

JOINT PLANNING COMMISSION & CITY COUNCIL WORK SESSION

AGENDA

Monday, October 12, 2026

5:15 p.m.

This meeting includes in-person and virtual participation.

Council Chambers

333 Broadalbin Street SW

Or join the meeting here:

<https://council.albanyoregon.gov/groups/plc/zoom>

Phone In: 1-253-215-8782 (long distance charges may apply); Meeting ID: 837-8633-4863;

Passcode: 464432

Please help us get Albany's work done.

Be respectful and refer to the rules of conduct posted by the main door to the Chambers and on the website.

1. Call to order and pledge of allegiance
2. Roll call
3. Scheduled Business:
 - Mixed Use Commercial Zone Discussion (Attachments 1 and 2) [Page 26 – Page 32]
 - Data Center Planning (Attachments 3 through 5) [Page 33 – Page 90]
 - Tree Code Concepts (Albany Municipal Code [Chapter 7.98](#) and Albany Development Code [Article 9](#), Section 9.202-206)
 - Miscellaneous Development Code Changes Review (Attachment 6) [Page 91- Page 94]
4. Public Comment
5. Next Regular Scheduled Planning Commission Meeting Date: November 9, 2026
6. Adjournment

This meeting is accessible to the public via video connection. The location for in-person attendance is accessible to people with disabilities. If you have a disability that requires accommodation, please notify city staff at least 48 hours in advance of the meeting at: cdaa@albanyoregon.gov or call 541-917-7550.

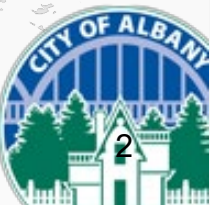
Testimony provided at the meeting is part of the public record. Meetings are recorded, capturing both in-person and virtual participation, and are posted on the City website.

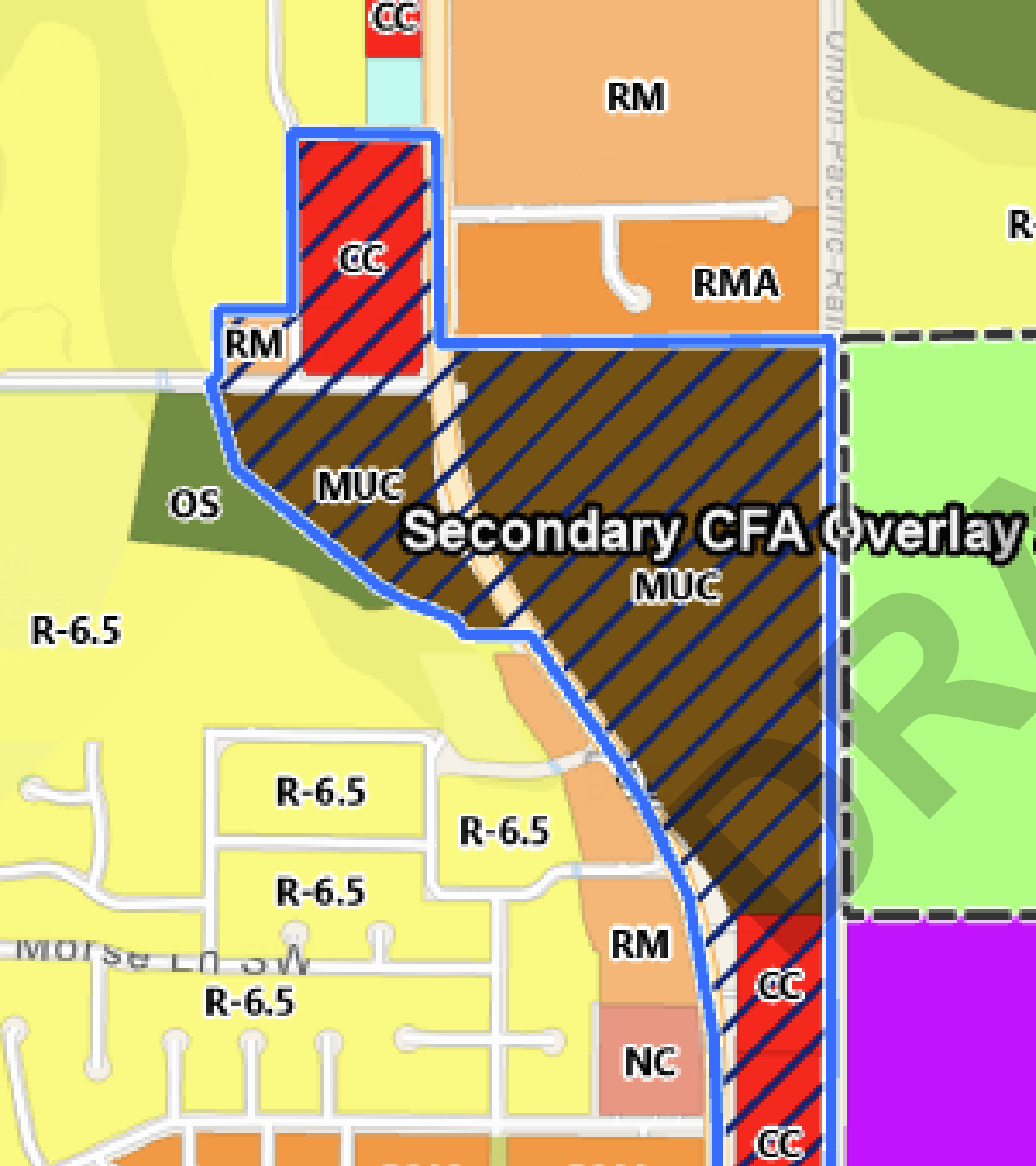
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October 12, 2026, Planning Commission & City Council Work Session Agenda

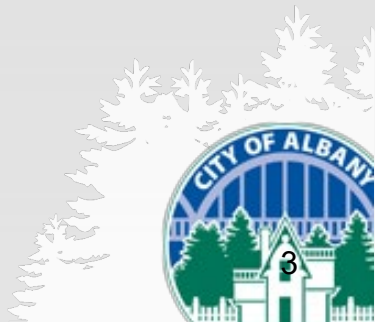
- **Mixed Use Commercial Zone Evaluation**
- **Data Center Planning**
- **Tree Standards Concepts**
- **Local ADC Updates Review (DC-02-26, part 2)**





Mixed Use Commercial zone

Where's the commercial?



Mixed Use Commercial (MUC)

Commercial/Residential Mix – Should a minimum amount of land be reserved for commercial/non-residential purposes?

If yes, how much?

- South Albany – limits residential to 50% of the **ground level** of each district
- East Albany – residential only permitted on same site as commercial (in same building or separate building)

Applicability:

- Citywide? Certain areas, or properties over a certain size?
- Per “district” or per property?



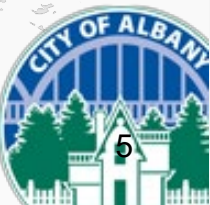
Mixed Use Commercial (MUC)

To encourage more vibrant mixed-use districts, should some housing types be restricted?

Residential Uses Currently Permitted: the full spectrum of housing types are permitted - single detached, middle housing, multi-dwelling units if minimum 10 units/acre (15 in CFAs)

IDEAS:

- Don't permit detached housing (single & middle housing types); and/or
 - Set minimum density at 15 u/acre for all MUC districts (or other minimum); and/or
 - Limit residential to above or attached to commercial/non-residential uses for a portion of the district/property
-
- MUC IN CFAs: must allow townhouses and multi-dwelling unit development but can require ground level commercial/office in multi-dwelling unit developments.



Mixed Use Commercial (MUC)

5.060 Non-Residential Permitted Uses:

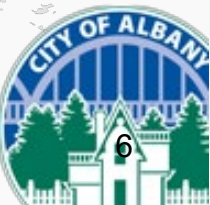
- Commercial uses except for vehicle sales/rentals, adult entertainment, vehicle repair, mini-storage, and hotels/motels, no large footprint regional draw uses (Costcos, etc.)
- Institutional uses excluding hospitals, jails and detention facilities.
- Small scale manufacturing (< 10,000 SF)

5.090 Development Standards, Table 5.090-1:

DEVELOPMENT STANDARDS for	MUC
Maximum Building Footprint (square feet)	
Non-grocery (16)	60,000 SF
Grocery-anchored (13)(16)	80,000 SF
Height maximum	85'
Lot Coverage maximum	80%

(13) May include one or more businesses in attached buildings

(16) Max footprint can be exceeded for educational institutions



Data Centers

Joint Planning Commission & City Council Meeting
October 12, 2026



Introduction



Oregon Data Centers by City

City	Facilities	Top operators
Boardman	32	Amazon Web Services
Hillsboro	31	Flexential, Quality Technology Services, Stack Infrastructure
Umatilla	19	Amazon Web Services
Hermiston	15	Amazon Web Services
Portland	4	Alco Properties, Digital Fortress, Inc, H5 Data Centers
Beaverton	2	Digital Fortress, Inc
Bend	2	US Signal, Fort Rock Data Center
Eugene	1	Data Center West, Inc.
Wilsonville	1	Siemens Digital Industries Software
Salem	1	State of Oregon



Data Centers



Generators and their exhaust pipes are visible outside of an Amazon data center in Umatilla, Ore., in April 2026.

Saskia Hatvany / OPB

Data Centers



Zoning Categories

ZONING APPROACH	FEATURES
By Right	Projects that meet all zoning requirements are allowed to proceed without discretionary review or public hearings. Streamlined and predictable process.
By Condition Use	Projects may be allowed if they meet specific conditions set by the zoning ordinance. Typically requires a public hearing and approval from a zoning board or commission.
By Special Exception	Projects not normally permitted under current zoning may be approved if they meet certain criteria and do not adversely impact the surrounding area. Usually involves a public hearing and discretionary review.

Questions?

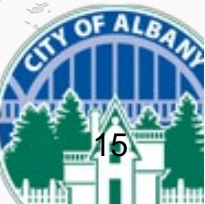




Tree Standards Discussion

Current Tree Standards

- **Municipal Code regulates removal of the following on property of any size:**
 - Heritage trees designated by the city Parks, Rec and Tree Commission
 - Street trees and trees on public property
 - Healthy trees over 20" in diameter at breast height (DBH) – but CAN be removed if associated with building permit or land use application.
 - City Forester “may” require replacement
- **Development Code regulates removal on properties over 20,000 SF:**
 - 5 or more trees with DBH of 8” inches or more
 - City “may” require retention of unique, large/mature trees with value

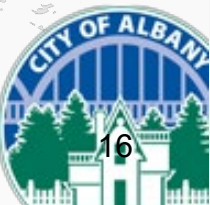


Tree Standards – Why updates are needed:

- Complaints about loss of trees, tree groves, Oregon White Oaks
- There is **no requirement to retain trees** except heritage trees
- There is **no requirement to replant or replace removed trees** – including large trees (20 inches diameter at breast height (DBH))

Public Input:

- Require tree retention - develop around trees, environment ; prioritize saving healthy endangered, natives, large trees, tree groves
- Street trees and trees in general make neighborhoods nice
- Require replanting/mitigation: allow larger street trees/planter strips to count, set a fee-in-lieu program to strategically plant new trees in public spaces, riparian areas, etc.



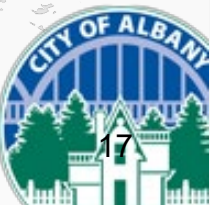
Trees - Municipal Code Recommendations

Definitions, AMC 7.98.020

(9) “Significant Tree” means:

- (a) Rare, threatened, endangered trees of any size as defined **locally*** (keep list), or under state or federal law, **including Oregon White Oaks of 12 inches or more in diameter at breast height (DBH).**
- (b) Heritage trees, **tree groves** and other trees designated significant by the PRTAC.
- (c) **ADD:** Large healthy non-invasive trees 20 inches or more DBH.
- (d) **ADD:** Significant tree groves, those in a healthy growing condition of relatively mature trees and the Grove:
 - 1. **Includes locally significant tree(s) or trees of an unusual nature; or**
 - 2. **Has a crucial functional and/or aesthetic relationship to a natural resource; or**
 - 3. **Has a documented association with a historic figure, property, or significant historic event.**

(13) “Tree Grove” means: a small group of three or more healthy non-invasive trees, typically of the same species, growing closely together, without many shrubs, bushes or other plants underneath, with a minimum canopy of 10,000 square feet. **Have a MINIMUM CANOPY? or another amount?**



Tree Removal - When permits required:

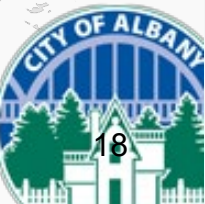
Applicability:

1. AMC – Removal or damage to the following:

- Healthy trees 20 inches or more in diameter at DBH **must be retained; could allow mitigation on/off site**
- Locally significant, threatened or endangered trees 12 inches or more in diameter at DBH, not designated a heritage tree – **allow removal with mitigation only**

2. ADC –Site Plan Review required when:

- Lots 20,000 or greater, when removing **3 or more healthy trees 6 inches or more at DBH**



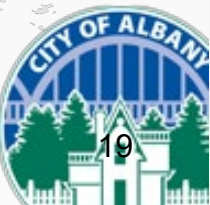
ADC Tree Retention & Removal Concepts

Retention suggestions for all healthy, non-invasive trees over 6-inches DBH:

- Option to measure total canopy or total DBH
- **Clear and Objective Options:** 1. 20% priority trees retained (Oregon White Oak, etc. list maintained by City Forester); 2. 25% of all trees; or 3. 10% with mitigation to 30% tree canopy/DBH
- **Discretionary Option:** Allow less than 10% retention if satisfy criteria demonstrating need (collector/arterials, utilities, block length standards etc.) and with mitigation. **WHAT threshold? Require replanting to attain X% canopy on site or with off-site mitigation?**

Additional considerations:

- When a site contains less than 20% tree canopy (or other %), then 50% (other %) of trees must be retained or mitigated
- **RELATED:** Is there a minimum amount of canopy desired per property regardless of how many trees on the site, including those sites with no trees? [Note: Larger MDU and non-residential development with parking lots will require trees and landscaping.]



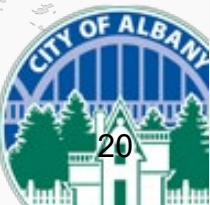
Retention Incentives and Fee in Lieu

Potential Incentives:

- Reduced setbacks, lot coverage and/or increase height allowance?
- Lower mitigation ratio for needed/desired development such as low-income housing and/or vibrant mixed-use developments (with a minimum height or floor-area ratio)?
- Lower ratio when replacing non-native canopy with native and larger trees, trees on City Forester priority list?

Allow Fee in Lieu to allow off-site mitigation (strategically plant new trees)

- Public property and receiving zones (/RC and wetlands)
- Partner with Calapooia Watershed Council to plant trees in public spaces
- Pay fee in lieu – around \$500/tree to buy, plant, monitor until established



Tree Mitigation Concepts

[Albany Development Code, ADC, and Albany Municipal Code, AMC]

- **ADC:** Allow street trees to count towards mitigation (at a reduced canopy? 50 - 75%); when trees will mature to 25' minimum and planter strip meets minimum width requirements (minimum 6 feet excluding curbs)
- **ADC/AMC:** Base # and type of replacement trees on the removed tree's size and species – scale number to DBH size: EXAMPLE: Removed tree DBH 6-12 inches – 1 tree; DBH 10-20 inches – 2 trees; DBH more than 20 inches – 3 trees. Different if removed outside of construction area (Oregon City)
- **ADC/AMC:** Require a mix of tree species from city forester list and/or no more than 30% from any one species, genus or family (modified 10-20-30 rule)?
- **ADC/AMC:** Pay fee in lieu for each tree required to achieve minimum %
- **ADC/AMC:** When Oregon White Oak removed, must be replace with same
- Incentivize retention by requiring more canopy/DBH with mitigation? Example – less than minimum %, require higher % with mitigation.



Local ADC Amendments Review (DC-02-26 Part 2)

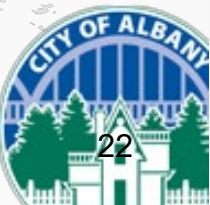
A. Neighborhood Meetings, ADC 1.140

When mandatory: ANY MODIFICATIONS?

- multiple dwellings abutting single-dwelling unit zones;
- commercial or industrial development, manuf. home parks abutting a residential zone
- Subdivision with more than 10 lots, excluding expedited and middle housing land divisions
- Cluster and planned developments
- Retail and service uses in the Light Industrial zone that require Conditional Use approval.
- For other non-residential applications or revisions to applications that the Director determines may have a neighborhood impact, such as Conditional Uses.

Notice Areas - ANY MODIFICATIONS?: 300 feet for non-residential and residential up to 50 units; 1000 feet for residential over 50 units

Time and Location: Add language to require meetings start between 5 and 7 pm and provide virtual attendance options.



Local ADC Amendments Review

- B. Accessory Buildings Exempt from Site Plan review; **Proposal:**** Increase exemption size from 750 SF to 900 SF in Residential and Mixed-Use Zones; consider in commercial zones
- C. Minimum separation between apartment buildings; **Proposal:****
- Expand the 10-foot separation between one-story buildings to < 30 feet.
 - Apply the 20-foot separation to buildings 30 feet or taller;
 - For long-term affordable housing allow scaled reduction from 20 feet to 12 feet depending on level and amount of affordable housing.
- D. Flag lot “pole” width; **Proposal:**** Reduce minimum from 22 feet to 10 feet; some developments will require larger widths due to other standards in the code.

E. Remove Barriers to Needed Housing

1. Multi Dwellings in Mixed Use Zones: remove the minimum per unit area standard for multiple dwellings in the WF, PB, MS and ES zones.

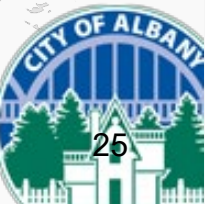
TABLE 5.090-1										
STANDARD	MUC	WF	HD	DMU	CB	LE	PB	MS	ES	MUR
Minimum Lot Size or Area Requirement (square feet)										
Multiple-Dwelling Unit	None	1,600/u None	N/A	None	None	None	1,600/u None	1,600/u None	3,300 1,600/u	1,600/u

2. Middle Housing in RM & RMA: reduce or remove minimum lot sizes for triplexes and fourplexes. Max height and lot coverage determines lot size needs.

STANDARD	RR	R-10	R-6.5	HM	R-5	RM	RMA	HDR
Triplex	5 acres	10,000 sf	6,500 sf	5,000 sf	5,000 sf	5,000 sf	5,000 sf	None
Fourplex	5 acres	10,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	None
Cottage Cluster	5 acres	10,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	None
Multiple-dwelling units	N/A	N/A	N/A	N/A	N/A	None	None	None
Single Room Occupancy Development	5 acres (15)	10,000 sf	6,500 sf	5,000 sf	5,000 sf	500 sf/unit None	500 sf/unit None	500 sf/unit None
Maximum Height	30 ft	30 ft	30 ft	30 ft	30 ft	45 ft	60 ft	75 ft
Maximum Lot Coverage	20% (11)	50%	60%	60%	60%	70%	75%	80%

Questions?

Next Steps Overview



MIXED-USE COMMERCIAL (MUC) BACKGROUND INFORMATION & DISCUSSION ITEMS

Establishment and Evolution: The MUC zone and the Village Center (VC) Comprehensive Plan designation were created with the Balanced Development Patterns project to promote efficient land use and transportation patterns, preserve natural resources, and use more mixed-use zoning to promote walkable and accessible commercial uses.

MUC was first applied in North Albany in 2003 in two locations to provide options for a future grocery store and commercial uses and services to support North Albany residents. Recognizing that North Albany was unlikely to support two commercial centers, it was decided not to limit residential or require a minimum amount of commercial in the district. Rather, a minimum density of 10 units an acre was set to encourage denser housing to support a vibrant center.

MUC was next applied in **East Albany** on Knox Butte when the large “Brandis” property was annexed, to reserve land near residential zones for a grocery store and other commercial services. When the East Albany MUC district was developed with solely residential uses, the East Albany Plan (2023) identified the need to limit residential, so in East Albany only, residential is permitted only in conjunction with a commercial or institutional use (on the same property or in the same building as a non-residential use).

The **South Albany** Area Plan (SAAP, 2012) identified 3 smaller mixed-use Neighborhood Centers and set a comprehensive plan policy to limit ground level residential uses to 50 percent of the property. [Note: the large 36-acre “piano” shaped property was not identified as a Neighborhood Center in the SAAP and is not subject to this standard.]

MUC Zoning District Purpose Statement (ADC 5.040): The MUC district is intended primarily to provide a mix of convenience commercial, personal services, offices and medium density residential uses. The district would typically be anchored by a grocery store and may include a mix of smaller retailers, offices, live-work units, and residences. The MUC district is easily accessible to nearby residences, and commercial uses are compatible in scale and design with adjacent neighborhoods. Uses in the MUC zone will serve area residents and should not draw from the region.

MUC Commercial/Housing MIX Considerations:

MUC needs to provide for commercial services and institutional uses to serve nearby residential development and accommodate some residential. Factors to consider:

- Property location –commercial/services needs by area (See MUC Locations document.)
- Property size – larger properties especially need to provide commercial (36-acre piano property example)

a. **Commercial/Residential mix:** Should a minimum amount of land be reserved for commercial/non-residential purposes? If so, how much?

- Consider applying the SAAP 50% ground floor residential limitation to other areas or citywide.
- Consider a different limit on residential permitted on the ground floors (70%?)

- Applicability – should any limit on residential apply citywide, by district location, each property?

b. Residential in MUC: Should some Residential Uses be restricted in MUC?

Residential requirements in CFAs: must allow townhouses and multi-dwelling units but can require ground level commercial/office in multi-dwelling unit developments, unless it is affordable housing. [CFAs have a minimum density of 15 units/acre in all but the primary CFA (14th Avenue by the mall) where the minimum density is 25 units/acre.]

Consider limiting residential uses to higher density housing types – a few options to consider:

- Don't permit detached single & middle housing types; or
- Don't permit any single or middle housing types, except townhouses; and/or
- Limit multi-dwelling units to above or attached to commercial/non-residential uses for a portion of the district/property

c. Permitted Uses Evaluation (ADC Table 5.060-1): Should some non-residential uses be permitted or prohibited? Are property size and location factors?

The following non-residential uses are permitted/excluded.

- Commercial/retail **excluding** vehicle sales/rentals, vehicle repair, adult entertainment, mini-storage, and hotels/motels, no large footprint regional draw uses (Costcos, etc.)
- Institutional uses **excluding** hospitals, jails and detention facilities.
- Industrial uses are **restricted to** small-scale manufacturing (< 10,000 SF)

MUC Development Standards

Building Scale & Pedestrian Environment (ADC Table 5.090-1): To restrict larger footprint retailers that may have a regional draw (more traffic) from locating in MUC, a maximum building footprint of 60,000 SF was established (area of a downtown block - 266' x 225'). When a building includes a grocery store, the max footprint increases to 80,000 SF. A Maximum building footprints also support a pedestrian friendly environment.

STANDARD	MUC
Maximum Building Footprint (sq. ft.)	
Non-grocery (16)	60,000
Grocery-anchored (13) (16)	80,000
Height maximum (14)(22)	85'
Lot Coverage maximum (6)	80%(23)

(13) May include one or more businesses in attached buildings

(16) Max footprint if grocery store occupies at least 50% of the total square footage.

Shorter block lengths also support walkability and accessibility. Most vacant MUC land is in a CFA overlay district where block lengths are limited - the maximum length is 500 feet for sites less than 5.5 acres, and 350 feet for larger sites. When block length exceeds 350 feet, a public through-block accessway must be provided for bikes/peds. [ADC 14.040(4)].

- A 350' x 350' block enables a building footprint of 122,500 SF if built to the property lines.

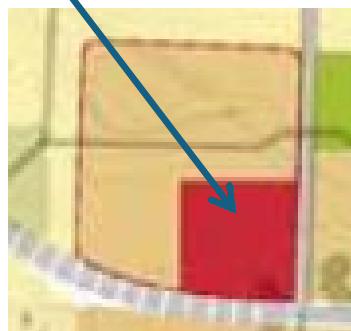
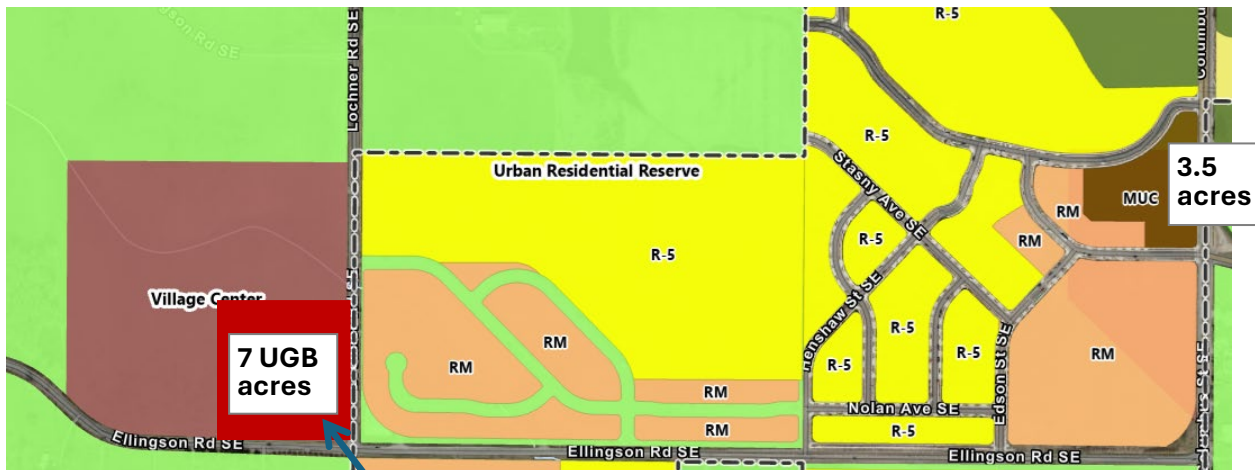
Should the current maximum building footprints be modified?

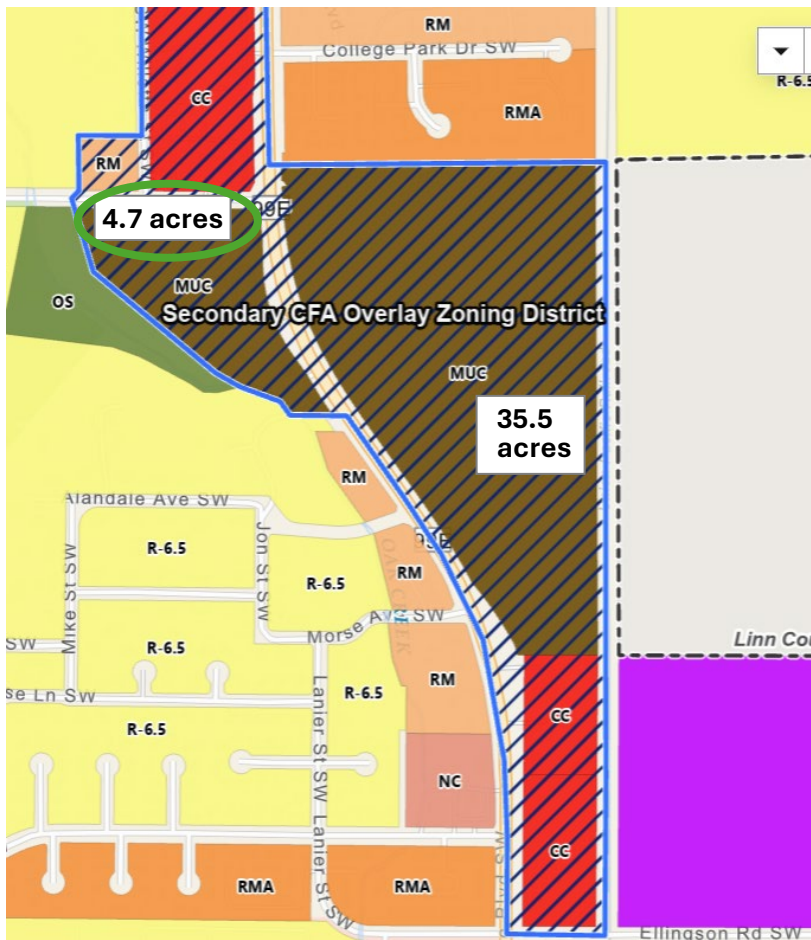
MIXED USE COMMERCIAL (MUC) DISTRICT LOCATIONS, vacant acreage noted

North Albany: MUC is in a secondary Climate Friendly Area (CFA overlay is the blue cross hatch)



South Albany: One site is in the city limits (on Columbus), and in the UGB on the northwest corner of Lochner and Ellingson Roads where MUC would be applied in the Village Comprehensive Plan designation where the red box is shown. The new CFA at 53rd and 99^E is also zoned MUC and has the most vacant land.

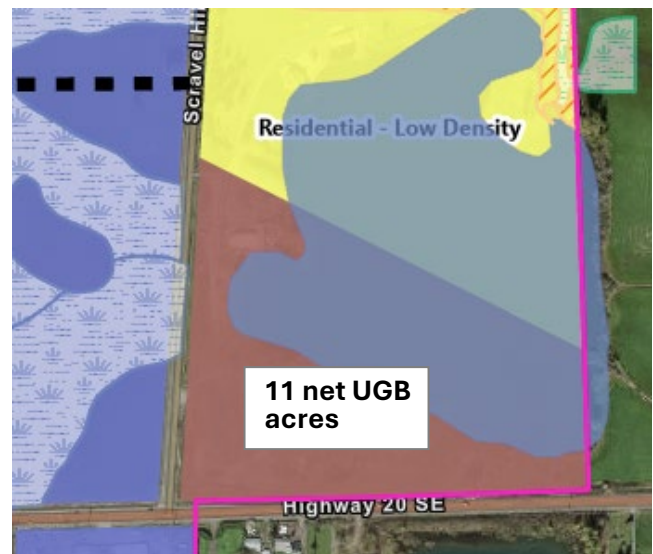
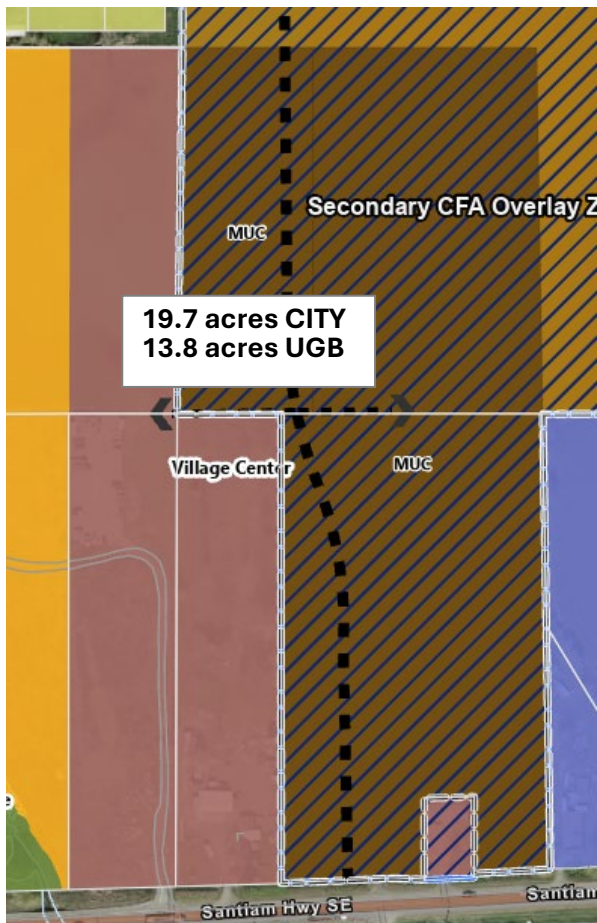




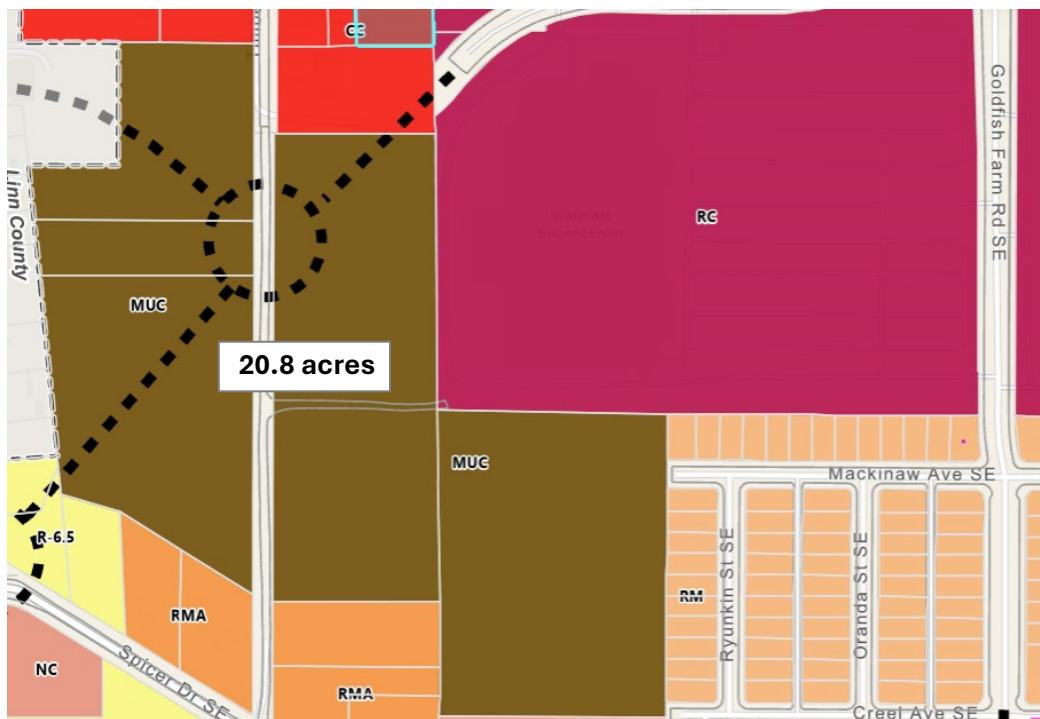
East Albany: There are several MUC districts or future locations in East Albany in the city limits and outside, some in a CFA overlay district, some not.



Santiam Highway (20 E) and the NE corner of Scravel Hill and Highway 20:



Recently annexed East Albany Town Center properties:



Local Guidelines for Data Center Development

By the ULI Americas Data Center Product Council



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Urban Land Institute

ULI Americas Data Center Product Council

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1

Introduction: data centers 101

This paper seeks to demystify data centers and their purpose while offering a balanced model zoning ordinance for data center development that authorities having jurisdiction (AHJs) can adapt straight from the page. It also aims to provide a roadmap to data center development for local officials, planners, and other municipal decision-makers.

Data centers are still a relatively new land use, and they are often misunderstood or miscategorized. To be ready when data centers are proposed in your jurisdiction or to attract them, first it is important to understand their purpose in our society and how they function, as well as to have strategies to mitigate common challenges.

Essential infrastructure

In the morning, most of us brush our teeth or take a shower. We may not know where the water comes from or where it goes. We may not know that it is treated at a plant and arrives at our homes, where wastewater departs, is received in a facility, and is released into surface water systems.

These days, we often check our email or social media first thing in the morning, even before we shower or brush our teeth. The internet—like water, sewer, and power systems—has become part of our essential everyday infrastructure.

Water and sewage systems are typically financed and delivered by local cities or counties. Power is funded and delivered by a mix of public and private entities. Data centers, however, which form the backbone of the internet, are financed, developed, and operated primarily by privately held businesses. Unlike what occurs with other critical infrastructure systems, the development of data centers requires navigating a complex landscape of private property laws, environmental impact assessments, and local zoning regulations. Local officials, in other words, play a key role in ensuring access to the internet economy.

Purpose and function

A **data center** is a building that houses the infrastructure that supports the world's computing functions. This building is filled with servers that process and store the data commonly referred to as “the cloud.”

Processing and storage

Whenever you swipe your credit card, join a Zoom meeting, or

send an email, your virtual activity connects to a real place in the physical world: a data center.

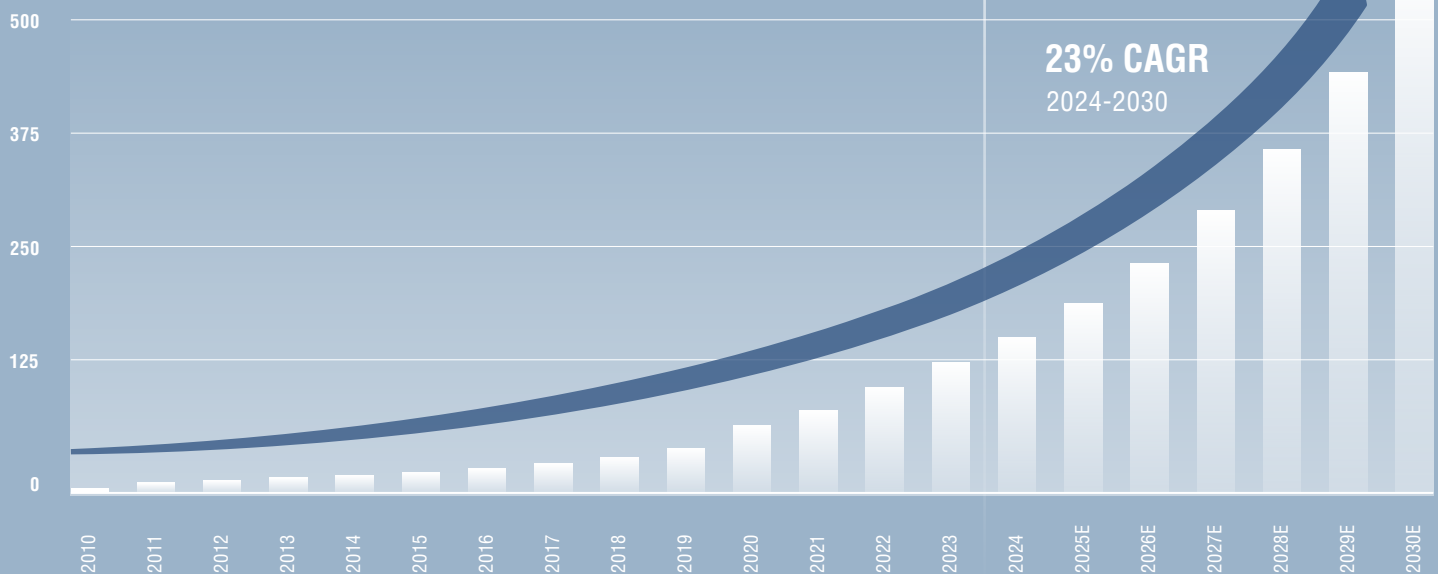
What gets processed in a data center? A better question: what does not? Data centers house our national security systems, including military communications. They enable online commerce, financial services, health care, and other essential services. Each app on your phone—even offline apps that

sync—and every activity on the internet requires a data center.

When you use your smartphone, that tiny device does not process your requests. Instead, your phone asks questions that get answered in data centers—usually in a fraction of a second.¹

Data centers' primary function is processing and accessing data, but they also store data, safeguarding sensitive information so it's inaccessible to hackers. When you save a file to the cloud, you are not storing it in the sky. A data center stores it, more efficiently and securely than a filing cabinet ever could.

Global data created annually in zettabytes



Source: JLL Research, IDC

The demand for more data center capacity

Our economy and communities were able to continue functioning during the Covid-19 pandemic—when schools, workplaces, and social gatherings shifted to the internet—thanks in large part to the support provided by data centers. This change also moved us further into an economy that exists, largely, online.

The rise of remote work and advancements in artificial intelligence (AI) that require high-density computing increased the demand for processing and data storage, thus requiring

more data center capacity. As a result, this property category has grown significantly.

If society and the economy continue the shift to the internet, we would seem to face a need for more data centers. Where these new data centers will be developed is a matter of great importance that requires several variables to come together. To discuss these variables, we first must discuss what a data center is.

Types of data centers

Corporate or enterprise data centers, which store and process a single organization's data, rose in prominence in the mid-1990s as the dot-com boom drove demand for fast internet connectivity and 24/7 operations. These data centers often store

the data of financial institutions—think American Express or Wells Fargo—that typically own and operate such facilities themselves, rather than leasing them from a provider.

¹ "One: You Use Data Centers," Where the Internet Lives, Google, podcast audio, <https://podcasts.apple.com/us/podcast/one-you-use-data-centers/id1541394865?i=1000501909698>.

At **colocation data centers**, which include **retail data centers**, third-party operators lease data center space—a certain number of server cabinets, for example, or kilowatts (kW) to multiple companies.

Wholesale data centers are a type of colocation data center where a third-party developer rents large portions of the space and energy capacity to one company—often, all of it.

Telecom data centers, owned by telecommunications companies such as Verizon, are where traffic from cell towers “switches” to the internet. These facilities tend to be smaller than the other data center types and require less energy.

Hyperscale data centers are built for a single customer: one of the large tech companies that provide many of the services we use every day—Google (Google Cloud), Amazon (AWS), Microsoft, and Meta. These companies sometimes own their own centers, and sometimes they lease them from a third-party developer. These centers are built based on the data demands of the hyperscaler.

The name *hyperscaler* emphasizes the ability to scale resources up or down quickly and efficiently to meet demand. These companies have a massive number of users and generate vast amounts of data, which together demand substantial processing power and storage capacity, especially as user bases grow unpredictably.

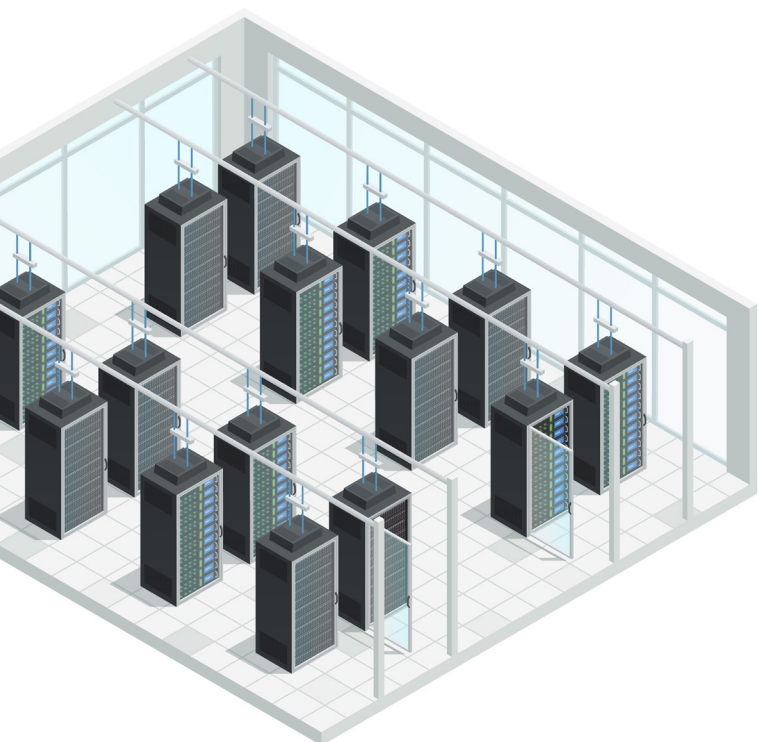
Differences from industrial warehouses

Data centers differ from other forms of commercial real estate. They constitute a relatively new category and, until recently, they were concentrated in select geographic areas. As a result, the buildings housing our essential internet infrastructure are widely misunderstood.

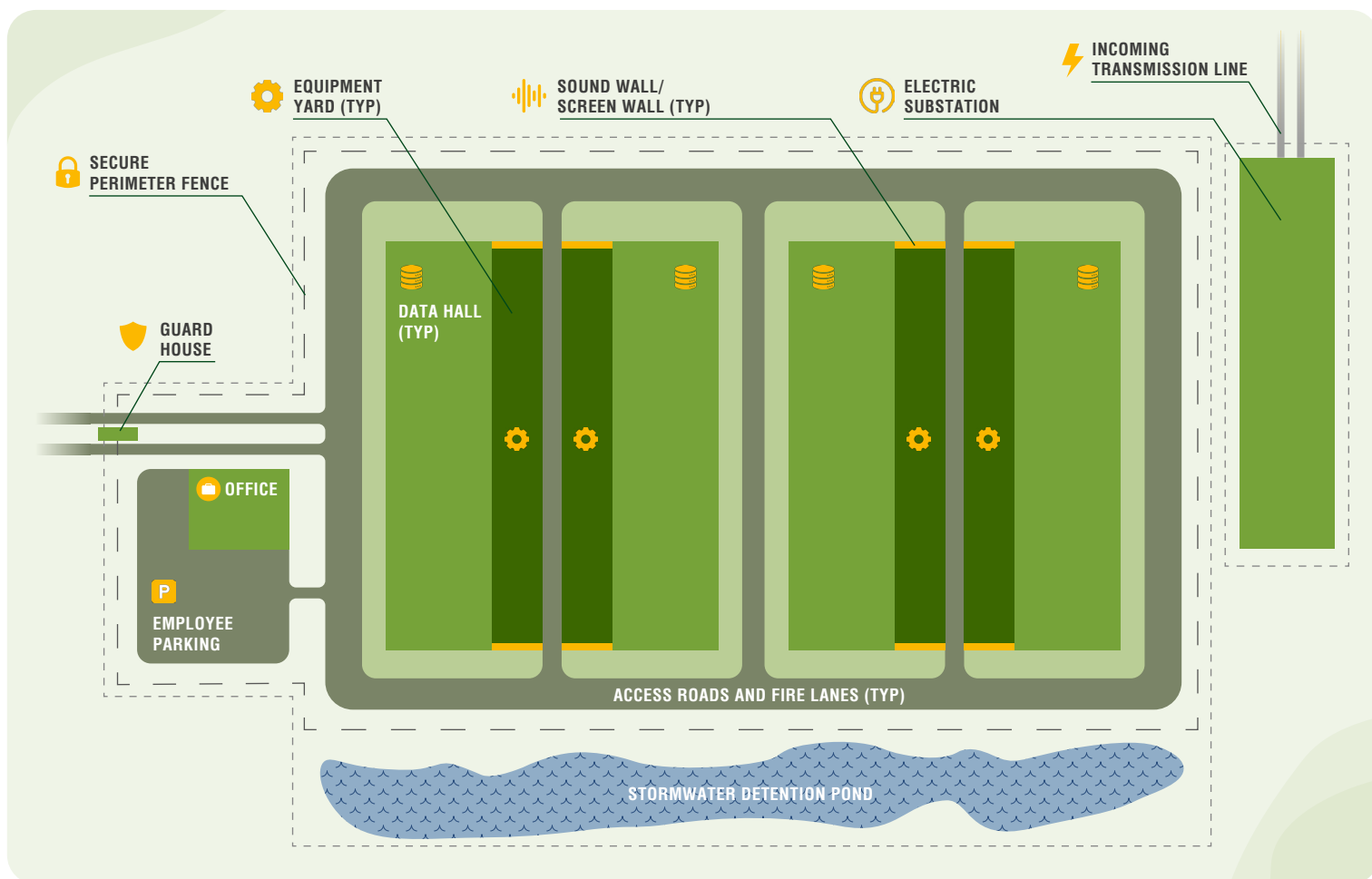
Typically, data centers are not explicitly mentioned in zoning codes. Instead, they fall under the umbrella of general industrial zoning uses. But because they store data, they are not typical warehouses. Their classification, as such, causes planning challenges, which we will detail further in a [later section](#).

Here's how data centers differ from industrial warehouses or factories:

- Data centers are more compatible with other uses nearby because, unlike factories or warehouses, they are odorless and lack truck traffic.
- They are often taller than traditional single-story warehouses. Data centers can be single-story or multistory. Single-story data centers start at around 30 feet (9.1 meters) and multi-story data centers go up from there.
- They require fewer employees once construction is complete, so long-term impacts on traffic, schools, and public services are minimal.
- They need fewer parking spaces and plumbing fixture counts than are typically mandated by industrial codes.
- Data centers require more robust underground and above-ground infrastructure.
- Unlike warehouses and factories, data centers have external electrical and mechanical equipment.
- Some data centers need multiple layers of redundancy, which we'll discuss [in a moment](#).
- Data centers require more security measures than industrial buildings, including 24/7/365 surveillance and controlled-access points.



Let's tour a hyperscale data center campus



Most of the data centers developed today are hyperscale data centers—typically within campuses. We tour one below.

Approaching the campus

As you approach a hyperscale data center campus, you are likely to encounter a fence or gate—often with a gatehouse—beyond which you may be able to see equipment yards and cooling equipment in the distance.

Security

Data center campuses have extensive security measures and strict protocols for employees and visitors. Infrared surveillance cameras and tall, anti-climb security fences that detect movement surround the property. A guard at the gatehouse checks guests' credentials outside. If you make it past this point—few people do—you will find another security checkpoint at the entrance to the data center building itself, where additional security personnel check badges.

Equipment yards

Before heading inside, let's first follow the winding campus driveway and stop at the mechanical and electrical equipment yards.

Electrical yards

In the electrical yards, you'll hear the low hum of static if you stand directly under the transmission lines. A nearby **utility substation transformer** receives this power and converts it down to the lower voltage needed for use inside. The medium-voltage power feeds into **switchgear** in the electrical yard—or another type of power distribution equipment that similarly dispenses electrical power throughout the data center.

Alongside the switchgear, you will see multiple generators that provide emergency power in case of an electrical utility outage. If they look like they aren't running, it's because they are usually turned off. Except during emergency outages, they are turned on only for monthly maintenance tests for a mere 30 minutes² and are quiet while running due to sound-attenuated enclosures.

2 GeneratorSource, "Data Center Generator Maintenance," GeneratorSource, January 2024, <https://www.generatorsource.com/blog/January-2024/Data-Center-Generator-Maintenance.aspx>.

Redundancy

Like hospitals, data centers require a high level of redundancy to ensure they never go down, and the generators are part of this preparedness. Redundancy is often also created through multiple power feeds. The servers have backup capacity, too. For instance, your inbox is stored on several servers so that if one fails, your emails remain accessible.

Mechanical yards

The mechanical yards operate similarly but typically focus on cooling rather than on power redundancy. On the ground, you'll find chillers that cool the data center. At some data centers, they are on the roof.

Heat is a byproduct of computer processing. The servers within data centers must remain cool to function correctly. There are multiple ways of to achieve this cooling, but for the purposes of this paper, we focus on three main categories: air-cooled chillers, water-cooled chillers, and evaporative cooling.

A highly efficient **air-cooled chiller system** is sealed in a closed loop and uses little to no water—less than the amount used in three single-family homes.

Both water-cooled and evaporative systems use more water and consume less electricity than air-cooled chiller systems. In an open-loop **water-cooled chiller system**, cooling towers evaporate water for cooling purposes. **Evaporative cooling** is primarily achieved by large air-handling units that move air

across a wet medium to evaporate water, which removes heat and cools the air in the data hall.

Data center structure

Let's now make our way through the security checkpoint and into the data center building itself. Inside, we find the **data hall**, where the servers sit in rows of tall racks along a series of aisles fed by **electrical distribution equipment**. Data halls are the *pièce de résistance* of any data center. Such a structure is typically designed from the data hall outward, with all supporting infrastructure responding directly to its needs.

If you examine the racks from the floor upward, you see bundles of colorful fiber optic cables (inside of which are thin strands of glass) connecting servers to switches and routers. These cables enable high-speed data transfer. Without them, we would be unable to access the web or many of the apps we use daily. The cables are organized in lanes that converge at massive **switches**.

Inside the data center building, you also find electrical rooms that house other critical power supply infrastructure. Battery-powered **uninterruptible power supply (UPS) systems** sit in large cabinets against the wall. In the event of a utility outage, these systems feed power to **power distribution units (PDUs)** inside the data hall. UPS systems are the first-used backup power source and often prevent use of the generators outside.

The importance of clustering

The internet is a network of interconnected networks, and so are data centers. **Clustering** refers to the practice of linking the servers at multiple data centers with high-speed, low-latency connections so they work together as a unified system. This interconnected group is called a cluster, and each server in the cluster is called a **node**.

Importantly, clustering requires physical proximity: locating multiple data centers close to one another geographically so that optical signals in fiber cables don't lose strength. That's why a huge portion of global internet traffic passes through major hubs such as northern Virginia's "Data Center Alley."

Clustering also requires interconnection—linking these data centers through high-speed, low-latency connections.

Reduced latency

One primary reason for data center clustering is to reduce **latency**, the time it takes for information to travel from its source to its destination. When data centers are geographically distant from each other, latency increases, which leads to slower application performance for end users, including the dreaded "spinning wheel of death." When data centers are

located near each other, data can travel shorter distances, and this information exchange runs faster. Due to quicker response times, the user experience improves.

Improved reliability

Clustering enhances redundancy. If one data center server goes offline, others in the cluster can take over, ensuring continuous service availability. Without clusters, one server failure could cause an outage with international implications. In the appendix, we explore this concept further through a case study.

Load balancing

Clustered data centers allow for more efficient **load balancing**, the process of distributing network traffic across multiple servers at interconnected data centers. This practice prevents any single server or center from becoming overwhelmed.

Shared infrastructure

Data centers require conduits for power and, in some cases, water. When data centers cluster, they benefit from shared power and cooling infrastructure while also reducing the need for long-distance fiber optic connections.

2

What happens when data centers come to your region: opportunities, challenges, and mitigations

Data centers can provide significant economic benefits and other opportunities. Data center projects also introduce unique planning challenges, however. To be prepared, and to seize opportunities when appropriate, AHJs must understand these challenges and how to mitigate them.

Opportunities

Support essential national infrastructure

Data centers contribute to national infrastructure and economic growth. Also, they enable the digital economy by underpinning businesses of all sizes in virtually every industry.

According to the United States Department of Energy³, “At a national level, data centers are critical to supporting America’s economic growth by powering businesses and enabling continued leadership in innovation, including for AI applications.”

HERE’S HOW DATA CENTERS SUPPORT NATIONAL SECURITY AND ECONOMIC GROWTH:



They protect the privacy of all of the data within U.S. borders against cyber threats by powering security measures such as encryption, firewalls, and access controls.



Data centers also support the development and deployment of emerging tech. Data centers are the backbone of AI infrastructure, which requires rapid data processing, storage, and analysis at scale.



They host critical infrastructure for our emergency services, providing the necessary computing power and data storage to support communication networks, emergency response coordination, and real-time data analysis during crises.



On a macroscale, maintaining advanced data center infrastructure allows the U.S. to compete with such countries as China in the race for AI dominance, thus fostering economic growth and strengthening national security through technological leadership.



Our health care system depends on data centers. They enable a range of services, from telehealth visits to managing digital health records, and they even assist in providing data-analysis-informed diagnoses for patients.



On a microscale, data centers also improve businesses’ operational efficiency by democratizing access to supercomputer processing and secure cloud storage so that small businesses can compete more easily with larger corporations.

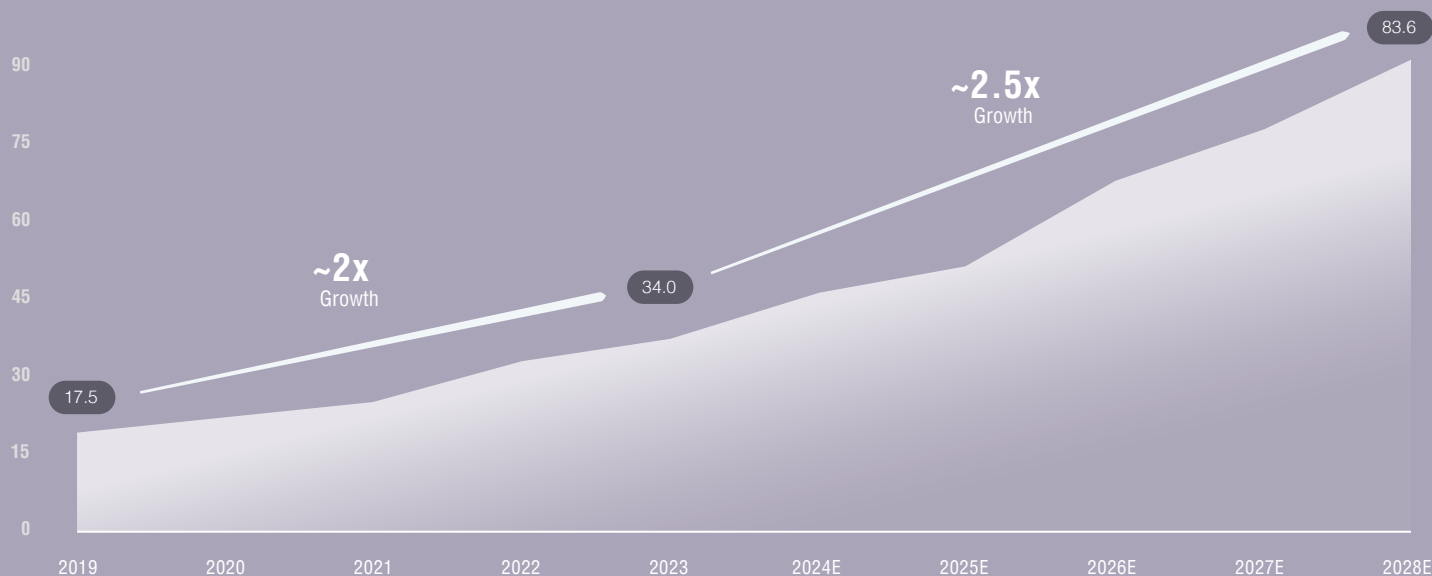


Banks and the rest of our financial ecosystem rely on data centers for their daily operations.

3 U.S. Department of Energy, “Clean Energy Resources to Meet Data Center Electricity Demand,” <https://www.energy.gov/policy/articles/clean-energy-resources-meet-data-center-electricity-demand>.

Increase much-needed processing and storage capacity

Growing global data center demand in gigawatts



Source: CBRE, DC Bytes

Our needs for data center capacity have grown—and continue to grow at a fast clip as we create more data.

If we don't build data centers that support this increasing data density, it could hamper the economy, business operations, and our daily lives.

On a microlevel, a lack of data center capacity or redundancy makes files and apps load slowly. On a macrolevel, if we don't build enough data centers to meet our growing storage and processing needs, there will be outages with international consequences, like the October 2021 Meta outage. We include a case study on this incident and its profound impacts in [the appendix](#).

Jobs

When data centers are in operation, they require fewer employees to operate than most other commercial properties, leaving minimal impacts on traffic in surrounding areas. A typical data center operates with fewer employees than other commercial or industrial facilities. Unlike industrial facilities, there is no fleet of trucks going in and out, which further minimizes traffic congestion.

More workers are present while the data center campus is under construction, though. Data center construction projects happen in phases, especially on larger campus developments, and these

phases can extend over several years. This phased approach often leads to misunderstandings regarding the permanency of the increased traffic. Clear communication about the nature and duration of construction phases can help manage expectations and reduce misunderstandings.

This phasing approach has a plus side, however. Data centers create local construction jobs for tradespeople who otherwise travel from job to job—with less fossil fuel consumption thanks to reduced commuting. Jobs related to data center construction typically provide these workers, sometimes called journey-people, with more stability and longer timelines, offering a higher quality of life. This outcome, in turn, can prevent or alleviate labor shortages and reduce renovation and building expenses in the area, benefiting homeowners and businesses.

Although the operational workforce of data centers is relatively small, people employed in these roles are well-compensated, often earning six-figure salaries without the need for significant training or a college degree. During both the construction and operational phases, data center jobs boost to the local economy because workers spend at retail stores, nearby restaurants, hotels, and suppliers.

Data centers also indirectly create many jobs across the broader economy. According to PricewaterhouseCoopers International Limited⁴ (PwC), each direct job in the U.S. data center industry

4 PwC, "Economic Impact Study of the US Data Center Industry," January 2021; "Data Centers and Ancillary Job Creation," TechIndustryReview, March 2022.

generates, on average, six ancillary jobs throughout the national economy. As a result, the total annual impact of the data center industry on national employment—combining direct, indirect, and induced effects from both construction and operations—grew from 2.9 million jobs in 2017 to 3.5 million jobs in 2021, representing a 20 percent increase.

Furthermore, the PwC study does not include jobs created by the cloud access and processing power that data centers enable. Data centers also facilitate zero-commute remote work across the country, further reducing fossil fuel consumption and contributing to a more sustainable economic model.

Tax revenue

Data centers provide municipalities with substantial economic and fiscal benefits through various forms of tax revenue (if unabated) that far exceed ones associated with other property types.

Hyperscale data centers are capital-intensive developments that can cost billions to construct—and are filled with high-value equipment and infrastructure. Taxes levied against them can be a windfall for AHJs.

A case in point: the data center tax base in Loudoun County, the central hub of North Virginia's Data Center Alley, increased from \$15.996 billion in 2023 to \$25.627 billion in 2024, constituting 58.5 percent of the municipality's total tax revenue.⁵

Data center owners pay two primary forms of property taxes. The first is real property tax, which applies to the land campuses are built on and the permanent structures that sit upon it, such as buildings. The second is personal property tax, which is levied on movable assets such as the servers and equipment inside data centers.

These revenues become significant boons to surrounding municipalities. In Loudoun, personal property tax revenue from computer equipment purchases for data centers surged by 170 percent in 2023, accounting for two and a half times the tax revenue.

The presence of data centers can also lower the overall tax burden for residents. In Loudoun, the general property tax rate

is set at \$0.87 per \$100 of assessed value; it would be \$1.33 (an additional 52 percent) but for the influx of data center developments, according to the county's executive director of economic development.⁶ Revenue from data centers accounts for \$0.47 of the tax rate, thereby alleviating the burden on other taxpayers.

Data center revenue can be channeled into net-zero programs and those related to health care, education, and other critical public services.

Data center revenue can be channeled into net zero programs and ones related to health care, education, and other critical public services. Revenue from data centers in Quincy, Washington, for example, has been used to fund local schools, public safety, and infrastructure improvements.⁷

By 2026, Loudoun County projects it will receive roughly \$1.4 billion in tax revenue from the personal property tax it levies on computer equipment alone.⁸ This amount constitutes nearly half of Loudoun County's entire fiscal 2021 budget of \$3 billion.

Community incentive packages

Data center operators also provide significant benefits through incentive packages negotiated with municipalities that can include funding for schools or public infrastructure projects. In multiple cases, hyperscalers have funded renewable energy plants and created workforce development programs in areas where they operate.

As part of AWS' \$10 billion data center campus investment in Mississippi, the company developed STEM-focused workforce training and career awareness programs for K-12 school systems and funded the state's first utility-scale wind farm.⁹ You can learn more about the community benefits the hyperscaler provided in [the appendix](#).

5 Emily Leayman, "Loudoun's Data Center Tax Base Jumps, Residential Increases Continue," Patch, February 8, 2024, <https://patch.com/virginia/ashburn/loudouns-data-center-tax-base-jumps-residential-increases-continue>.

6 Hanna Pampaloni, "Rizer: Land Value Increases Bring Benefits and Challenges," Loudoun Now, June 28, 2024, https://www.loudounnow.com/business/rizer-land-value-increases-bring-benefits-and-challenges/article_5b417aa8-3592-11ef-b587-f7ca7fd349c0.html.

7 Nick Parker, "Quincy Data Centers: The Data Center Conversation" (Presentation, Port of Quincy), <https://wedaonline.org/wp-content/uploads/2020/10/Port-of-Quincy-Presentation.pdf>.

8 "Loudoun Data Center Revenue Growth," Washington Business Journal, October 19, 2020, <https://www.bizjournals.com/washington/news/2020/10/19/loudoun-data-center-revenue-growth.html>.

9 Amazon Staff, "AWS plans to invest \$10 billion in Mississippi, the largest capital investment in the state's history," About Amazon, January 25, 2024, <https://www.aboutamazon.com/news/aws/aws-10-billion-investment-mississippi>.

The region that includes Fredericksburg, Virginia—an emerging exurban hyperscale campus market located southeast of Loudoun County—is a case study in how AHJs can attract landslide economic and fiscal benefits while mitigating potential concerns well in advance.

In March 2024 Virginia's governor, Glenn Youngkin, alongside other state and local elected officials, announced that AWS was making a \$35 billion dollar investment in data centers in

Spotsylvania, Caroline, Stafford, and Louisa counties, creating approximately 2,000 new jobs. Also announced was AWS' contribution of \$400,000 in community funds to those localities.

We explore how AHJs in the region did the work to prepare for and attract that investment in [the appendix](#), which also covers similar measures in [Elk Grove Village](#), Illinois, a unique suburban community northwest of downtown Chicago that modified its zoning code to attract data center development.

Challenges and mitigations

Sustainability

The sustainability of data centers is a significant concern for both AHJs, as well as for data center operators and developers, who ensure that their centers are designed and engineered to minimize emissions and other community impacts.

Grid impact

Let's address the misconception that data centers draw from the grid power that other customers, such as residential consumers and retail operators, could use. This concern is common among constituents when a data center is proposed in a municipality.

The grid is heavily regulated. Under existing federal regulations (and in Texas, the only state that regulates its own power grid), demand from a new customer cannot affect the reliability or availability of an existing customer.

Rather than taking power from the grid, new large-load customers such as data center operators face the challenge of finding readily available power that the utility can deliver—especially because many seek clean power sources.

According to the U.S. Department of Energy (DOE), as quoted in a recent article,¹⁰ data centers can actually catalyze the grid's clean energy transition: “Near-term data center driven electricity demand growth is an opportunity to accelerate the build-out of clean energy solutions, improve demand flexibility, and modernize the grid while maintaining affordability.”

Here's why: in many municipalities, energy providers are obligated to meet the power demands of various users. When a significant portion of demand comes from data center operators, many of which have strong commitments to using renewable energy, that activity accelerates the greening of the grid. These companies, driven by their climate goals, place considerable pressure on utility providers to adopt cleaner energy solutions.

“Near-term data center driven electricity demand growth is an opportunity to accelerate the build-out of clean energy solutions, improve demand flexibility, and modernize the grid while maintaining affordability.”

U.S. Department of Energy

Unlike AHJs, which cannot create the demand to push forward such changes themselves, data center operators wield considerable influence by creating substantial demand for renewable energy.

This dynamic forces utilities to accelerate and help finance their transition to greener energy sources, thereby modernizing the grid to meet contemporary environmental standards. Public officials have a critical role to play in this scenario. By ensuring the existence of clear and easy-to-follow guidelines for data center development within their jurisdictions, AHJs can become integral to the solution, thus fostering a cleaner energy infrastructure.

Conversely, discouraging data center development could inadvertently push these operations into regions with less stringent grid standards and undermine broader sustainability efforts. Thus, the collaboration between data center operators and local governments is pivotal in driving the clean energy transition and ensuring grid modernization.

10 U.S. Department of Energy, “Clean Energy Resources.”



Grid sustainability

Data center companies—third-party developers, operators, and hyperscalers among them—typically have far stricter carbon reduction commitments than do municipalities themselves.

- The top five hyperscalers have a combined renewable energy portfolio totaling more than 45 gigawatts (GW) worldwide, the equivalent of roughly 118,215 Tesla Model 3 motors¹¹ running on full power—and that figure doesn't include on-site generation.¹² Roughly 57 percent of global corporate wind and solar capacity tracked by S&P Global Commodity Insights is tied to these five companies alone.
- Amazon first committed to powering all of its operations, including AWS data centers, with 100 percent renewable energy by 2025. As of 2023, Amazon reported achieving this goal early, with 100 percent of its electricity consumption matched with renewable energy sources. The company also set a goal to reach net-zero emissions by 2040.¹³
- Microsoft committed to designing and operating data centers that are carbon negative, water positive, and zero waste before 2030, procuring 100 percent renewable energy on a global scale by 2025, and significantly expanding and decarbonizing local electricity grids.¹⁴
- Apple has committed to becoming carbon-neutral across its entire supply chain and product life cycle by 2030. This effort includes using nearly 10 GW of existing renewable energy and investing in new renewable generation.¹⁵
- Google, meanwhile, announced its goal in September 2020 to operate carbon-free, on clean local electricity, 24 hours a day, 7 days a week, 365 days a year by 2030. From 2010 to 2023, the company signed more than 115 agreements totaling in excess of 14 GW of clean energy generation capacity.¹⁶

- Meta committed to net zero emissions for its supply chain and to becoming water positive by 2030. The company plans to power all of its data centers with renewable energy by 2025.¹⁷

The methods through which hyperscalers and data center developers are working toward these goals include:

On-site generation: Some data centers have solar panels or other renewable energy sources installed directly on their premises. Wind and solar require a lot of land, however, and on-site land is usually scarce. As such, these projects typically provide only a small portion of data centers' total energy needs.

Power purchase agreements (PPAs): In a PPA, data center companies (the buyers) sign long-term contracts with renewable energy providers (the sellers) to purchase electricity from specific wind or solar farms. PPAs often support the development of new renewable energy, thus contributing to overall grid decarbonization and improving the grid mix for local residents and businesses.

Renewable energy certificates (RECs): Companies purchase RECs to offset their energy consumption, which supports the economics of clean energy development. RECs are not necessarily tied to the specific municipalities where data centers are located, though.

Investment in renewable projects: Hyperscalers often invest directly in the development of new renewable energy projects.

Diesel generators

The role of diesel generators at data centers is often misunderstood. As we [discussed elsewhere](#), these generators are present only as a backup power source.

Also worth noting is that diesel generators are subject to a comprehensive regulatory framework. The Environmental Protection Agency (EPA) sets federal standards implemented and enforced at the state level for generators, and states may

11 U.S. Department of Energy, "How Much Power is 1 Gigawatt?" Office of Energy Efficiency & Renewable Energy, <https://www.energy.gov/eere/articles/how-much-power-1-gigawatt>.

12 S&P Global Market Intelligence, "Datacenter Companies Continue Renewable Buying Spree, Surpassing 40 GW in US," S&P Global, <https://www.spglobal.com/market-intelligence/en/news-insights/research/datacenter-companies-continue-renewable-buying-spree-surpassing-40-gw-in-us>.

13 Amazon, "Climate Solutions," Amazon Sustainability, <https://sustainability.aboutamazon.com/climate-solutions>.

14 Microsoft, "Microsoft's Datacenter Community Pledge: To Build and Operate Digital Infrastructure That Addresses Societal Challenges and Creates Benefits for Communities," Microsoft Blog, accessed September 15, 2024, <https://blogs.microsoft.com/blog/2024/06/02/microsofts-datacenter-community-pledge-to-build-and-operate-digital-infrastructure-that-addresses-societal-challenges-and-creates-benefits-for-communities/>.

15 Apple Inc., "Apple's Climate Roadmap," Apple Newsroom, <https://www.apple.com/newsroom/2021/07/apples-climate-roadmap/>.

16 Google, "Build a Carbon-Free Future for Everyone," Google Sustainability, accessed September 15, 2024, <https://sustainability.google/projects/carbon-free-24x7/>.

17 Meta, "The Next Stage of our Climate Commitment: Net-Zero Supply Chain Emissions by 2030," Facebook Newsroom, <https://about.fb.com/news/2021/10/the-next-stage-of-our-climate-commitment-net-zero-supply-chain-emissions-by-2030/>.

have additional requirements.¹⁸ Once permitted, each diesel generator's operation is bound by strict regulations. Operators typically may run generators for only a limited number of hours per year for routine maintenance and inspection purposes.

Although it varies by facility, generators at data centers are typically used far less than these rules dictate. Generators' brief monthly operation to ensure proper functioning is comparable to running a pump system that's been inactive for an extended period—regular checks prevent potential issues that accompany prolonged inactivity, such as seized components or degraded lubricants.

Greener alternatives to diesel are in various stages of development, but none has been proved at scale yet.

Water sustainability

Cooling accounts for almost 40 percent of the total energy consumed by data centers, McKinsey and Company estimates.¹⁹ Several factors determine the type of cooling that is most sustainable yet still suitable for the job.

Air cooling can be more efficient at lower load percentages and smaller equipment capacities. It can also be sustainable at any scale when the data center is located in an area with a high percentage of renewable sources in the energy grid, including ones generated on site.

When cooling processes require water, nonpotable water sources can be used so as not to reduce the local drinking water supply. Nonpotable water is treated—either at a local plant or, in some cases, on site—to remove contaminants, solids, and impurities. Then recycled water is then distributed in plum-colored pipes, which accounts for the nickname the **purple pipe system**. To pursue it, companies often consider access to recycled wastewater an important factor in the early stages of site selection.

Hyperscalers have even helped AHJs finance such projects, though that's not always viable, which makes proximity to existing treatment facilities a key consideration. In 2012, Google funded the construction of the Sweetwater Creek Sidestream Plant in Douglas County, Georgia, which we explore further in [the appendix](#).

Electrical utility transmission and distribution

When developers vet a site for a data center, they consider whether there are adequate transmission lines. At the local level, there can be pushback against the building of new transmission lines, inside and outside a data center context. Local pushback against transmission lines increased by 57 percent from 2022 to 2023, according to Columbia Law School research.²⁰

This challenge exists not just for data centers but also for the clean energy transition. One truism says that the transition can't happen without transmission. Here's why: as more sectors such as transportation go electric, overall power demand is likely to increase, requiring greater transmission capacity. Grids in the U.S. are not connected, which is a problem because such clean energy sources as solar and wind are often located far from urban centers, where electricity is most needed. Connecting grids across the country requires a plethora of new transmission lines.

"By the 2030s, we need to build so many new lines that they would reach to the moon if they were strung together," says Bill Gates, cofounder of Microsoft, in a video on his YouTube channel. "And by 2050, we'll need to more than double the size of the grid, while replacing most of the existing wires."

Most transmission lines, built between the 1950s and the 1970s, are now outdated.²¹

How did we get here? For a long time, electricity generation was centralized, and there was no need for a connected grid. Large coal-powered plants and nuclear power plants produced massive amounts of electricity in specific locations. This electricity was then distributed widely to homes, businesses, and industries throughout a large area. Power flowed primarily in one direction: from centralized plants to distributed end users.

As we transition to clean grid sources, however, we need a less centralized, more distributed system. Unlike fossil fuel plants, renewable energy sources are often geographically dispersed, variable in output, and located far from major consumption centers. They require a shift to an interconnected grid with diverse, distributed sources, one that's more resilient to outages and increasingly frequent extreme weather events caused by climate change. This shift requires more cross-regional transmission or inter-regional transmission. It requires . . . transmission lines.

18 U.S. Environmental Protection Agency, "Regulations for Emissions from Heavy Equipment with Compression-Ignition Engines," <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-heavy-equipment-compression>.

19 Srini Bangalore et al., "Investing in the Rising Data Center Economy," McKinsey & Company, January 17, 2023, <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/investing-in-the-rising-data-center-economy>.

20 "Opposition to Renewable Energy Facilities in the United States," Sabin Center for Climate Change Law, Columbia Law School, May 2023, https://scholarship.law.columbia.edu/sabin_climate_change/200/.

21 Bill Gates, "The Surprising Key to a Clean Energy Future," Gates Notes, January 24, 2023, <https://www.gatesnotes.com/Transmission>.

Often, constituents don't understand that transmission lines are an essential part of our sustainable future, even without data center demand. Properly communicating this message to a community isn't easy, but it's essential. Siting data centers near transmission infrastructure is most efficient, as doing so allows for use of the existing infrastructure and the associated rights of way for new infrastructure, if needed.

Sound

Another common community concern is sound. Most mitigations related to it are already baked into the development process. Data center designers, architects, and engineers tend to design data center campuses to mitigate impacts from sound upon nearby neighbors, including strategic placement of generators away from other uses. Developers typically employ on-site acoustic monitors as part of regulatory entitlements to ensure sound levels remain within acceptable limits.

Let's discuss where sounds occur at data center campuses. Remember the low hum in the equipment yards? It comes from cooling equipment. Screens and sound attenuators make it barely audible.

Generators make mechanical sounds, albeit only when they are turned on for testing or emergencies. Sound impacts can also be easily mitigated by housing generators in sound-attenuated enclosures with proper exhaust systems.

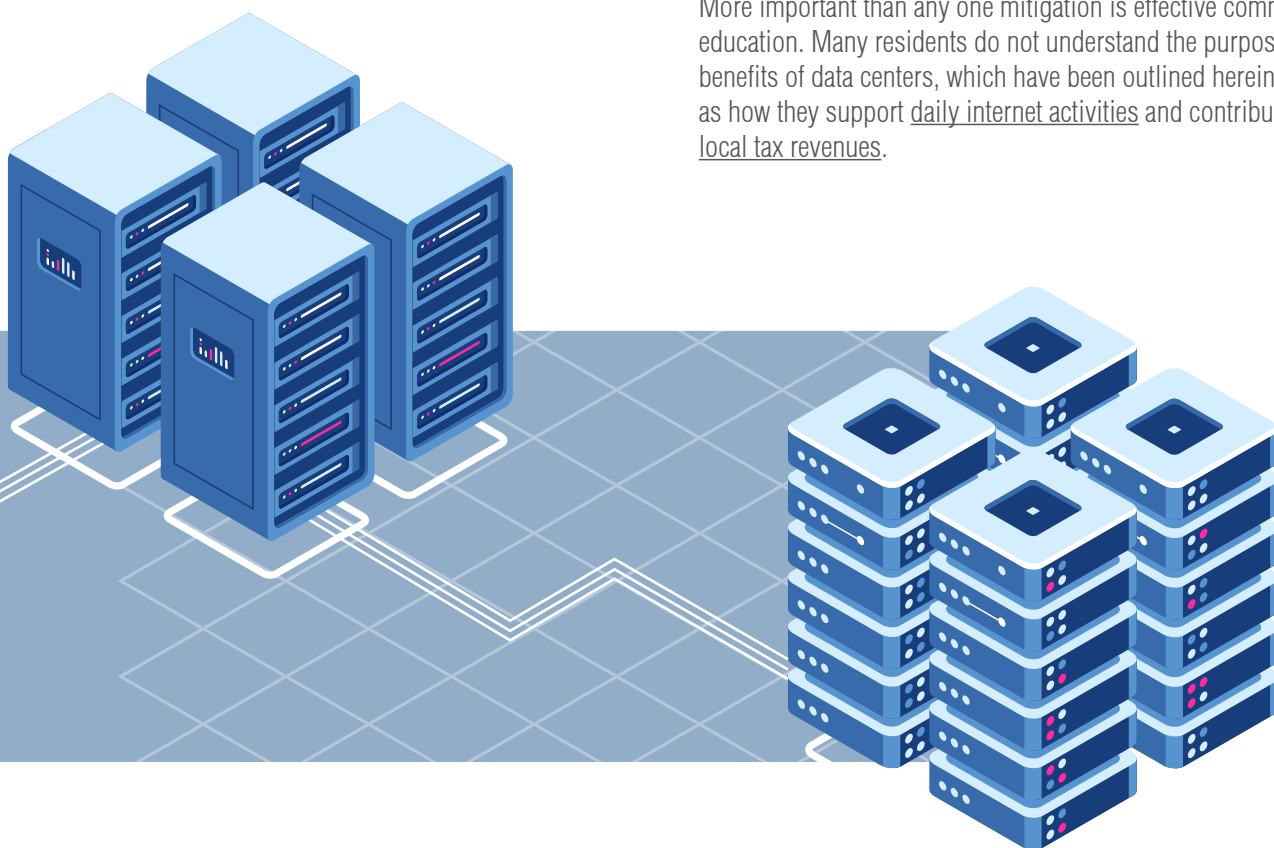
Aesthetics

Community members often raise concerns about whether data center campuses will look as if they fit into the community. This issue can be mitigated by:

- Creating buffer zones near residential and retail areas
- Employing glass façades in key areas to make data centers more closely resemble office buildings than industrial complexes
- Applying other exterior design techniques that use materials and colors to blend buildings into their surroundings, if required and appropriate to the context

Although these mitigations are effective, it's important not to codify excessively specific or restrictive design standards into zoning codes, as doing so can discourage data center development. Exceedingly stringent height restrictions, for example, could hinder the functional design of these facilities. Balancing aesthetic considerations with operational needs of data centers is key.

More important than any one mitigation is effective community education. Many residents do not understand the purpose and benefits of data centers, which have been outlined herein, such as how they support daily internet activities and contribute to local tax revenues.



3

Long-term planning for data centers



Location considerations

Because of their unique operational and physical requirements, several crucial factors must be considered when deciding what sites suit data centers:

● Power

Data centers are power-intensive. Reliable and robust access to power is non-negotiable, making proximity to high-capacity substations essential.

● Roads

Whereas operational traffic is minimal, the initial construction phase generates more traffic. Thus, easy access to highways and major roads is vital for logistics and transportation.

● Land

Hyperscale campuses require ample land area to accommodate both the facility and its accompanying infrastructure.

● Discharge infrastructure

If there is runoff from water-based cooling, a site will need adequate infrastructure for wastewater discharge, such as a connection to a municipal sewer system, an on-site water treatment facility, or proper drainage.

● Wet utilities

Some data centers require access to municipal water supply greater than what typical industrial developments need. The climate goals of most hyperscalers and developers are driving demand for recycled, rather than potable, water.

Frequent missteps

Common pitfalls in planning for data centers include:

● Height restrictions:

Failing to allow sufficient building height can impede the efficient design of cooling systems, which rely heavily on vertical space for optimal airflow. The minimum height for a single-story data center could be as much as 30 feet (9.1 m). In denser jurisdictions with higher land basis, multistory data centers are common and typically require at least 66 feet (20.1 m) of height, in addition to considerations for rooftop equipment. Minimum heights are generally measured ground level to the roof line. Ancillary height structures, such as parapets, equipment platforms, screens, and stairwells can add another 15–20 feet (4.6–6.1 m) of height in some cases.

● Zoning challenges:

The lack of a uniform land-use category for data centers presents challenges for localities in siting these facilities appropriately. Data centers typically fall between office and industrial/warehouse uses, which often makes the applicant request variances that appear to be special considerations rather than basic requirements. This outset can lead to high-stakes decision-making by exception that undermines the existing zoning codes.

● Building code challenges:

Typical building code requirements around occupancy and plumbing fixtures may need to be modified for data center uses.

● Parking and plumbing standards:

Regulations developed for office or warehouse uses often impose excessive parking and plumbing fixture counts on data centers, which necessitate variances and complicate the planning process.

● Substation zoning:

Substations often fall under different categories than does the data center itself, creating further zoning inconsistencies and the need for additional, sometimes separate, approvals for one campus.

● Construction confusion:

Data center campuses are often built over time, as we discussed above, which can cause planning confusion. The sightlines of a campus may change over time, so it's important to consider both the full campus and each individual building in the planning process.

● Fire Department considerations:

Fire departments that are not yet experienced with data centers might not know that the on-site batteries and generators are for backup purposes only, so education is essential. Yet even though those backups aren't frequently used, data centers are built with robust fire detection and suppression systems. Modern batteries for UPS applications include multiple safety features, including battery management systems that monitor voltage, temperature, and current. Fuel tanks for backup generators are typically stored in separate, fire-rated enclosures, and secondary containment systems are used to prevent fuel spills and leaks.

Clear rules benefit all parties

Clear rules in zoning codes and land use plans, as well as in the entitlement and permitting processes, benefit all stakeholders involved in data center development, including the surrounding community.

Clarity simplifies the planning process, reduces the amount of planning that is done by exception, and lets communities gain maximum financial benefits from data center developments.

In the next few sections, we discuss planning options for AHJs seeking to be prepared to regulate thoughtful data center development, to attract it, or both. We also provide a model zoning ordinance that municipalities can adopt, designed to address common concerns while avoiding excessively restrictive measures that could hinder data center development.

4

Regulating data centers

Planning-related options

AHJs that want to bring data centers to their region can start by identifying strategic locations. Municipalities should perform comprehensive analyses to determine suitable areas, based on power availability, infrastructure, and environmental impact.

Ideally, more than one area should be designated for potential development—as with the process for industrial parks—to provide flexibility and attract varied investments.

● Option 1: Create an overlay district

One option for guiding the development of data centers is to incorporate an overlay district. An overlay district is mapped to certain areas of the jurisdiction's zoning map without necessarily changing the underlying zoning district and what is allowed therein.

A historic overlay district is a common application of this tool. It typically provides for certain additional standards—an expansion of the uses that might be permitted in that district, a limitation of them, or some mix of the two.

A data center overlay district can allow for the development of data centers and prescribe that such development meet certain standards or requirements. An overlay district clearly indicates where and under what circumstances data centers are permitted and provides additional direction to any data center developer seeking to develop in that jurisdiction.

● Option 2: Create a planned innovation, research, and technology (PIRT) district

PIRTs—and their regional equivalents, which include innovation zones, technology corridors, and research and technology parks—offer municipalities a flexible approach to land use that goes beyond traditional industrial or commercial zoning.

This designation allows for a mix of uses and can adapt to the specific requirements of data centers without necessitating a rezoning. Data centers in a PIRT district can integrate seamlessly with adjacent research facilities or tech hubs, fostering synergistic growth and innovation. Examples of successful PIRT districts include Palo Alto's Stanford Research Park.²²

When data centers are sited clearly as being a by-right use, data center developers are more likely to consider the location for investment because they have the required certainty that the land they acquire won't struggle or be delayed in the approvals process. In the appendix, we explore how Elk Grove Village did so successfully.

● Option 3: Note preferred data center locations in the comprehensive plan and invite owner- or hyperscaler-initiated rezoning applications

AHJs can identify preferred locations for data center development in their comprehensive plans and invite rezoning applications in those areas.

Municipalities and data center companies can agree on development conditions—sometimes called proffers, development agreements, or conditional zoning—which are voluntary commitments made by developers in return for allowed zoning. They outline specific conditions or promises agreed upon to mitigate the impact of proposed developments or to otherwise benefit the municipality's residents.

Development conditions may include infrastructure improvements, restrictions on use, environmental protections, community benefits, and other strictures. They are flexible enough to apply to various zoning categories, including PIRTs.

● Option 4: Implement a specific data center zoning district defined by ordinance

Creating a data center-specific zoning district is a solution that's more detailed and restrictive than the previous three. We recommend it as a best practice in many jurisdictions because it establishes clear guidance on where data centers are permitted by right and eliminates the possibility that high-stakes decisions are made by exception. The ordinance should define data centers and outline general standards for building them, such as building size thresholds, height limits, and floor area ratio (FAR) requirements.

The zoning ordinance should include specific use standards for data centers, such as parking, setbacks, buffering, plumbing fixture counts, equipment screening requirements, and operational sound limits. The next chapter consists of a model ordinance that AHJs can adopt.

22 "About Stanford Research Park," Stanford Research Park, <https://stanfordresearchpark.com/about/>.

5

Model zoning ordinance guidelines

AHJs that want balanced and transparent zoning standards that mitigate unwanted impacts while encouraging the many potential benefits of data center development can take this zoning ordinance off the page and adapt it.

No two jurisdictions are the same. Each needs to layer in its own considerations.

Our intention, however, is to offer a strong foundation upon which AHJs can build zoning districts for data centers defined by ordinance. Note that the language provided below is to be included in the zoning ordinance and there may be other provisions that govern development, such as in the building code as it pertains to plumbing fixtures, that may need to be adjusted.

For example:

- Rural counties can consider additional guidelines and requirements when a data center is adjacent to certain agricultural uses or other sensitive uses.
- Urban municipalities can consider additional guidelines and requirements when a data center is adjacent to transit hubs or to prioritize pedestrian activity.

Zoning categories

Broadly, zoning districts in which data centers have specific considerations fall into four categories:

Residential: Because data centers are ultimately an industrial use, we believe that data centers are not appropriate in residential districts.

Industrial: Given the nature of data centers, they should be permitted in all industrial categories, from light industrial to heavier industrial. In such areas, data centers should be permitted as any other industrial use would be allowed, including following the same height, setback and landscaping requirements.

Rural/agricultural: In rural areas, data centers should be permitted to the extent that industrial uses would be permitted in such areas, provided that the same conditions are applied that would be applied to permissible industrial uses on such land. If another industrial use would require a certain setback, landscaping treatment or other mitigation on rural or agricultural land, our recommendation is that the same conditions be applied for a data center on such land.

Commercial: Data centers in commercial areas can be appropriate, provided they comply with certain use standards as set forth below. For the purpose of this section, commercial districts are defined as ones that permit a diversity of nonresidential uses, such as office and retail.

Use standards for commercial areas

Data centers shall be permitted by right in commercial districts if the following criteria are met:

1. To provide screening and reduce noise levels, all equipment for cooling, ventilation, or otherwise operating the facility—including generators or other power supply equipment—must be fully enclosed, except when determined by the [zoning administrator] not to be mechanically feasible. If the zoning administrator determines that full enclosure is not mechanically feasible, all equipment for cooling, ventilation, or power generation must be screened by a wall or similar barrier. In addition, any accessory electrical substation must be screened from adjacent nonindustrial properties or public streets by a wall or similar barrier. This standard does not apply to solar panels.
2. A data center building must include a main entrance feature that is differentiated from the remainder of the building façade by a change in building material, pattern, texture, color, or accent material. The entrance feature must also either project or recess from the adjoining building plane.
3. The primary façades of data centers must include either:
 - a. A change in the primary facade surface for every approximately 150 horizontal feet of at least one of the following: building material, pattern, texture, color, or accent material; or

- b. A minimum of thirty percent (30%) of the primary facade shall be comprised of windows, doors, or similar fenestration design features such as faux windows that are generally distributed horizontally and vertically across the façade.
 - c. These standards do not apply to accessory uses.
 - d. For the purposes of this requirement, a primary facade shall be deemed to be a facade that fronts on a public street.
- 4. Buildings may be constructed up to one hundred (100) feet (30.5 meters) in height or taller with special exception approval and subject to FAA limitations.
 - 5. FAR shall not exceed [1.5 times the maximum FAR of the commercial district] without approval of a special exception. With approval of a special exception, the FAR may be increased to [2.5 times the maximum FAR of the commercial district].

Use standards for industrial areas adjacent to residential

Although data centers are appropriate in all industrial zoning categories, special attention may be afforded when industrial land is adjacent to residential. In such cases, the following language could be included in the locality's zoning ordinance:

- 1. Where industrial is adjacent to residential or any other sound-sensitive use, any data center building or ancillary equipment should (1) be located at least 200 feet (61 m) from the residential or noise-sensitive use or (2) meet the other standards set out for data centers in the commercial districts set out in [section 1](#).
 - a. A lesser distance that does not conform to the standards in paragraph 1, above, may be allowed with special exception approval.

Parking requirements for all data centers

As referenced elsewhere in this document, the parking requirements for data centers are far less than would be required for another industrial or commercial use of a similar size. Overbuilding parking for a given data center site or campus can be unnecessarily costly but more importantly creates excess impervious surface and avoidable environmental consequences. Accordingly, we recommend that the parking requirements for data centers be established either by:

- 1. Applying the parking requirements for office that exist in the ordinance, but only to the portion of the data center building that is actually utilized for office space; or
- 2. Requesting a staffing plan from the data center developer and allowing such data to inform the minimum number of needed parking spaces.



6

Appendix, contacts, and additional resources

Appendix: case studies

Google's Gmail and the need for redundancy

According to Google's podcast *Where the Internet Lives*,²³ Gmail launched in 2004 while offering a staggering 1 gigabyte of storage—more than 250 times the capacity of other email services at the time.

Gmail revolutionized user expectations and increased the need for data center capacity. It made every individual's account data exist on multiple interconnected servers at Google's hyperscale data centers, ensuring that users always have access to their personal information, even in the event of individual server failures, and allowing users to search and organize emails in a new way.

The Meta outage and the quest for data center capacity

The October 2021 Meta outage affected Facebook, Instagram, WhatsApp, Messenger, Oculus, and other services, making them inaccessible to billions of users for six to seven hours. This disruption, caused by an ill-timed and erroneous maintenance command, led to a cascade of failures that severed Meta's data centers from the internet. The primary cause was a lack of redundancy in the backbone network, which left no failover capacity for critical services.²⁴

The economic impact was significant, with individuals and businesses that relied on these services facing major interruptions—amplified by the fact that many users sign in to other apps and services through their Facebook logins. As Mike Isaac and Sheera Frenkel wrote, in the *New York Times*, this mix of factors led “to unexpected domino effects such as people not being able to log into shopping websites or sign into their smart TVs, thermostats, and other Internet-connected devices.”²⁵ Meta's stock value dropped by billions of dollars during and after the outage.²⁶

Google's financing of a water treatment plant

In 2012, Google funded the Sweetwater Creek Sidestream Plant in Douglas County, Georgia. This move made its nearby data center the first in the state to use recycled water for cooling. Google partnered with the Douglasville-Douglas County Water and Sewer Authority on an initiative to conserve the Chattahoochee River's potable water supply, especially during droughts and summertime.

AWS' community incentives package in Mississippi

As part of AWS' \$10 billion data center campus investment in Mississippi—the single largest capital investment in that state's history—the company funded Mississippi's first utility-scale wind farm, located in Tunica County, and developed STEM-focused workforce training and career awareness programs for K-12 school systems.

The hyperscaler committed to supporting local educational institutions—community colleges, technical schools, universities, and workforce development organizations—by developing training programs for high-demand career pathways in data center construction and operations, as well as the broadband expansion sector. AWS also provided a free cloud computing curriculum to local institutions and learners.

Fredericksburg, VA's windfall

Located southeast of Loudoun County, Fredericksburg, Virginia, is an emerging exurban hyperscale campus market. Alongside its regional partners, it represents a case study in attracting data center development—and landmark economic and fiscal benefits—while also mitigating potential concerns well in advance.

In March 2024, Virginia's governor, Glenn Youngkin, alongside other state and local elected officials, announced that AWS was making a \$35 billion investment in data centers in Spotsylvania, Caroline, Stafford, and Louisa counties, thereby creating approximately 2,000 new jobs. It was also announced

23 Fischer Barry, “Two: Inside the Walls,” *Where the Internet Lives*, December 9, 2020, podcast, 40:54, <https://www.google.com/about/datacenters/podcast/>.

24 Kerry Sheridan, “Facebook Outage: Social Media Giant Blames Network Problem for Global Disruption,” *BBC News*, October 4, 2021, <https://www.bbc.com/news/technology-58793174>.

25 Mike Isaac and Sheera Frenkel, “Gone in Minutes, Out for Hours: Outage Shakes Facebook,” *New York Times*, October 4, 2021, <https://www.nytimes.com/2021/10/04/technology/facebook-down.html>.

26 Greg Roumeliotis, “Facebook Services, Including Instagram and WhatsApp, Suffer Worldwide Outage,” *Reuters*, October 5, 2021, <https://www.reuters.com/technology/facebook-instagram-whatsapp-suffer-outage-2021-10-04/>.

that AWS would be contributing \$400,000 in community funds within those four localities, which, together with bordering Fredericksburg, constitute an economic region: the Fredericksburg Area Association of Realtors service area.

What Youngkin called the largest single economic development investment in the history of the state didn't happen by accident. The Fredericksburg Regional Alliance (FRA) at the University of Mary Washington and other regional groups had together been paving the way for data center development since 2016, when they also focused on ensuring the facilities would be built away from residential areas or well-buffered if close to them.

"The reality is [that] this region is one of the [fastest-growing] areas in the Commonwealth. With growth comes the need for infrastructure and services that the area can [afford only] by attracting new revenue sources or raising taxes on local businesses and residents," stated Curry Roberts, president of the FRA, in a local op-ed. "To get ahead of this [need], leaders in our region have worked for over a decade to attract data centers and the tremendous local tax revenue they bring."

According to Roberts, the regional coalition began its quest by evaluating 50 sites to determine whether—based on zoning, transmission lines, and water access—they were compatible with data center use. The coalition eventually narrowed its list down to 15 locations across five localities, with each site exceeding 100 acres. This groundwork set the stage for an ambitious economic development plan aimed at attracting major industry players such as AWS.

Roberts emphasized the importance of getting information in front of the public proactively, rather than waiting for opposition to arise. Stafford County, for example, held several community meetings to educate people about data centers before any specific projects were proposed.

Stafford and Spotsylvania counties set the stage for evaporative cooling by engineering recycled wastewater systems for that purpose in data centers. These systems are now used by data centers, which pay for the service, thus creating additional revenue for the localities.

When AWS approached regional leaders in 2018 about a data center project, the FRA was able to act quickly. It coordinated with localities to harmonize tax rates and depreciation schedules on a parcel that straddled several jurisdictions, ensuring a straightforward fiscal environment for AWS.

Although the project stalled during the pandemic, by 2023 AWS had acquired and entitled approximately 2,500 acres (1,012 ha), paving the way for the development of 18 million to 19 million square feet (1.7 million–1.8 million sq m) of data center space.

Tax benefits from the investment are immense. According to Roberts, for every dollar of service demanded by a data center, the operator is paying \$13 in taxes.

Elk Grove Village's innovation district

Elk Grove Village, Illinois, a suburban community northwest of downtown Chicago, is located at a major fiber intersection. It intentionally attracted data center development through a combination of zoning code modifications, the promotion of strategic location advantages, and proactive communication with the development community.

Since its formation, the village has had unique zoning. The eastern half of the community, adjacent to O'Hare International Airport, is home to the largest contiguous industrial park in the United States and is zoned as such. The western half of the village is primarily residential and zoned to protect housing.

Matthew Roan, the village manager of Elk Grove Village, said the municipality updated its zoning code to spur redevelopment within its office park by creating a new "innovation and technology" zoning district that specifically permitted data centers as an approved use, thus inviting data center operators to fill unused space.

Additional modifications to the zoning code allow data centers to have greater building heights and front-yard fencing or screening that wouldn't normally be permitted for industrial uses. Other changes reduce parking requirements. All of these changes allow data center builders to get their projects off the ground more quickly, amid the certainty that the structures can be built and won't struggle in the approvals process—an uncertain phase that makes land acquisition too risky for some parties.

This proactive approach has attracted data center developers and hyperscalers, including Meta and Microsoft. Roan, who has served in various roles in village government since 2000, said it brought significant economic benefits to the region, including long-term development and permit fee revenues, financial assistance for local school districts and other taxing bodies, high-quality site aesthetics, and temporary construction jobs. The increased tax and fee revenue from data centers allowed the village to reinvest in infrastructure improvements and redevelopment projects, he said.

This strategic positioning of Elk Grove Village as a data center hub exemplifies how proactive municipal policies can drive growth and innovation—as well as stable economic returns. Once data centers make their large capital investments, Roan said, they tend to stay in the community long term, unlike more transient industrial users.



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7 Glossary

air-cooled chiller system: A cooling system sealed in a closed loop that typically consumes very little water—less than the amount used in three single-family homes.

clustering: The practice of data centers locating near one another, connecting their servers to work as a unified system, or both.

colocation data centers: Multi-tenant data centers where third-party operators (developers) lease data center space—a certain number of server cabinets, for example, or kilowatts (kW) to a host of other companies.

corporate data centers: Also called enterprise data centers, these facilities store and process a single organization's data. These data centers often store the data of financial institutions—think American Express or Wells Fargo—that typically own and operate such facilities themselves, rather than leasing them from a provider.

data center: A building or campus that houses the infrastructure that supports the world's computing functions.

data hall: The rooms in data centers where data is processed and stored.

evaporative cooling: A cooling system that uses large fans to move air across a wet medium to evaporate water, which removes the heat from the data center and cools the air.

hyperscale data centers: Large data center buildings or campuses that process and store the data of companies that often need to scale up or scale down their infrastructure quickly.

hyperscaler: A company that occupies and operates a large data center building or campus. These companies—which include AWS, Microsoft, Google and Meta, often need to “scale up” their infrastructure quickly.

latency: The time it takes for information to travel from its source to its destination.

load balancing: The process of distributing network traffic across multiple servers at interconnected data centers.

node: An individual server in a cluster of servers.

phasing: A process for data center campus construction that occurs in stages.

power distribution units (PDUs): Devices that distribute energy to servers, network devices, and other equipment within a rack.

power purchase agreements (PPAs): An agreement between a data center company (the buyer) and a renewable energy provider (the seller) to purchase electricity from specific wind or solar farms.

purple pipe system: A recycled water setup whereby water is treated to remove contaminants, solids, and impurities and then distributed via plum-colored pipes.

renewable energy certificate (REC): A tradable commodity wherein each REC equates to the generation of 1 MWh of power from a qualified renewable resource, usually wind or solar power generation facilities.

switch: A device used to connect network devices and route data through interconnected networks.

switchgear: Power distribution equipment that controls, protects, and distributes electrical power throughout the data center.

telecom data centers: Where traffic from cell towers “switches” to go out to the internet. Typically owned by such telecommunications companies as Verizon, these centers tend to be smaller facilities than the other data center types and require less than 10 kW.

uninterruptible power supply (UPS) systems: Electrical equipment used in data centers to provide battery backup power in the event of a power outage.

utility substation transformer: A large electrical device in the electrical yards of a data center campus that steps down high-transmission voltages from the utility grid to lower, more manageable medium-voltage levels suitable for distribution throughout the data center.

water-cooled chiller system: An open-loop pipe system in which water removes heat from the refrigerant.

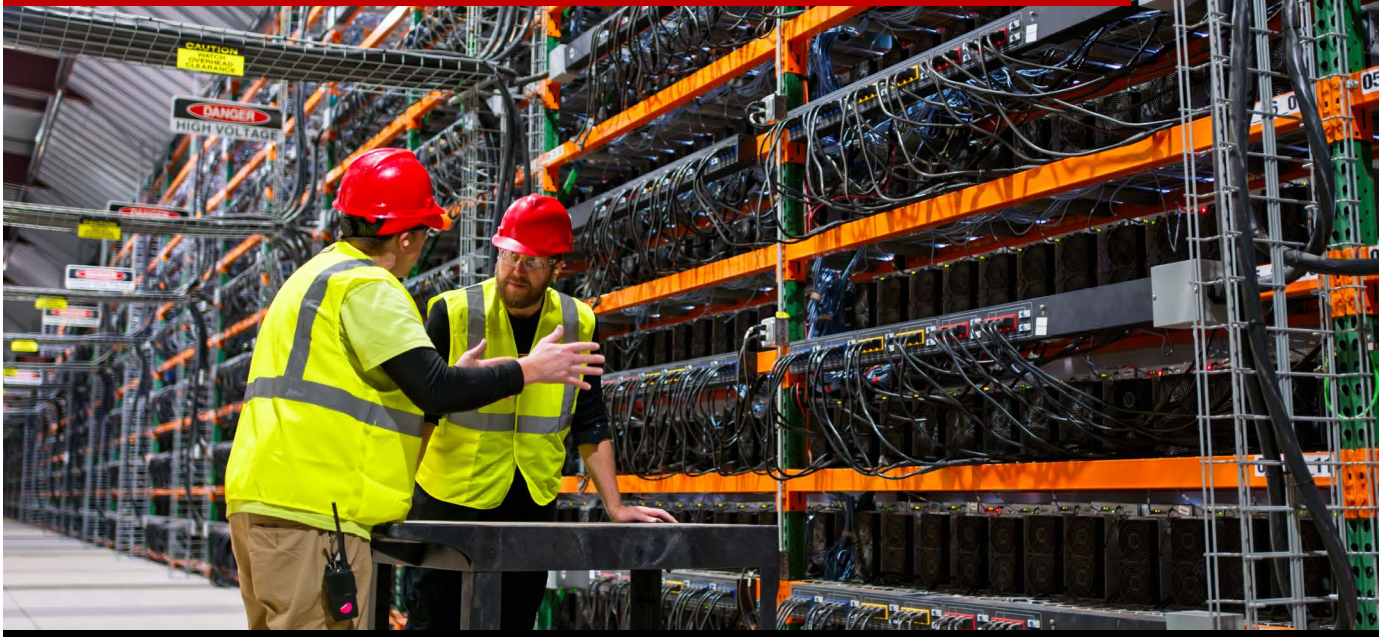
wholesale data center: A type of data center where a third-party developer rents a large portion of the space, the energy capacity, or both to one company—often, all of it.

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ZONING PRACTICE

Unique Insights | Innovative Approaches | Practical Solutions

The Physical Footprint of Artificial Intelligence



In this Issue: [What Are the Physical Needs of AI?](#) | [How Is AI Infrastructure Regulated \(or Not\)?](#) | [What Should Planners Be Thinking About?](#) | [Where Can Planners Learn More?](#)

The Physical Footprint of Artificial Intelligence

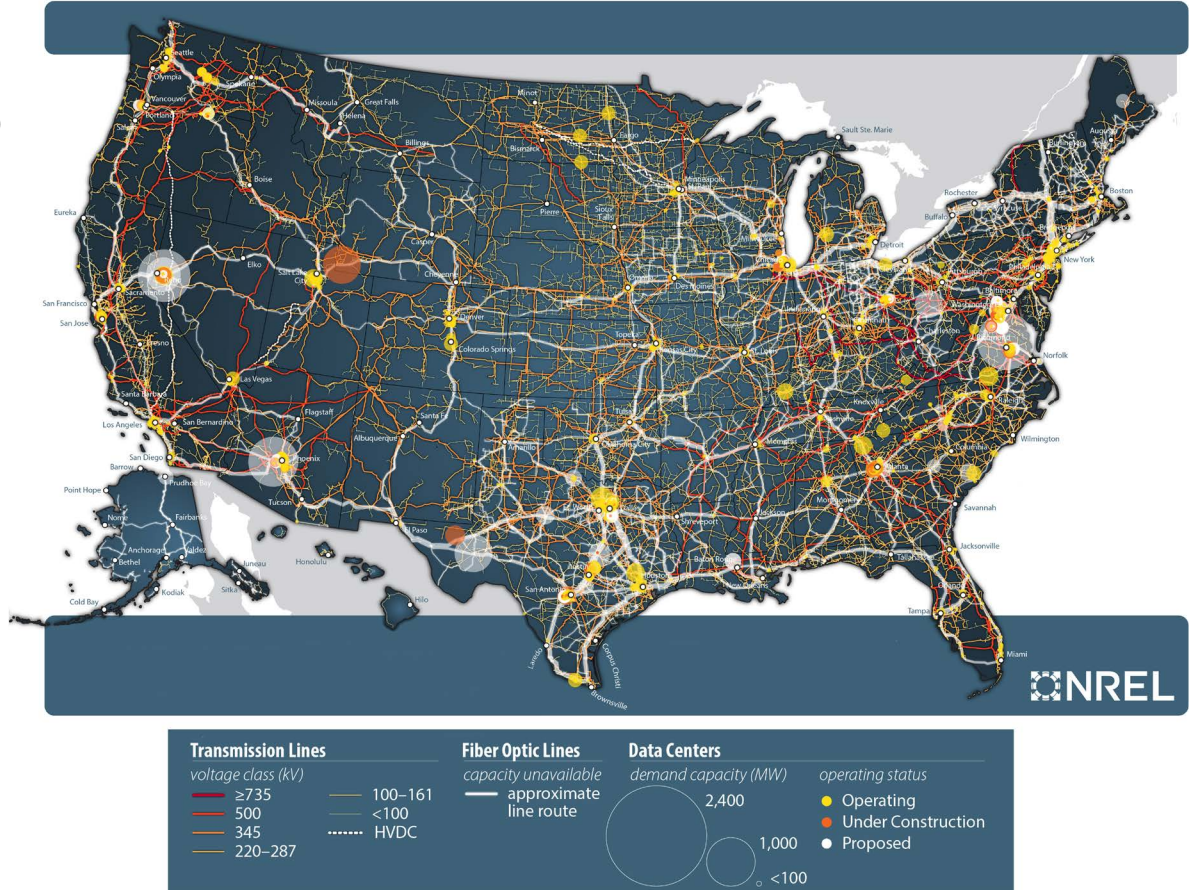
By Charlie Nichols, AICP

Every time you ask ChatGPT, Gemini, or Claude a question, you are tapping into a sprawling, power-hungry network of machines. Somewhere, a data center's processors are whirring, fans are spinning, and megawatts of electricity are flowing.

Artificial intelligence (AI) may feel virtual, but its footprint is intensely physical. Behind every chatbot interaction, predictive algorithm, or autonomous system lies a vast network of data centers, power generators, and electricity transmission and distribution infrastructure. As vast as it is now, the demand for computing power is growing at an exponential rate, and local zoning is on the front lines.

This issue of *Zoning Practice* explores the physical effects of AI deployment and highlights core considerations for local planning and zoning. It begins with a summary of the land use characteristics of the system of data centers that host and serve contemporary AI models before highlighting noteworthy regulatory approaches and areas of opportunity for zoning updates and land use decision-making processes.

Data center infrastructure in the United States, 2025
(Credit: [NREL](#))



What Are the Physical Needs of AI?

When we think about artificial intelligence, we often imagine abstract ideas or algorithms, software, or maybe a chat assistant or a robot. But AI is deeply physical. It runs on powerful hardware that lives in large buildings, draws enormous amounts of electricity, and requires robust infrastructure to keep it cool and operational. These needs are shaping land use decisions in ways many communities have never dealt with before.

AI Lives in Data Centers

The primary home of AI is the data center. These are large, sometimes windowless, buildings filled with servers, networking equipment, and backup systems. While some are sleek and high-tech, many look like simple warehouses. But inside, the technology is anything but simple.

AI workloads require far more computational power than traditional cloud computing. That means more servers packed with graphics processing units (GPUs), which are optimized for machine learning tasks. These GPUs are energy-intensive and generate a significant amount of heat (Shehabi et al. 2024; Casey 2025).

This is why the design, location, and infrastructure of data centers have become such a big deal. For example, Meta's Altoona, Iowa, data-center campus has more than five million square feet of space and is still growing (Miller 2022).

Data centers themselves fall into several distinct categories. Edge or micro facilities are the smallest, often modular container-sized enclosures ranging from a few hundred to a few thousand square feet. Enterprise data centers, typically operated by corporations or universities, can range from about 5,000 to 50,000 square feet, sometimes larger. Colocation facilities lease space to multiple tenants and often fall between 50,000 and 600,000 square feet, with many averaging around 150,000 square feet. At the largest scale are hyperscale data centers, typically built by major cloud or AI providers, which can easily reach hundreds of thousands of square feet per building and exceed one million square feet across a campus (Zhang 2023).

While many forecasts focus on power

demand rather than square footage, it is possible to translate one into the other. Deloitte estimates that AI-driven data centers could require up to 123 gigawatts (GW) of capacity in the U.S. by 2035, compared to roughly 4 GW today (Stansbury et al. 2025). Real-world projects suggest that every megawatt of IT load requires between 5,000 and 12,000 square feet of total building area. Applying that ratio to 123 GW implies a national buildout of 615 million to 1.48 billion square feet of data center space, equivalent to about 22 to 53 square miles. Land use estimates point in a similar direction, with recent projects averaging 0.5 to 1.5 acres per MW, which would translate to roughly 96 to 288 square miles of U.S. land devoted to AI-related data center campuses by 2035 (Stansbury et al. 2025).



AI Needs Lots of Electricity

Power demand is one of the most critical limiting factors in scaling AI. The U.S. Department of Energy's Secretary of Energy Advisory Board notes that legacy hyperscale data centers have typically connected at 20–50 megawatts (MW), but utilities are now receiving AI-driven connection requests for single campuses of 300–1,000 MW (2024). To put the low end of that new range in context, a 300 MW facility running around the clock would consume about 2.6 terawatt-hours a year—roughly the annual electricity use of 250,000 U.S. homes (calculated

A proposed 612-acre hyperscale data center campus in Cedar Rapids, Iowa (Credit: QTS)

with the U.S. EIA average of 10,500 kWh per household). These unprecedented loads are forcing planners, utilities, and regulators to rethink siting, transmission capacity, and community-impact mitigation.

This demand is driving data centers to locate near existing transmission infrastructure, substations, or power plants. In some cases, new substations or transmission lines are being proposed just to support AI infrastructure. Local planners are being asked to approve not just buildings, but energy projects with regional impacts.

There is also growing concern about the climate impacts of AI. Researchers estimate that the cumulative carbon emissions from AI models could reach 3.66 to 8.72 million tons in the U.S. alone—the equivalent of driving an average gasoline-powered car nine to 22 billion miles (Ding et al. 2025; USEPA 2024). This has led to pressure for data centers to run on renewable energy, adding another layer of land use complexity as solar or wind farms are proposed nearby or colocated together with data centers.

Top-five U.S. Google data centers by annual water withdrawals, 2024 (Credit: Google's 2025 Environmental Report)

AI Needs Water and Cooling

All that power generates heat, and that heat has to go somewhere. Most data centers use a combination of air- and watercooling systems. Some of the largest AI-focused facilities can consume hundreds of thousands of gallons of water per day

for evaporative cooling (Lei et al. 2025; Shehabi et al. 2024; Selsky 2022). That's raising concerns in water-scarce regions or places where water infrastructure is already stretched thin.

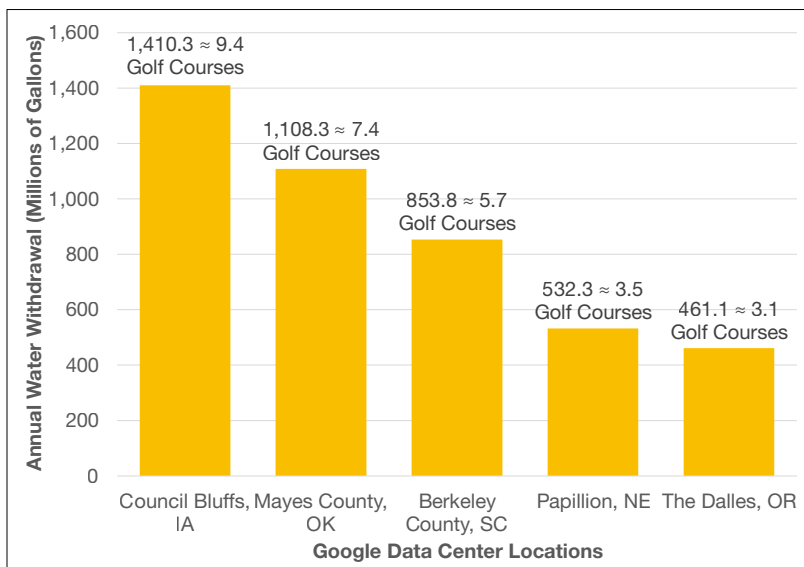
For example, in The Dalles, Oregon, a dispute between Google and the city over water use became national news when the city council approved a water agreement to support Google's data center expansion, despite local concerns about long-term water availability (Selsky 2022).

Water and cooling infrastructure also raise siting questions. Should data centers be allowed in areas with limited water supply? What happens when a tech company becomes one of the largest users of municipal water? These questions are starting to reach planning commissions and city councils.

AI Needs Fiber and Connectivity

Finally, AI infrastructure depends on high-speed fiberoptic connections. Training models and delivering AI services both require fast, reliable data transmission. This can drive the need for new fiber lines, telecom infrastructure, or even small-cell installations in rural or suburban areas (RVA LLC 2025; Walker 2024).

It's not just big cities seeing these investments. Some rural areas are gaining interest from AI developers because they offer space, lower land costs, and cooperative local governments—provided they can offer fiber access and a willing utility partner.



How Is AI Infrastructure Regulated (or Not)?

If your city or county does not already have a data center, just wait. The odds are increasing that a tech company, or the utility that serves them, will soon come knocking. Yet most local governments are not fully prepared to regulate AI infrastructure. In many places, the regulatory framework is either nonexistent or built for a different era of technology.

Zoning Codes Rarely Mention AI or Data Centers

Many zoning codes still make no explicit reference to “artificial intelligence” or even to “data centers.” Where definitions are

absent, planners may choose to slot these facilities into broad buckets such as warehousing, light-industrial, or public-utility uses, even though the buildings may be packed wall-to-wall with servers instead of pallets.

Yet these facilities behave very differently from the categories they're often shoehorned into, and there are many reasons why local governments may want to specifically define data center uses (Morley 2022). Their continuous operation demands megawatts of electricity and, in many climates, hundreds of thousands of gallons of cooling water per day; the equipment generates heat and noise; and the employment footprint is minimal. When such impacts are overlooked, communities can be blindsided—as happened in Prince William County, Virginia, where approval of a massive datacenter corridor sparked backlash over noise, power delivery, and land use compatibility.

Recognizing this mismatch, an increasing number of jurisdictions have begun to write data-center-specific rules. Loudoun County, Virginia, imposes façade, screening, lighting, and pedestrian-connectivity standards on by-right data centers to blunt visual impacts while leveraging their tax base (§4.06.02). Prince William County uses a Data Center Opportunity Zone Overlay to funnel projects to infrastructure-served parcels and require design review (§32-509). Missoula County, Montana, offers a different model. The county's ordinance, crafted for cryptocurrency mines, confines those operations to industrial zones and requires them to offset 100 percent of their electricity use with renewable energy (§5.10). Because cryptocurrency mines and large-scale data centers both run continuously, draw high-density power, and employ few on-site workers, planners can adapt the same toolkit—clear land use definitions, targeted overlay districts, and energy-focused performance standards—to data centers when communities want comparable safeguards.

Looking ahead, AI training clusters dwarf the loads discussed in 2022, with utilities now fielding single-campus interconnection requests of 300 MW and more. The zoning fundamentals remain the same, but the stakes are higher. Without

proactive definitions, locational criteria, and impact standards, local governments risk conceding critical decisions about land, water, and grid capacity to developers' timetables rather than community goals.



Many AI Facilities Are Allowed by Right

In areas that do allow data centers by right, local officials often have little authority to influence their design or siting (Morley 2022). Developers may be able to build massive facilities with only administrative approval. If the project complies with the basic zoning and building code, it can move forward, even if it brings significant impacts to neighboring properties or the local infrastructure system.

This hands-off, by-right approach can leave neighbors in the dark when a campus that draws 100 MW or more of power is permitted the same way a warehouse is. Such facilities may also require hundreds of thousands of gallons of cooling water per day and generate continuous low-frequency noise from chillers, pumps, and backup generators (Van Geet and Sickinger 2024). Without a public-hearing trigger, residents may not learn what is coming until the bulldozers roll.

That said, relying on discretionary use permits alone is not a perfect fix. Case-by-case approvals can introduce uncertainty, increase timelines, and duplicate reviews that utilities already perform when they decide whether to supply the necessary electricity and water. A more balanced strategy is to embed objective, use-specific standards (e.g., caps on sound at the property line, requirements for renewable-energy procurement, and

Data Center Alley in Loudoun County, Virginia (Credit: Gerville/iStock/Getty Images Plus)

water-recycling targets) directly into the zoning code. Guidance from the Urban Land Institute shows how clear definitions, overlay districts, and measurable performance thresholds can give developers predictability while still protecting community interests (Miet 2024). By pairing these standards with early coordination among planners, utilities, and residents, communities can address local impacts without resorting to duplicative or open-ended discretionary reviews.

Infrastructure Approvals May Be Handled Separately

Adding to the complexity, the infrastructure needed to support AI such as transmission lines, substations, power generation facilities, battery energy storage, and fiber installations is often regulated under different frameworks. Utilities may have their own review and siting authority at the state level, which can bypass local land use processes entirely.

Large solar or wind projects, for example, are pre-empted from local control in more than 20 U.S. states, leaving local governments to vet the data-center building, while the power generation facility that feeds it is debated elsewhere (Gomez and Morley 2023; Morley 2025). Fragmented approvals make it hard for planners to tally

cumulative effects such as substations, access roads, or groundwater withdrawals.

Battery-energy-storage systems (BESS) create another layer of complexity, and a clear trend of data centers colocating BESS on-site is accelerating (ZincFive 2024). Some states exempt utility-scale BESS that are colocated with generation assets, while others treat them as industrial equipment needing only an electrical permit. Where local authority does apply, recent guidance recommends clear definitions, district regulations, and objective safety standards, thermal-run-away monitoring, minimum setbacks, and emergency-response plans to avoid ad-hoc hearings (Ross and Vadali 2024).

Developers are now bundling data centers with on-site renewables and storage in microgrid “energy parks,” aiming to bypass long interconnection queues and control energy costs. Recent projects in Texas and Virginia pair hundreds of megawatts of generation and storage with adjacent server halls, creating hybrid campuses that straddle state energy-facility review, regional transmission rules, and local zoning (DiGangi 2025). To keep pace, planners can identify jurisdictional triggers early, embed measurable performance standards (e.g., noise caps, screening, or renewable-energy sourcing) in their codes,

*The Eland Solar-plus-Storage Center in Kern County, California
(Credit: The Desert Photo/iStock/Getty Images Plus)*



and coordinate with utilities so local and state reviews proceed on aligned timelines.

Environmental Review Is Inconsistent

Environmental review of AI infrastructure also varies widely. In states that require environmental impact statements (EIS), large-scale data centers may undergo detailed scrutiny. But in states without EIS laws, or for smaller projects, there may be minimal analysis of water use, energy consumption, or greenhouse gas emissions (Morris 2024).

Even where review is required, the focus may be on the building itself, rather than the full ecosystem of impacts. For example, if a local code does not require review of off-site power infrastructure or supporting utility upgrades, critical issues related to energy delivery, environmental impact, or long-term capacity may fall through the cracks.

Local Governments Are Starting to Catch Up

Local governments are no longer standing still while hyperscale campuses spring up at the edge of town. Since 2023, a wave of city councils, county boards, and planning commissions have begun moving data centers out of catch-all industrial categories and into their own, better-defined regulatory boxes. Some jurisdictions, such as Atlanta, now require special-use permits tied to energy, water, and noise studies ([Ordinance 25-O-1063](#)). Others, such as Cedar Rapids, Iowa, leverage community-benefit agreements to ensure local reinvestment when a project wins approval (Pratt 2025).

Approaches vary, but the trend is unmistakable: Communities are adopting objective, use-specific standards rather than relying solely on ad-hoc discretionary permits. Some ordinances steer projects into infrastructure-served corridors, others set caps on sound and water use, and a growing number link approvals to renewable energy procurement or on-site battery storage. [Table 1](#) highlights seven recent examples illustrating the breadth of new zoning language, overlay districts, and design guidelines that together show local governments are indeed catching up.

Table 1. Examples of Recent Local Regulatory Updates for Data Centers

Jurisdiction	How it regulates data-center impacts
Atlanta, GA	Requires a special-use permit for every new data center and empowers the city council to review water-consumption, energy-efficiency, and noise-mitigation plans (Ordinance 25O1063 , 2024)
Brainerd, MN	Prohibits data centers unless the planning commission approves a conditional-use permit that addresses cooling noise and utility demand (Ordinance No. 1581 , 2025)
Chandler, AZ	Adds a data center use category; limits the use to Planned Area Development zones and sets size, generator-testing and water-recycling standards (Ordinance No. 5033 , 2022)
Tempe, AZ	Requires a water use plan and enhanced setbacks next to homes and schools, and “innovation hubs” (Ordinance No. O2025-23 , 2025)
Phoenix, AZ	Defines “data center,” restricts locations, and introduces design standards such as façade articulation and noise studies (Ordinance G-7396 , 2025)
Sugar Grove, IL	Creates a dedicated district with height limits, façade screening, and a master-utility-plan requirement (Ordinance No. 2022-1206B , 2022)
Frederick County, MD	Establishes an overlay zone that limits where data centers can be built (Bill No. 25-05 , 2025)

What Should Planners Be Thinking About?

Artificial intelligence may sound futuristic, but the decisions that shape its physical footprint are being made today. Local governments that wait too long to prepare may find themselves reacting to projects rather than guiding them. So what should planners be thinking about now?

Think About Scale

AI infrastructure often hides in plain sight until its true footprint emerges. What looks like a single “warehouse” can blossom into a portfolio buildout—multiple server

halls, two substations, a battery yard, and a 30-inch water main, all staged over a decade (USDOE SEAB 2024). To avoid approving these megaprojects one slice at a time, some jurisdictions now demand a phased master plan up front. For example, Loudoun County, Virginia, requires every data-center rezoning to include a “Data Center Development Plan” showing the full buildout of power feeds, cooling infrastructure, and utility corridors before the first site plan is approved (2025).

Regional utilities are following suit by running scenario-based load models to test whether transmission and groundwater supplies can keep up. A 2024 white paper by Energy + Environmental Economics describes how such models informed Portland (Oregon) General Electric’s latest integrated-resource plan and helped local planners identify future right-of-way corridors for two new 230-kV lines (Riu et al. 2024). By asking for phased utility exhibits and participating in utility load-growth scenarios, planners can make sure each new server hall fits into a system-wide picture rather than becoming an isolated surprise.

Many comprehensive plans still treat “technology infrastructure” as an afterthought, yet data center proposals are now shaping decisions on land supply, energy policy, water allocation, and broadband.

Think About Alignment With Your Plans

Many comprehensive plans still treat “technology infrastructure” as an afterthought, yet data-center proposals are now shaping decisions on land supply, energy policy, water allocation, and broadband. Start by inventorying where AI-related facilities touch existing plan elements—utilities, environmental stewardship, economic development—and flag the gaps.

One emerging best practice is to link

data-center approvals directly to community climate goals. Embedding such benchmarks in comprehensive plans or codes gives planners clear decision criteria and ensures that new AI infrastructure advances, rather than conflicts with, local resiliency objectives.

Plans can also weave data-center growth into broadband and workforce strategies. The U.S. Department of Energy’s 2024 report on AI infrastructure recommends that local governments coordinate land-use designations with state broadband-expansion maps so that fiber corridors serving data centers double as backbone routes for underserved neighborhoods (USDOE SEAB 2024). Aligning these layers up front helps planners negotiate public-benefit clauses—such as dark-fiber set-asides or training programs, rather than scrambling for concessions late in the process.

Updating your plan first and then adopting measurable standards that flow from it gives applicants clarity, while ensuring projects advance the community’s long-term vision.

Think About Infrastructure Capacity

AI campuses can overwhelm local utilities faster than many other land uses. Virginia’s Joint Legislative Audit and Review Commission estimates that data centers will require 11 gigawatts (GW) of new electric generation and transmission in that state alone by 2035, roughly one-third of Dominion Energy’s entire current system (VJLARC 2024). National modeling by Energy + Environmental Economics shows a similar surge, with some balancing areas seeing load grow 25 percent in a single decade under an “AI-high” scenario (Riu et al. 2024).

Water systems face parallel stress. At Google’s complex in The Dalles, Oregon, public records show cooling demand could top one-quarter of the city’s current supply, prompting a 2023 agreement that pauses future phases unless new wells come online (Selsky 2022). Quincy, Washington, responded to similar pressures by creating a special water rate class and meter fee for data centers to fund infrastructure upgrades (2025). These examples point to tools planners can



The Three Mile Island nuclear power plant in Middletown, Pennsylvania, which is coming back online to power Microsoft data centers (Credit: gsheldon/iStock Editorial/Getty Images Plus)

adopt: cumulative-demand studies embedded in utility master plans, tiered rate structures that recover capital costs, and permit conditions that link new construction to confirmed water-capacity projects.

Electric and water systems are only part of the picture. Broadband providers may need additional conduit banks, and public works departments often discover that construction traffic surpasses road-design volumes. Objective, use-specific standards, such as requiring a utility infrastructure plan that maps ultimate substations, mains, and fiber routes, plus haul-route and pavement-repair agreements, give planners leverage without duplicating state or utility reviews.

Think About Cumulative Impacts

A single 30 MW data center can feel benign, yet clusters of 10 or more along one corridor may push peak electric load past a gigawatt, double truck traffic during construction, and raise ambient sound by up to 10 dBA at nearby homes (VJLARC 2024). Project-by-project review often misses these system-level effects, so several jurisdictions now require applicants to look beyond their parcel lines.

Clustering can also amplify benefits

if managed deliberately. Developers in Texas and Virginia now pair multiple server halls with a shared microgrid that combines on-site solar, wind, and battery storage—an “energy-park” model that eases interconnection delays and helps regions meet renewable-energy goals (DiGangi 2025). By mapping preferred corridors for both data centers and their supporting infrastructure, planners can steer growth to areas where capacity, compatibility, and community returns align.

Think About Equity and Community Benefits

Data-center projects promise major capital investment but generate few long-term jobs and can offload noise, truck traffic, and resource use onto nearby neighborhoods. Additionally, new cost analyses show that ordinary ratepayers are already footing most of the bill for AI's voracious appetite for electricity.

Monitoring Analytics, the independent market monitor for PJM Interconnection, the largest regional transmission organization in the U.S., calculated that between 2024 and 2025 data-center electricity demand added about \$25 to the typical household's monthly bill (Biryukov 2025). PJM now projects that AI and data-center

demand will double the region's energy use by 2033, whereas growth would have been only 15 percent by 2040 without new campuses (JLARC 2024).

In response to this and other similar projections of effects on ratepayers, lawmakers in New Jersey ([AB 5466](#)), Oregon ([HB 3546](#)), and other states have introduced bills or tariffs to place data centers in a separate rate class or require them to “bring their own clean power,” so everyday customers are not forced to subsidize the electricity needs of trillion-dollar tech companies (Levy 2025). More communities are also moving to tie approvals to arrangements that deliver measurable local benefits.

For example, Cedar Rapids, Iowa, required QTS to sign a community benefits agreement (CBA) that will return about \$18 million over 20 years for workforce training, broadband expansion, and green-infrastructure projects (Pratt 2025). Legal guidance stresses clear milestones, third-party verification, and enforcement clauses to keep such agreements credible (Eisensohn 2023).

Meanwhile, Quincy, Washington, created a special water rate class for data centers in 2024, adding higher volumetric charges and meter fees earmarked for new wells and main upgrades. Targeted surcharges turn one user's high demand into system-wide resilience.

By weaving CBAs and host-community fees into zoning approvals or development agreements, planners can ensure that AI infrastructure acts as a

catalyst for broader community gain rather than an enclave of private benefit.

Where Can Planners Learn More?

As artificial intelligence infrastructure expands, planners have a growing need to stay informed about what these facilities are, how they function, and how to plan for them thoughtfully. The good news is that several helpful resources already exist, and more are emerging every year.

Follow the Energy

Many AI-related land use challenges stem from energy demand. That means energy planning organizations are a good place to start. Resources from the U.S. Department of Energy, National Renewable Energy Laboratory, and Lawrence Berkeley National Laboratory offer insights into data center energy use, grid impacts, and cooling technologies (Shehabi et al. 2024; USDOE SEAB 2024; Van Geet and Sickinger 2024).

State and regional energy offices are also useful partners. They can help planners understand energy trends, forecasted demand, and opportunities to align AI-related development with state energy goals.

Watch the Water

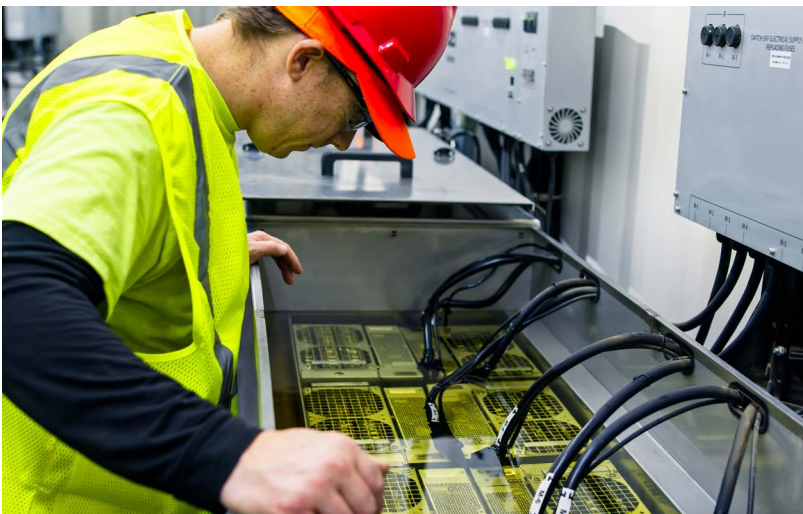
Water use is another key issue, especially in places facing drought or groundwater depletion. Reports from the U.S. Environmental Protection Agency, as well as local water utilities and watershed management agencies, can help assess water-related impacts of AI infrastructure.

Planners can also look to academic and journalistic research on water use in cooling systems, which varies significantly based on the type of cooling and climate zone (Berreby 2024).

Track Technology and Land Use Trends

For a broad view of how technology affects land use, the Lincoln Institute of Land Policy and the Urban Land Institute have both published helpful materials. These organizations explore how emerging technologies from AI to autonomous vehicles are reshaping cities, infrastructure, and land markets.

A North Dakota data center using nonconductive fluid to cool servers rather than air or water cooling systems (Credit: halbergman/E+)



Local case studies can also be instructive. Some jurisdictions have started sharing lessons learned from planning for large-scale data centers or tech campuses. For example, Loudoun (2024; 2025) and Fairfax (2024) Counties in Virginia offer planning documents and staff reports that shed light on real-world challenges and solutions.

Build Cross-Sector Relationships

Planning for AI infrastructure requires collaboration. It touches on land use, utilities, economic development, and environmental protection. Building relationships with energy providers, water utilities, economic development groups, and regional planning agencies can help planners spot opportunities and anticipate challenges.

Conferences like the American Planning Association's National Planning Conference, Grid Forward, or Smart Cities Connect often include sessions on technology infrastructure. These events are a great way to hear from peers and industry experts.

AI infrastructure is no longer a far-off idea; it's already shaping land use decisions in communities across the country. For planners, this presents both challenges and opportunities. By understanding what AI infrastructure is, what it requires, and how it fits into broader planning goals, local governments can prepare for development that is sustainable, equitable, and forward-looking.

As with many emerging trends, the best path forward is to stay curious, build partnerships, and think holistically. AI may be powered by algorithms, but the future it creates will depend on human decisions, including the choices planners make today.

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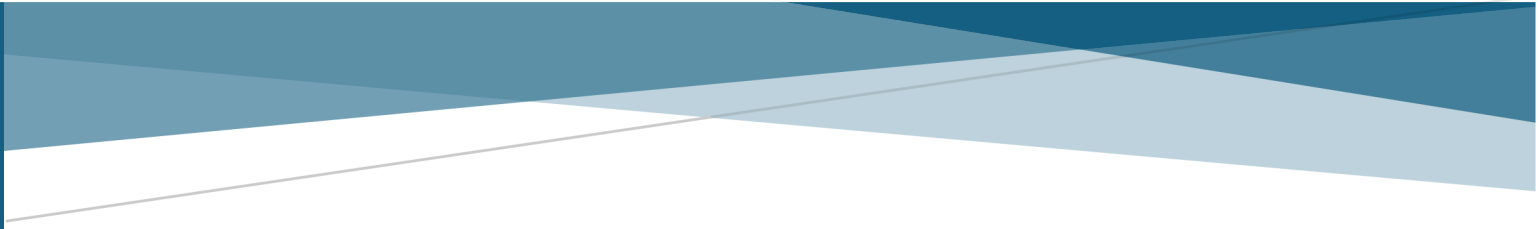
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OREGON DATA CENTER ADVISORY COMMITTEE

Preliminary Learnings and Questions Document

Abstract

Governor Tina Kotek established the Data Center Advisory Committee in January 2026 to help Oregon develop a thoughtful, forward-looking approach to data center development that supports economic opportunity while protecting Oregon's air, land, water, energy system, communities, and public finances. After nine months of reviewing information, hearing presentations, and listening to public comment, this document captures the committee's initial learnings and remaining questions.

The Committee comprises: Dan Dorran, Greg Dotson, Bill Edmonds, Margaret Hoffman, Michael Jung, Tim Miller, and Jean Wilson. This Report was drafted using an iterative process between Committee members and committee staff. All Committee members had an opportunity to add to and refine this document. The final version was edited by co-chairs Margaret Hoffmann and Michael Jung, and facilitator Donna Silverberg.

Oregon Data Center Advisory Committee (DCAC)

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September 2026

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Oregon Data Center Advisory Committee (DCAC)

PURPOSE & CHARGE

Governor Tina Kotek established the Data Center Advisory Committee (Committee or DCAC) to help Oregon develop a thoughtful, forward-looking approach to data center development that supports economic opportunity while protecting Oregon's air, land, water, energy system, communities, and public finances.

The Committee's charge is not to determine whether data centers should exist in Oregon or whether Oregon should prohibit future development. Rather, the Committee was asked to examine how continued data center development could occur responsibly and in a way that reflects Oregon's values, protects the state's resources, and delivers meaningful benefits to Oregonians and host communities.

The Committee is developing recommendations for Governor Kotek later this year. This document contains the Committee's Preliminary Learnings and Questions, which is a step in the recommendation development process. Its purpose is to:

- summarize what the Committee has learned to date;
- identify important information and data gaps;
- surface policy questions that require additional examination; and
- invite additional input before the Committee develops its final recommendations.

This document does not contain the Committee's final recommendations. Instead, it provides a foundation for continued discussion and public comment. Following review of additional information and public input, the Committee expects to submit final recommendations to the Governor before the end of 2026.

PROCESS & ENGAGEMENT

The Committee spent nine months examining the opportunities and challenges associated with data center development in Oregon. Recognizing Tribal sovereignty, the Committee Co-Chairs provided a separate and distinct invitation for Tribal Governments' elected officials and/or staff to provide input directly to the Committee. The Committee convened substantive sessions focused on economic and workforce impacts, water, land use, energy, affordability, taxation and revenue, air quality, and transparency.

Throughout the process, the Committee invited and heard presentations from 127 experts including Tribal officials and their staff, state agencies, local governments, utilities, community colleges, economic development organizations, industry representatives, labor unions, subject-matter experts, advocacy groups, elected officials, and members of

Oregon Data Center Advisory Committee (DCAC)

the public. Committee members also reviewed research, case studies, and examples of approaches being considered, implemented, or challenged in other states.

Public input has been an important part of the Committee’s work. Well over 700 substantive written comments have been received to date. The comments reflect significant public concern about the effects of data center development, particularly related to energy affordability, taxation and incentives, water, climate, and air quality. At the same time, the Committee recognizes that written comments have not been evenly distributed geographically, with relatively few comments received from communities where substantial data center development is actually occurring.

The Committee will continue to seek input during the public comment period regarding the observations and facts presented within this document. The public is encouraged to respond to the questions identified throughout the document and to identify important issues or information that the Committee has not yet considered.

OREGON’S DATA CENTER LANDSCAPE

Data centers are centralized computing facilities that enable internet services and our digital economy. American families and businesses rely on the benefits they provide, ranging from the convenience of email and streaming media to essential first responder communications and digital medical records. Oregon was an early market for data centers and has housed facilities that have supported these aspects of our lives for over twenty years.

Based on the Committee’s research and presentations, there are five types of data centers in Oregon, reflecting varying physical designs and business models:

1. Retail: Multi-tenant facilities, usually serving organizational customers’ offsite computing needs;
2. Wholesale: Larger blocks of space and power leased to industrial tenants, such as media streaming companies or smartphone application providers;
3. Hyperscale: Very large facilities linked to massive storage, conventional cloud computing, and AI-scale computing, predominantly for single tenants;
4. Telco: Small facilities that support telecommunications and network exchange functions; and
5. Powered Shell: Buildings prepared for data center use, often with power and core infrastructure in place before a full IT buildout.¹

¹ ECONorthwest and University of Virginia. 2026. “Understanding Oregon’s Data Center Industry: An Evidence-Based Assessment.” Presentation to the Oregon Data Center Advisory Committee, July 31, 2026. Preliminary findings from forthcoming report prepared for The Lemelson Foundation.

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Today a new type of data center is emerging around the world, far larger and more resource-intensive than ever before. These next-generation data centers support training of artificial intelligence (AI) large language models (LLMs). Today's global race to build the infrastructure to train AI LLMs is placing unprecedented demands on land, water, and energy resources. Of the 31 data centers in the process of siting in Oregon, 19 are Wholesale, 5 are Powered Shell, and 8 are Hyperscale. Although business confidentiality and legal protections can make it challenging to determine specific services provided by data centers, the Committee found no available data suggesting that data centers for the exclusive purpose of training AI LLMs have been planned in Oregon.

To some, data centers represent the backbone of the next generation of critical infrastructure, following similar development of railroads, electricity grids, interstate highways, telephone lines, wireless networks, and the internet. They provide opportunities for community investment and prosperity that parts of Oregon have not seen for generations. To others, data centers are harbingers of an AI future that displaces workers, misleads the populace, and grossly consumes limited energy resources while avoiding taxes, skirting compliance with natural resource regulations, and failing at being transparent businesses which Oregonians can trust. Striking a thoughtful and well-reasoned balance between these two sentiments is a challenge Oregon can meet. Doing so could not only bring more responsible oversight of the data center industry, but also accelerate progress toward Oregon's existing policy priorities.

Data Centers & Federal Policy

It is critical to note that State government is not the only actor in this policy landscape. Under the current Administration, the US federal government is increasing its efforts to assert control over the siting of data centers and to ensure that they face minimal barriers. The President has issued an executive order setting a national priority of achieving a "rapid" buildout of AI data centers throughout the country.² He has issued several other executive orders, and federal agencies, such as the Environmental Protection Agency and Federal Energy Regulatory Commission, have acted to reduce barriers to the build out of AI data center infrastructure. While the federal government has supported unbridled AI data center development and necessarily increased the demand for electricity, it also has taken actions that thwart the development of renewable energy, which is a clean, affordable, and abundant source of energy in the Northwest. This demonstrates the chaotic policies of the federal government currently. While pulling available levers to accelerate AI data center construction throughout the country, the federal government has simultaneously been making it harder to add clean energy to the grid.

² 90 Fed. Reg. 35385 (July 28, 2025), <https://www.govinfo.gov/content/pkg/FR-2025-07-28/pdf/2025-14212.pdf>.

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WHAT THE COMMITTEE HAS LEARNED

Governor Kotek asked the Committee to understand the “challenges and opportunities in key policy areas related to the siting of data centers in our state.” Her charge focused the Committee squarely on the question of the sustainability of these facilities. After conducting extensive fact-finding over seven public meetings across nine months, supplemented by over nine hours of oral public comments and extensive literature review, the Committee understands that there is significant general public opposition to data centers. That said, this Preliminary Learnings Document represents an evidence-based report on what we have discovered to date. The Committee sees both opportunity and risk for Oregon. Our state has hosted data centers since the earliest generation of internet infrastructure, and these facilities have contributed to the prosperity of urban and rural communities alike across the state. At the same time, the current unprecedented scale and speed of data center development has raised serious concerns for many Oregonians. The Committee has repeatedly heard concerns voiced about the sustainability of development, the need for transparency, and the role of AI in society.

The Committee has reached the collective understanding that Oregon must consider the individual impacts of data centers at the local level, the cumulative effects of multiple facilities operating in the same community, airshed, basin, or energy system, and the industry’s role in our state.

Water Stewardship

Overview

Data centers need to be cooled, and water has historically been utilized directly for data center cooling systems. Some conventional methods, such as evaporative cooling, are water-intensive, while other more modern approaches, such as closed-loop cooling, are more water-efficient. There are cooling approaches that use little-to-no water directly, such as free-air and immersion cooling, but these generally increase electricity demand. Some forms of electricity production require water consumption, which means that using less *direct* water for cooling generally increases *indirect* data center water consumption.

The Committee learned that indirect water consumption associated with electric power generation can be multiple times larger than direct data center water usage, depending on the generation source. Solar and wind energy use very little water, while thermal generation (e.g., fossil-fired) and hydroelectric power are highly water-intensive. The state has jurisdiction only over water resources used directly in Oregon’s data centers and used indirectly from power generation facilities sited within Oregon’s borders.

Oregon’s surface and groundwater resources are already fully allocated. To construct a new facility, data centers must obtain an existing water right. They can do this by purchasing an industrial water right from an entity no longer using it or accessing water through a municipal system.

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While data center water use is relatively small compared with statewide agricultural irrigation or other uses, the Committee heard that water impacts are highly place-specific and time-sensitive. Seasonal demand and basin conditions can make the effects of a facility much more significant locally than overall statewide comparisons suggest.

The Committee also heard that non-disclosure agreements (NDAs) can make it difficult for the public to understand how much municipal water is being used at the individual data center level. The Committee identified significant gaps in publicly available information about water intake, discharge, indirect water use, and basin health.

Key Learnings

- **Energy-Water Nexus:** Cooling technology choices create a fundamental tradeoff: low/no-water cooling approaches (e.g., closed-loop, free-air) increase electrical grid load, whereas water-based cooling systems (e.g., evaporative, chilled water) conserve energy by drawing upon local water resources and discharging water after use.
- **Resource Allocation:** Surface and groundwater rights are, for all intents and purposes, fully allocated statewide. Data center developers must acquire an existing water right or work within a municipal allocation. Widespread use of NDAs reduces visibility into actual data center water usage, both direct and indirect.
- **Consumption Patterns:** Direct data center water use represents a small, single-digit percentage of statewide water consumption, but data center water demand can spike during seasonal irrigation peaks. The share of local water impacts may vary seasonally, with an enterprise-scale data center using water in amounts approaching that used by a single irrigation center pivot during peak demand.
- **Water Quality:** Since water is used by data centers for cooling rather than processing, primary on-site water quality impacts stem from thermal heat transfer and evaporative residual concentration. Chemical impacts to water used in data centers, from additives used for disinfection, to inhibit corrosion, and address scaling, are modest in comparison to other industrial water processes. All water discharged by data centers, including water released to and discharged by municipal wastewater treatment systems, must meet federal and state water quality standards.
- **Information Deficits:** Since most data centers access and discharge water through municipal water systems, and with NDAs being common practice, significant public data gaps exist regarding data center water consumption (both direct and indirect) and water quality impacts (comparing facility water at intake vs discharge).

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Questions for Consideration

1. How could/should Oregon most effectively mandate standardized reporting and public disclosure of data center impacts on water consumption (both direct and indirect) and water quality (at discharge and basin-level)?
2. What water-related metrics should be required for individual data centers or aggregated data from municipal water suppliers to report? How can basin-level constraints and seasonal variances be reflected in these metrics to add precision and increase accuracy?
3. Should the state require or incentivize renewable power combined with low/no-water cooling technologies to reduce direct and indirect water impacts from data centers?
4. How could approaches, such as regional Managed Aquifer Recharge projects, which store abundant winter water for availability during peak summer demand, be leveraged to address the seasonal nature of data center water usage in Oregon?
5. What specific safeguards could be implemented to further protect Tribal water rights and cultural resource interests at the basin level?
6. How could data center water performance relate to incentives, such as tax abatements and permitting speed, to ensure benefits to Oregon's water resources?

Land Use & Community Planning

Overview

Oregon's land use system was designed to manage long-term growth and competing land uses. Data center development presents new challenges because facilities can require large sites, substantial power and fiber infrastructure, water access, transportation connections, and other specialized infrastructure. The Committee heard that most existing data center facilities are located within designated urban areas, with a smaller share located on rural lands.

The unprecedented pace and scale of proposed development raise questions about whether Oregon's existing planning tools adequately address cumulative impacts, facility clustering, infrastructure demands, and potential conflicts with agricultural, forest, residential, Tribal, and other land uses.

The Committee will need to consider whether Oregon should develop better statewide information about available industrial land and whether regional approaches could help communities evaluate data center development more strategically.

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Key Learnings

- **Rapid Expansion:** Active data center facility counts grew from 8 in 2000 to ~123 by 2025, with 80% located within Urban Growth Boundaries (UGBs) and 20% on rural industrial exception lands.
- **Pipeline Pressure:** Development pressure is unprecedented, with ~9,000 acres known to be proposed in the pipeline—6,500 acres of which would require UGB expansions or changes in rural land use designations.
- **Framework Strain:** Oregon's landmark land use planning system was built for long-term growth management amidst competing priorities, and it experiences friction when responding to the speed and scale of the data center industry's demand for new sites with appropriate characteristics.
- **Cumulative Land Impacts:** Oregon's land use planning system has facilitated facility clustering ("data center gravity"), creating localized infrastructure demands for which traditional project-by-project reviews may not be optimized to evaluate. That said, the system may be helping to minimize some of the incompatible and undesirable land use activities that appear to be taking place in other states.

Questions for Consideration

1. Is the existing land use framework adequate to handle growth while protecting Exclusive Farm Use (EFU) lands, forests, and residential areas?
2. Should the state build a centralized industrial land inventory to evaluate regional siting options and cumulative impacts?
3. What role, if any, does the state have to play in supporting local governments responding to data center development interests?
4. Should best practices be established for facility clustering, vertical "stacking" (i.e., multi-story builds), and buffering zones to protect farmland and residential areas?
5. Are current engagement and permitting processes sufficient to protect Tribal lands and cultural sites, or are changes needed to address data center-specific impacts?
6. Should Oregon encourage regional industrial land "pools" to limit piecemeal local UGB expansions?

Energy & Affordability

Overview

Data centers represent rapidly growing and large-load electricity demands that differ from many historical patterns of load growth. Their impacts therefore extend beyond individual

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facilities to the effects on and questions about grid planning, transmission, generation, energy reliability, air and noise emissions, and affordability.

The Committee heard that Oregon’s regulatory and policy frameworks do not apply uniformly across investor-owned utilities, consumer-owned utilities, and the Bonneville Power Administration (BPA). Investor-owned utilities are subject to regulation by the Oregon Public Utility Commission (PUC), consumer-owned public utilities are locally governed, and BPA is a federal agency. As such, different mechanisms to manage growth and to protect energy affordability for ratepayers are utilized.

One of the biggest concerns raised in public comments was whether data centers have driven or will drive up electricity rates substantially. The Committee heard from consumer-owned utilities (COU) that their first goal is to keep rates low for their customers and that the mechanisms they have put in place to ensure their customers are protected from data center-driven costs are working effectively. The Committee also heard from experts regarding the protections established through Oregon’s groundbreaking POWER Act for investor-owned utility (IOU) customers. Current evidence indicates that Oregon’s COU and IOU ratepayers are effectively protected from the increased costs caused directly by data centers.

The Committee also observed that data centers could potentially provide value to the electricity system, and/or keep rates low for customers, through flexible loads, demand response, energy storage, distributed resources, and other grid-enhancing technologies.

The central question is not simply how much electricity data centers consume, but how Oregon can ensure that data center loads contribute to the development of a reliable, affordable, and clean energy system without shifting disproportionate risks and costs to other customers.

Key Learnings

- **Grid Impacts:** Data center electrical loads increasingly represent exceptionally large, fast-growing, and always-on energy demands that stress grid planning and transmission models differently than historic growth. As a result, the demand for these increased loads has an impact on the entire energy ecosystem that must be considered carefully, both in current operations and in long-term planning.
- **Flexibility:** Data center-enabled grid flexibility, both within data centers themselves and on the grids to which they are connected, can address challenges from ongoing constraints to new generation and transmission.
- **Air Quality & Backup Power:** Diesel backup generators are generally stand-alone (not grid-connected) assets that are deployed, nearly universally, to sustain data center operations with emergency power when needed. Consistent with federal and state regulations, they are permitted to operate for up to 100 hours/year for routine testing without exceeding air quality standards. Declared emergency operations, in contrast, could exceed these limits and, if they happen frequently, result in

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additional air quality requirements. While such emergencies are rare, evidence is growing that shows our aging grid infrastructure is increasingly vulnerable.

- **Grid Utilization:** The power grid is built to meet peak demand, which results in low overall grid utilization for this capital-intensive infrastructure. As large, steady power users, data centers could become anchor tenants to *increase* grid utilization, spreading fixed infrastructure costs over a larger overall base of power consumption, which could reduce upward pressure on electricity rates.
- **Utility Cost Increases:** Most regulated utility cost increases appear attributable to growing wildfire-related expenditures, investments in aging transmission infrastructure, rising prices for routine equipment, and higher costs for power procurement.
- **Regulatory Asymmetry:** Oregon’s climate policies, such as Oregon HB 2021’s clean energy mandates, and regulatory institutions, such as the PUC, apply to the state’s IOUs but do not apply to COUs.
- **Ratepayer Protections:** Oregon’s POWER Act (HB 3546) provides essential cost-containment tools (e.g., exit fees and special tariffs) for IOUs, and COUs have their own separate and distinct rate-payer protections in place.
- **Marginal Costs:** To the extent that data center demand raises the marginal costs of incremental generation procured by IOUs and COUs alike, these impacts affect all electricity customers and make it harder and more expensive for Oregon to meet its energy needs.
- **Clean Energy:** Many data center companies have their own decarbonization goals. To the extent that data center procurement of decarbonized energy raises the marginal costs of clean energy, these impacts may make it harder and more expensive for Oregon to meet its clean energy goals, especially in the near term. On the other hand, data center-driven demand for clean energy also can stimulate investment in clean energy technologies and supply, which could make it easier and cheaper for Oregon to meet its clean energy goals, particularly in the long run.
- **BYONCE and Energy Storage:** Several states are developing and implementing policies to encourage or require data centers to *Bring Your Own New Clean Energy* (BYONCE). In addition to decarbonized generation resources, this also can include utility-scale and distributed energy storage systems that can augment wind and solar power, while also serving as a grid-connected buffer for backup generation.
- **VPPs, DERs, and Microgrids:** Virtual power plants (VPPs), distributed energy resources (DERs), and microgrids show promise as complements to the traditional utility-centric infrastructure approach to energy supply and delivery.
- **Public Concerns:** Utility affordability is the single most frequent concern expressed in public comments (38.7%), though limited comments were received from rural eastern Oregon host communities.

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Questions for Consideration

1. How can the state best motivate data center-enabled grid flexibility to address peak power demands, including inside data center facilities (e.g., emergency and/or economic curtailment, compute-prioritization), in data center campuses (e.g., on-site energy storage, microgrids) and on the grid nearby (e.g., distributed energy resources, virtual power plants)? Who would or should have the authority to manage this process?
2. How could grid utilization be usefully measured and practically managed across Oregon's diversified electric grid landscape?
3. Should regulatory policies distinguish between new data center facility builds and major retrofits/upgrades?
4. Does Oregon need to ensure that data center-driven energy procurement in COU service territories is more consistent with the state's clean energy and climate goals? If so, how could this be accomplished?
5. Should the state mandate facility-level emissions/water performance rules and/or incentivize next-generation energy backup/storage for data centers?
6. Are ratepayers in IOU and COU service territories adequately protected from rate increases related to data center development or are new mechanisms needed?
7. How could Oregon accelerate deployment of cleaner alternatives to conventional stand-alone diesel backup generators for data centers to reduce carbon emissions, lower air pollution, and provide benefits to local communities and the broader power grid?
8. How might data centers contribute to a statewide infrastructure fund or other financing mechanisms to support projects that reduce pressure on and enhance the electricity grid for all customers?

Tax Incentives & Community Benefits

Overview

Oregon has three primary tax incentive programs that are utilized by data centers. They include the Standard Enterprise Zone (SEZ), the Long-Term Rural Enterprise Zone (LTREZ), and the Strategic Investment Program (SIP). These three incentive programs exchange a temporary, targeted local property tax reduction or abatement for a durable investment and recurring long-term public revenue. In general, these exchanges are as follows:

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- **What the state and local communities give:** Temporary reductions in local property taxes on newly installed buildings, machinery, and equipment only. The land and pre-existing property remain fully taxable throughout. Abatements run 3–10 years in Standard Enterprise Zones, up to 15 years in Long-Term Rural Enterprise Zones, and 15 years under the Strategic Investment Program. When the abatement ends, the full value of the property returns to the tax rolls.
- **What the state and local communities get:** New private capital investment, new and higher-paying jobs, and long-term recurring revenue from local property taxes. The state and communities also benefit from the business paying the Corporate Activity Tax, payroll taxes, community service fees and/or School Support Fees, other negotiated fees, and property tax on land and existing improvements. Data center companies must meet minimum investment amounts and satisfy continuing performance criteria for the duration of the abatement.

The Committee heard that Oregon’s lack of a general sales tax, mild climate, access to high-speed computer fiber, industrial land, and historically low electricity costs are important factors in the state’s attractiveness to data center developers. Many rural communities reported that partnerships with data center developers have enabled significant, sometimes generational, infrastructure investments that otherwise would not have been possible.

At the same time, Oregon lacks a centralized, readily accessible picture of the tax incentives provided to data centers. This includes the revenues and payments generated by facilities and the community investments made possible outside of formal enterprise zone agreements or community benefit agreements.

This creates a basic policy question: What should Oregon provide to attract data center investment, and what should Oregon and its communities receive in return?

The Committee will examine to what extent existing fiscal incentives remain necessary, how incentives could be tied to measurable outcomes, and how Oregon can improve transparency around public costs and community benefits.

Key Learnings

- **Incentive Structures:** Property tax abatements through Enterprise Zone Agreements (EZAs) are intended to increase economic investments that lead to tax revenue for the state. They serve as one of Oregon's incentives structures for data centers. EZAs combine with the state's other competitive advantages: no general sales tax, a mild climate, land, and historically low electricity costs. Other states use different incentive tools tied to their own specific situations, including sales/use tax exemptions, investment tax credits, and expedited permitting.
- **Local Flexibility:** Communities hosting data centers value the discretionary

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flexibility enabled by tax abatement community benefit agreements. This allows a local jurisdiction to determine what the community benefits agreements will fund, as opposed to tax revenue that is tied to a local distribution formula.

- **School Funding Impacts:** Abating local property taxes decreases the amount of local school funding revenue available for schools statewide; however, because Oregon's tax incentive programs are targeted to new investments, the taxes abated would not otherwise exist absent the incentive. Once the tax incentive expires, the data center company's property taxes are assessed in full, increasing the local property tax base and the share of local funding for schools statewide.
- **School Support Fee Administrative Challenges:** In 2023, the Oregon Legislature established the Enterprise Zone School Support Fee, a required payment in lieu of property taxes. Companies that receive an SEZ or LTREZ exemption within an enterprise zone must make direct payments to local K-12 school districts. Zone sponsors and local school districts mutually set a flat rate between 15% and 30% of property taxes that would have otherwise been due without abatement. Communities value the flexibility of these discretionary payments from data centers. However, the EZA program puts new administrative burdens on school districts – essentially billing data centers directly. This can create a challenge, especially for smaller districts.
- **Data Fragmentation:** Public information does exist about data center incentives, investments, and payments across state agencies (such as Business Oregon, DEQ, OWRD, and ODOE). That said, this data remains siloed and difficult to access in a consistent, centralized manner.

Questions for Consideration

1. Should additional standardized, centralized public reporting be required for all data center tax abatements, revenues received, and community investments? If so, how could this be implemented and coordinated?
2. To what extent are existing property tax abatement programs still necessary to attract data centers, given Oregon's natural and inherent advantages (e.g., mild climate, fiber access, land, no sales tax)?
3. What should be the role of local governments in negotiating the EZA incentives vis a vis the state negotiating these incentives for data centers?
4. Should future data center transparency requirements apply retroactively when existing facilities undergo major hardware or repowering upgrades?
5. How might data center tax abatements be most effectively tied to data center performance across resource impacts, public benefits, etc.?

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Transparency & Accountability

Overview:

A consistent theme the Committee heard across every topic area was the difficulty of evaluating cumulative impacts because information about data centers is fragmented across state agencies, local governments, utilities, and private entities. The Committee identified potential value in a coordinated, state-hosted data center information system that could bring together standardized information on:

- water intake and discharge;
- energy use, peak demand, and flexibility;
- backup power, emissions from them, and any violations/penalties;
- tax abatements and public revenues;
- employment and workforce outcomes;
- community benefit agreements;
- infrastructure investments; and
- facility development and locations.

The Committee notes that data center transparency frameworks should avoid unnecessary duplication and reporting burdens, respect legitimate confidential business information, and focus on information needed to understand and address public concerns and policy impacts.

Economics & Workforce

Overview

The Committee learned that data centers can create substantial economic activity, particularly through construction, engineering, operations, and infrastructure investment. In some rural communities, data center development has been associated with significant changes in short and long-term employment and economic activity.

The Committee heard that Oregon has opportunities to strengthen local workforce pipelines. Community colleges and other training providers are developing programs for data center occupations, but high rates of students being hired before completing programs demonstrate the need for stackable credentials, dual-credit opportunities, apprenticeships, scholarships, and other strategies that help workers complete training and advance their careers.

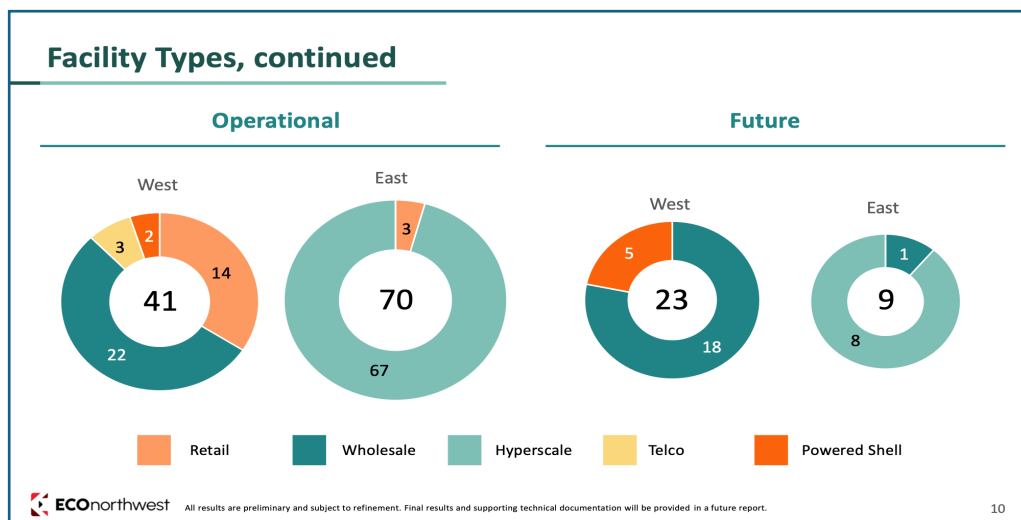
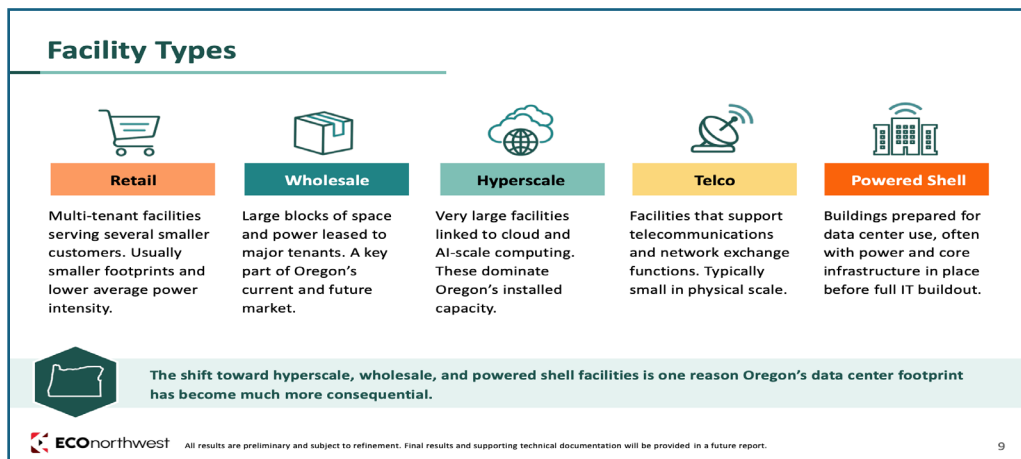
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The Committee also heard that community benefits can vary significantly depending on the capacity of local governments to negotiate skillfully with developers. Many communities have secured data center investments in transportation, water systems, schools, first responders, hospitals, libraries, and other local priorities.

These observations raise questions about how Oregon can ensure that economic benefits derived from data centers are durable, measurable, and broadly shared.

Key Learnings

- Industry Scale:** Oregon hosts 123-144 facilities, depending on data center definitions, ranging from a variety of telecom nodes, wholesale campuses and retail facilities in the Portland/Hillsboro metro region to predominantly hyperscale complexes in Eastern Oregon.



- Data Center Services:** Data centers in Oregon are primarily smaller, non-AI-oriented facilities that serve as infrastructure for a wide range of internet services, including data storage, payment processing, cloud computing, content streaming, telecommunications, and social media.

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- The Committee notes that, during the entire review process, it heard no indication of data centers exclusively dedicated to training Artificial Intelligence (AI) Large Language Models (LLMs) operating in Oregon today.
- **Rural Economic Impacts:** Data center investments and operations drive substantial local economic activity and prosperity in both the short- and long-term, especially in rural areas where their benefits are most clearly evidenced. For example, the Committee learned that the arrival of data centers in Prineville reduced unemployment from 20% to 6%, employing ~400 on-site personnel. The Committee also learned that data center operations jobs represent about 15% of total employment in Morrow County.
- **Sustained Construction Jobs:** Ongoing multi-year campus expansion cycles have been shown to generate ongoing construction and engineering employment. This cumulative effect counters the narrative that data centers only offer one-off construction jobs. For example, ECONorthwest reported that data center construction has directly created approximately 3,900 jobs and \$980M in labor income. According to the same study³, almost one in every 100 jobs in Oregon is related to data centers.
- **Workforce Pipelines:** High student hire-away rates in community college programs (e.g., Blue Mountain CC) underscore the need for stackable credentials, dual credits, and structured apprenticeships.
- **Negotiation Disparities:** Community Benefit Agreements (CBAs) can yield uneven local benefits, depending on municipal representatives' negotiation capacity.

Questions for Consideration

1. What role should the state play in local CBA negotiations? Should the state offer model guidelines and/or facilitation of negotiations?
2. How should the state track and publicly report community investments occurring both within and outside formal Enterprise Zone Agreements (EZAs) or via CBAs?
3. Would a regional process, such as the Central Oregon Regional Large Lot Program, which helps cities and counties in Central Oregon manage and provide large industrial land sites for economic development, be valuable to replicate in other areas in the State? If so, what is the State's role in facilitating their creation?
4. Should Oregon establish a centralized public database for direct/indirect workforce, investment, and expenditure metrics?

³ ECONorthwest and University of Virginia. 2026. "Understanding Oregon's Data Center Industry: An Evidence-Based Assessment." Presentation to the Oregon Data Center Advisory Committee, July 31, 2026. Preliminary findings from forthcoming report prepared for The Lemelson Foundation.

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5. What policy frameworks should address data center facility decommissioning, repowering, or server rack retrofit cycles?
6. What opportunities could Oregon create for public/private partnerships between industry, public universities, community colleges, and other organizations to advance collaboration, accelerate innovation, and enhance competitiveness on a statewide level?
7. Should Oregon be offering retraining or other types of support for workers in other industries or sectors?

OREGON VOICES & PUBLIC COMMENT

Public input provided an important perspective on the Committee’s work. To date, Committee staff have catalogued more than 700 substantive written comments after accounting for duplicate and non-substantive submissions. The comments reflect strong concern about the effects of continued data center development. Major themes include energy affordability, taxation and incentives, water, climate, and air quality. Approximately 90 percent of written comments reviewed to date oppose continued or expanded data center development.

The Committee recognizes that the written-comment record does not necessarily represent the views of all Oregonians or all communities affected by data center development. Approximately 70 percent of submitted comments were near-copy form letters, and the majority originated in the Portland metropolitan area. Comparatively few written comments came from communities in Morrow, Umatilla, and Crook counties, where substantial data center development is occurring and proposed.

The Committee will continue to seek input from across Oregon before completing its recommendations.

COMMITTEE PRINCIPLES FOR FINAL DELIBERATION

The Committee coalesced around the idea that the state could lead on statewide data center impacts and transparency, while local governments would oversee local data center siting and community benefits agreements. Emerging Committee cross-cutting principles include at least (and are open for public comment for changes or additions):

- **Transparency first:** Build a coordinated statewide reporting approach that clarifies and standardizes core metrics, minimizes duplication, and balances commercial confidentiality with public accountability.

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- **Local vs. state roles:** Carefully determine where local input and decisions are appropriate (for example, in CBAs, land use approvals, etc.) and where broader statewide interests require coordination to achieve greenhouse gas goals, statewide affordability, and to assess cumulative natural resource impacts.
- **Cumulative impacts and “gravity”:** Data center clustering generates ongoing construction cycles and cumulative resource demands; Consider cumulative impact assessment tools rather than purely project-level review and consider decommissioning requirements.
- **Protect affordability:** Ensure any new large loads do not shift infrastructure and operating costs disproportionately to residential ratepayers; explore POWER Act-equivalent protections or other mechanisms for COU regions/areas and assess similar policies in other states.
- **Encourage positive public outcomes:** Incentives (if retained) should be outcome-oriented (e.g. workforce development, local infrastructure, local and statewide water/energy performance, actual community benefits) and paired with transparent measurement and enforcement.
- **Encourage innovation and grid optimization:** Explore incentives or contractual frameworks that promote long-duration storage and non-wire alternatives to grid expansion. Demand flexibility and grid-enhancing technologies to enhance how data centers might be system assets, not just system loads.
- **Place-specific policy:** Water and land use decisions must reflect local basin- and landscape conditions such as Tribal sovereignty, timing/temporality of water use, groundwater recharge, habitat impacts, and community concerns.
- **Phased/iterative approach:** Given rapid technology changes such as AI workloads, cooling innovations, and battery alternatives, adopt flexible, iterative policy recommendations that can be updated and incentivized as evidence and technology evolve.
- **Account for federal regulations:** Federal regulatory changes such as EPA’s permitting rules and federal incentives and rollbacks are potentially significant external drivers that can substantially affect Oregon outcomes. They may warrant state guardrails, such as regulation changes.

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LOOKING AHEAD

The release of this Document marks the next stage of the Committee’s work—not its conclusion. **The document will be available for a 45-day public comment period.** Members of the public are encouraged to respond to the questions identified in this document, provide additional information, identify gaps in the Committee’s observations, and share perspectives based on their experiences with data center development. **The Committee expects to present final recommendations to Governor Kotek by December 2026.**

Following release of this Document, the public will be asked to submit responses to the questions outlined in this document, or on anything missing from this document, via the form at: <https://www.surveymonkey.com/r/DCAC-Comments>.

The written public comment period for the Preliminary Learnings Document will start on September 10, 2026, and close at 5 PM on October 24, 2026.

To access Governor Kotek’s charge to the DCAC, Committee agendas, presentation materials, and meeting recordings and summaries, please visit:
www.oregon.gov/energy/get-involved/pages/oregon-data-center-advisory-committee.aspx.

LOCAL Development Code Amendments Considerations (originally in DC-02-26)

A. ADC 1.140, Neighborhood Meetings

Staff Comments: The purpose of neighborhood meetings is for applicants to understand and try to mitigate any real or perceived impacts their application may have on a neighborhood. Neighborhood meeting attendance varies. House Bill 4037 and Senate Bill 974 reduced notice areas for most residential developments to 100 feet and limits appeals of Type I-L residential applications to the applicant.

(1) **When Mandatory. ANY MODIFICATIONS TO LIST?**

- (a) Multiple-dwelling unit development that abuts a single-dwelling unit zoning district.
- (b) Commercial or industrial development that abuts any residential zoning district and the addition of outside seating areas to restaurants or bars/taverns/breweries/night clubs within 300 feet of a residence.
- (c) Manufactured home park adjacent to any residential zoning district.
- (d) Subdivision with more than 10 lots, excluding expedited and middle housing land divisions
- (e) Cluster and planned developments.
- (f) Retail Sales and Services Uses proposed in existing buildings in the Light Industrial zone that require Conditional Use approval per Section 4.060(11)(b).
- (g) For other non-residential applications or revisions to applications that the Director determines may have a neighborhood impact, such as conditional uses. In these cases, the Director shall determine the minimum notice area for the neighborhood meeting.

(2) **Time and location.** Based on the POLCO survey results, staff propose adding this language: Meetings must start no sooner than 5 p.m. and no later than 7 p.m. All meetings must provide virtual attendance options and include the options on the meeting notice.

(3) **Neighborhood meeting notice areas.** With the notice area changes required by state law for residential developments, the current neighborhood meeting notice areas may be more than what is required for the notice of filing when an application is submitted. **KEEP OR MODIFY AREAS?**

Proposals for:	Notice Area Boundary: minimum distance from the boundaries of the subject property*
Non-residential development (including the non-residential portion of a mixed-use development)	300 feet**
Residential development proposing 50 or less dwelling units, lots or spaces	300 feet
Any development which proposes more than 50 dwelling units, lots or spaces	1,000 feet
* Additional notice area requirements applicable to Historic Resources are found in Article 7. In cases of conflict with the procedures in Article 1, the procedures in Article 7 shall prevail. ** For applications which include non-residential development, the Director may increase the notice area based on the project scale, land use and transportation patterns or anticipated public interest in the project, up to a maximum of 1,000 feet.	

B. Residential Accessory Buildings Exempt from Land Use Review [ADC 3.080 (9); 5.070(18); 4.060(21)]

Residential Accessory Buildings are exempt from land use review when they do not exceed 750 Square feet and walls are no taller than 12 feet. Larger and/or taller buildings are exempt from land use review when they meet the standards below. If they don't meet the standards, then they can be permitted through Site Plan Review (these are also approved). *(Applicants must complete and submit the Residential Accessory Structure Checklist with the below information to determine if exempt.)*

- (a) The proposed building is not taller than the tallest building on any adjacent property. For this section, building height is measured at its highest point, usually the ridge of the roof, but excluding chimneys and other protrusions from the roof.
- (b) The proposed building's footprint is not more than the building footprint of the largest building on adjacent property.
- (c) The maximum lot coverage by zone provided in Table 3.190-1 is not exceeded.
- (d) The proposed building meets or exceeds the applicable setback requirements for the primary residence as listed in Table 3.230-1.
- (e) The materials used on the proposed building must be similar to those used on the primary residential structure (e.g., cement board lap siding is similar to wood lap siding).
- (f) If the proposed building is located in any of the special purpose districts listed in Articles 6, 7 and 14 of the Development Code, the building must also be reviewed for conformance with the requirements of the applicable district and may require a land use review application.

Staff Comments: Staff receive numerous requests for larger accessory buildings, the average is just over 1,000 square feet, and most of them meet the standards and end up being exempt from site plan review. This requires more work on the applicant to complete the checklist and staff to process these requests. Additionally, residential accessory dwelling units are permitted up to 900 square feet without requiring a land use review.

Staff Proposal: Increase the size from 750 SF to 900 SF and keep the current height maximum of 12 feet in Residential and Mixed-Use Zones (Articles 3 and 5), before triggering submittal of the accessory structure checklist demonstrating compliance with (a) – (f) above. *This increase was not proposed in the commercial zones (Article 4) because these zones are intended for commercial uses.*

C. Minimum separation between apartment buildings [ADC 3.180(12) and 3.220 (6)]

Table 3.180-1, Note (12): The city requires a 10-foot separation between one-story multi-dwelling unit buildings and a 20-foot separation for buildings 2 or more stories on the same property.

Staff Comments: The 20-foot separation between apartment buildings has come up in land use reviews – as it provides less flexibility in site layout and function and can result in fewer units on a property, including affordable housing. Other cities do not require a separation between apartment buildings on the same property because the building codes regulate minimum building separation – which is based on the fire rating of the walls and amount of windows.

Staff Proposal: Expand the 10-foot building separation to buildings up to 30 feet tall (height allowed in lowest density zones), and apply the 20-foot separation to buildings 30 feet or taller. Allow a reduced separation for affordable housing – down to 12 feet, scaled by the level and amount of affordable housing provided. (ADC Table 3.220-2)

(12) The minimum separation between multi-dwelling unit buildings on a single parcel must be 10 feet for buildings less than 30-feet tall and 20 feet for buildings 30 feet or taller. Minimum building separation for cottage clusters is provided in Section 3.192. Patios less than 30 inches from the ground may encroach up to 5 feet into the space between buildings.

TABLE 3.220-2

AFFORDABLE HOUSING AREA & HEIGHT BONUS STANDARDS						
Affordability Level	Percent of units (including bonus units) set aside for persons whose household income is less than or equal to the affordability level	Reduced Lot Size Allowance*	Height bonus in historic districts, HM, MUR, LE, ES	Height Bonus in RM, RMA, WF, CB, DMU, HD	Height Bonus in HDR & MUC	Reduced Separation between buildings 30 feet or taller
120% AMI	50 percent of units	5 percent	N/A	N/A	12 feet	None
100% AMI	50 percent of units	10 percent	N/A	N/A	12 feet	None
80% AMI	5 percent of units	10 percent	N/A	N/A	12 feet	18 feet
	10 percent of units	15 percent	N/A	N/A	12 feet	16 feet
	20 percent of units	25 percent	N/A	12 feet	24 feet	16 feet
60% AMI	5 percent of units	15 percent	N/A	12 feet	24 feet	15 feet
	10 percent of units	25 percent	12 feet	24 feet	36 feet	14 feet
	20 percent of units	35 percent	12 feet	24 feet	36 feet	12 feet

D. Flag Lot Dimensions – “Pole” width [ADC 11.090 (5)]

The code currently requires the “pole” of each “flag lot” to be at least 22 feet wide, unless two flag lots are being proposed, then the width is 12 feet for each pole for a combined minimum width of 24 feet. The “pole” width needs to accommodate utilities and provide enough width for safe ingress and egress. Most cities have a narrower “pole” width, which better supports infill development (Corvallis - 5 feet; Lebanon – none.)

Staff Proposal: Reduce the minimum width of the “pole” from 22 feet to 10 feet which is wide enough for utilities needed to serve each development. However, developments must still comply with fire access and other applicable code standards, which may require a pole width greater than 10 feet.

E. Remove Barriers to Needed Housing [Tables ADC 5.090-1 and 3.190-1]

Staff Comments: The Housing Implementation Plan (HIP) recommended removing the minimum area requirements for needed housing in zones where denser development is preferred and needed. The area per unit requirements penalizes one-bedroom units, the city’s most needed unit type. Maximum height and lot coverage determine the scale of development.

In addition, consider removing or reducing the minimum area requirements for middle housing types in the RM & RMA zones, which are the same for the lower density zones.

5.090-1 Staff Proposal: Remove minimum lot sizes for multiple dwelling units in the WF, PB, and MS zones and consider reducing the minimum area in the ES zone where MDUs require a conditional use review (Note: some of the ES zone is in the Monteith historic district).

TABLE 5.090-1

STANDARD	MUC	WF	HD	DMU	CB	LE	PB	MS	ES	MUR
Minimum Lot Size or Area Requirement (square feet)										
Multiple-Dwelling Unit	None	None	N/A	None	None	None	None	None	1,600/u	1,600/u

ADC Table 3.190-1 - Middle Housing in RM & RMA zones: To encourage middle housing in medium density zones, **consider reducing or removing the minimum lot sizes** for triplexes and fourplexes. Land area requirements for SRO units needs to be removed as this is a form of multiple dwelling units. Height and lot coverage determine property size.

STANDARD	RR	R-10	R-6.5	HM	R-5	RM	RMA	HDR
Triplex	5 acres	10,000 sf	6,500 sf	5,000 sf	5,000 sf	5,000 sf	5,000 sf	None
Fourplex	5 acres	10,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	None
Cottage Cluster	5 acres	10,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	7,000 sf	None
Multiple-dwelling units	N/A	N/A	N/A	N/A	N/A	None	None	None
Single Room Occupancy Development	5 acres (15)	10,000 sf	6,500 sf	5,000 sf	5,000 sf	None	None	None
Maximum Height	30 ft	30 ft	30 ft	30 ft	30 ft	45 ft	60 ft	75 ft
Maximum Lot Coverage	20% (11)	50%	60%	60%	60%	70%	75%	80%