



Potential Impacts of Data Centers

Air Quality and Emissions Impacts

Most data centers use diesel generators to keep systems online 24/7. Generators are used when data centers need a backup power source, which includes when grid reserves fall below prescribed thresholds.

Diesel generators release harmful air pollutants, including fine particulate matter (PM2.5) and nitrogen oxides (NOx), linked to respiratory disease, heart disease, asthma, adverse reproductive outcomes, and premature mortality *(Health implications of the rapid rise of data centers in Virginia: an exploratory assessment)*.

Potential Impacts of Data Centers

Equity Impacts

There is often a lack of transparency concerning the development of data centers. Many developers are requiring the utilities to sign non-disclosure agreements.

Research shows that data centers in other cities are being clustered in areas that already have high levels of pollution and environmental stress *(Kapor Foundation)*.

A data center in Ashburn, Virginia, sits in between an urban trail and a large senior living facility.
Photo Credit: Hugh Kenny

Potential Impacts of Data Centers

Noise Impacts

Data centers generate significant noise pollution primarily from diesel generators and heating, ventilation, and air conditioning (HVAC) systems.

Internal noise levels are also a concern, reaching up to 96 decibels. Larger industrial units can approach 100 decibels, which is well above safe levels of 70 decibels *(Science Direct)*.

Land Degradation Impacts

Data centers generate significant amounts of waste heat and can create "heat islands." Accelerating soil drying and moisture loss.

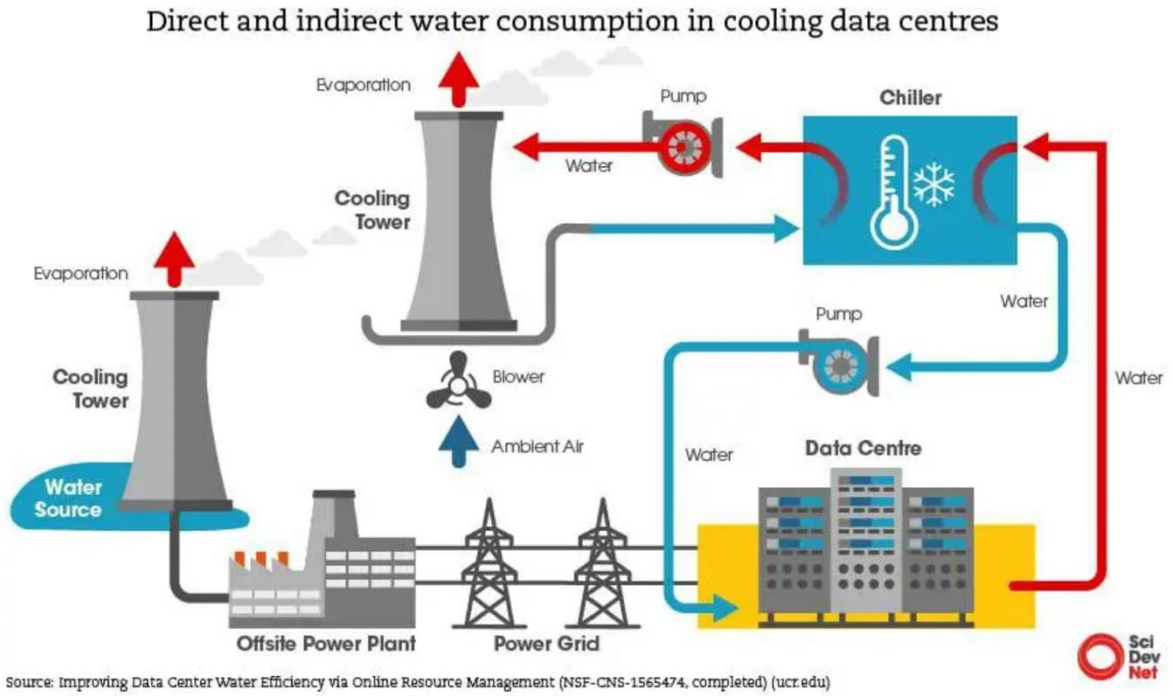
Research indicates this heat can raise surrounding land surface temperatures by an average of 3.6°F, with extreme cases exceeding 16°F, affecting areas up to 6.2 miles away. *(The data heat island effect: quantifying the impact of AI data centers in a warming world)*.

Potential Impacts of Data Centers

Water Related Energy Impacts

Data centers require huge amounts of water to keep servers cool enough to function. Mid-sized facilities can use up to 300,000 gallons of water a day, while large facilities can consume as much as 5 million gallons daily *(Environmental and Energy Study Institute)*

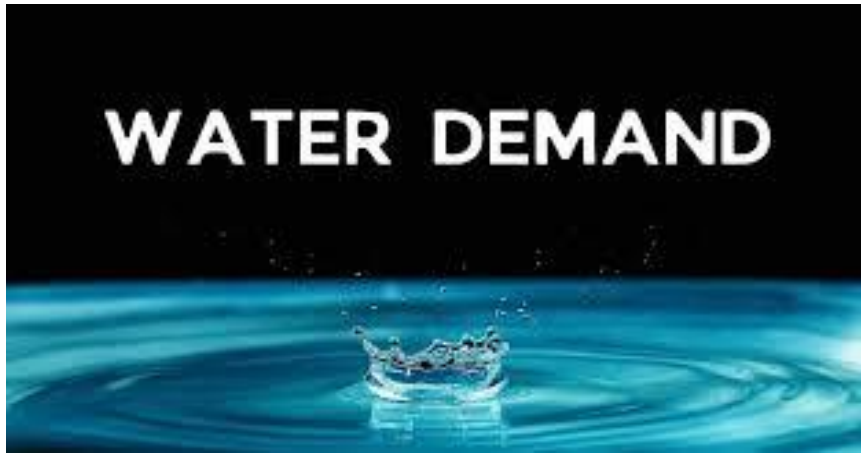
Strategies to reduce water use can increase energy demand, which can result in higher greenhouse gas emissions, greater demand on the electric grid, and negative impacts on local air quality.



More on Water Impacts

Overview

- There is a huge range in water demand that is dependent on:
  - The size of the Data Center
    - Water usage for centers in the Phoenix area range from 18,000-550,000 gpd (Ceres, Drained by Data 9/25)
  - The cooling method(s) used
    - Air cooled
    - Water cooled



More on Water Impacts

Water Commission Decision

- On March 19, 2026, the Water Commission supported the recommendation of only allowing air cooled systems.
  - What does "air cooled" mean?
    - Still requires water
    - Local water usage is reduced
    - Initial startup requires water to fill the system, then a portion of the water is flushed periodically.

More on Water Impacts

Direct vs Indirect Water Usage

- Air cooled systems have lower local water use (offset by increased electrical demand)
  - Power generation requires water usage
  - Solar and wind generated power reduce this load
- Regional water managers need to be in communication with each other due to the interconnectivity of resources

What do they look like?

Hyper-Scale Data Centers (1 million sq ft+)

- Energy and Water Impacts
  - Typical Energy impact
    - 500GWh – 1.5TWh per year (50,000-150,000 average homes)
  - Typical Water Impact
    - 1.5 – 5 million gallons of water per day (3,000-10,000 average homes)
  - Economic Impact
    - 30+ long-term jobs (salaries $60K-$120K)
    - $1.25 million – $3.6 million in City revenues

What do they look like?

Average Data Centers (AI Training Workloads)

- Typical Energy impact
  - 150GWh per year (15,000 average homes)
- Typical Water Impact
  - 500,000 gallons of water per day (1,000 average homes)
- Economic Impact
  - 20+ jobs (salaries $60K-$120K)
  - $160,000 - $450,000 in City revenues

What do they look like?

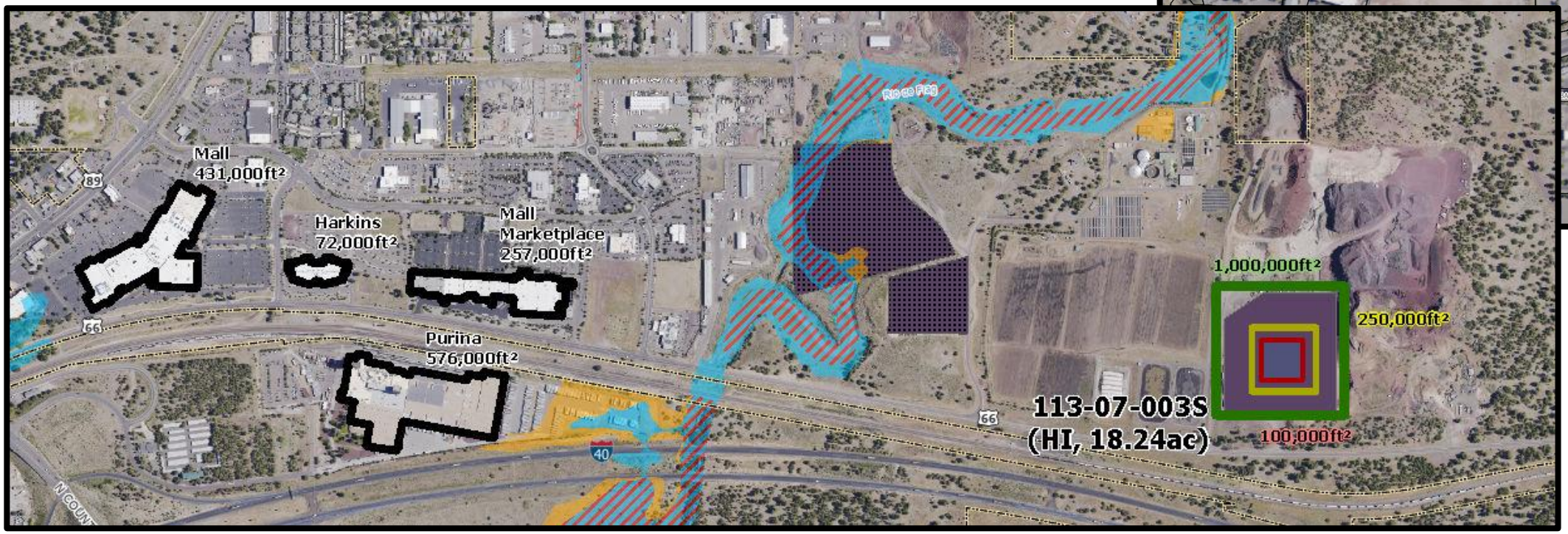
Average Data Centers (Collocation or Edge Data Centers)

- Typical Energy impact
  - Positive Impact or up to 80GWh per year (0-8,000 average homes)
- Typical Water Impact
  - 0 - 100,000 gallons of water per day (0-300 average homes)
- Economic Impact
  - 20+ jobs (salaries $60K-$120K)
  - $160,000 - $450,000 in City revenues

What do they look like?

How big are they?

- Hyperscale = 1 million sq ft+
- Average = 100,000 sq ft
- Small = 10,000 sq ft



What do they look like?

What defines a Data Center?

- Server rooms?
- Any computer equipment?
  - Does internet distribution count?
- Just servers?
  - Does any server count?
    - Including a single server in a small shop downtown?
    - A desktop computer running an office program out of a home office?

Potential Impacts of Data Centers

Economic Impacts revisited – Indirect Impact

- **Ability to retain and attract businesses may be limited**
  - The economy uses AI and big data in more ways each day. Flagstaff already has companies and institutions that require significant processing power. Maintaining a diverse economy requires the ability to provide the infrastructure necessary for the digital business and institutional landscape.

- **Services to existing businesses and residents may be impacted**
  - Community use of current and future tools may be impacted. (Autonomous cars, virtual health care, computational tools, AI use, etc).

Potential Impacts of Data Centers

Economic Impacts revisited – Direct Impact

- Capital Investment could generate one-time City revenue and short-term construction and project management related jobs.
  - Example of $125M project (Subject to deductions, rebates, etc.):
    - *$760,000 in General Fund Construction Sales Tax;*
    - *$1.1M in Transportation Construction Sales tax; and*
    - *200-800 short term jobs providing economic activity.*

- Ongoing estimates of $125,000 for Property Tax and $100K-$350K in Franchise Fees. Additional funds in State Sales Tax, etc.

- Ongoing employment is more limited, but 20-30 jobs at $60K-$100K per year in Flagstaff is impactful.

Potential Impacts of Data Centers

Learning from Others

1. Cities play a critical role in shaping where and how data centers are built.

    a) Through zoning, permitting, site plan review, and conditional approvals, cities can guide siting decisions, require design and mitigation measures, and ensure projects align with the Regional Plan, housing plans, industrial strategies, and long-term land use goals

2. Cities can influence whether data center growth raises costs for residents.

    a) Cities can require evidence that new projects will not shift infrastructure costs to other ratepayers, encourage more storage and demand response, and coordinate with utilities and regulators around infrastructure planning.

Potential Impacts of Data Centers

Learning from Others

1. Cities can set clear expectations around water use, air quality, noise, and ecosystem protection, particularly in communities already facing environmental burdens.

    a) Cities can regulate water use where feasible, mandate monitoring and reporting, and adopt enforceable standards to limit cumulative impacts and protect public health.

2. Cities can influence whether data center development delivers real local economic value.

    a) Cities can use tools such as performance-based incentives, community benefits agreements, and workforce requirements to strengthen local employment, infrastructure resilience, and accountability over time.

Potential Impacts of Data Centers

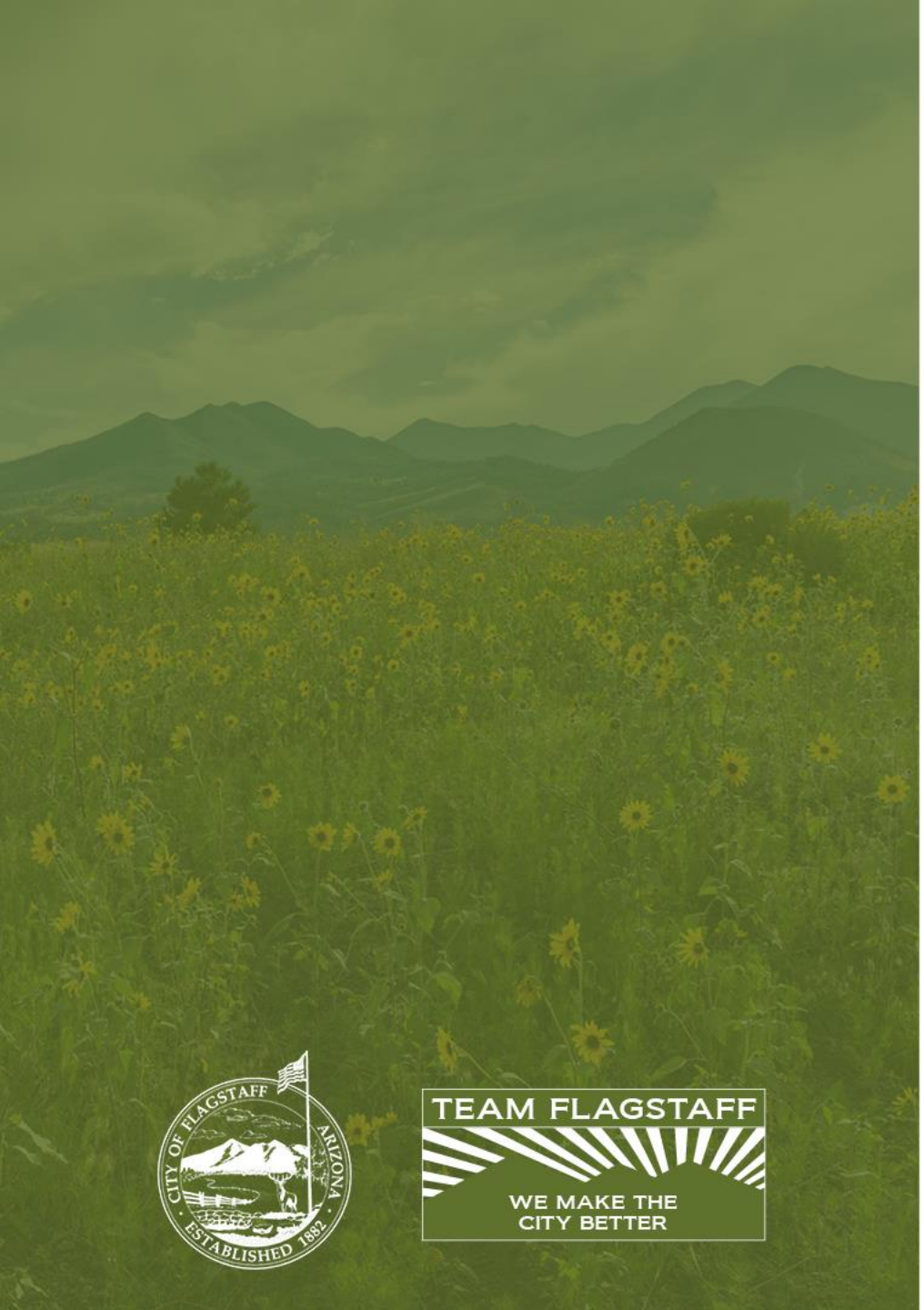
Learning from Others

Community Benefits Agreements ("CBAs")

- Legally binding, enforceable contracts between project developers and municipalities
- Targeted benefits to advance community priorities
- Engage community and individual voices
- Maximize return on local government investment in development, i.e.

Some cities are developing standardized CBA menus of pre-approved community benefits, co-designed with residents and businesses, giving developers clear expectations and reducing one-off negotiations while increasing certainty, i.e.

- Local hiring and purchases, workforce training, public infrastructure investments, or community-scale energy and resilience improvements.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Questions?