

Data Centers, Decarbonized

Where the Sector Stands and Where It's Going

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A CleanTech Alliance BUILT Cluster Project



CleanTech Alliance™

The nation's largest convener for clean technology and clean energy

Our mission

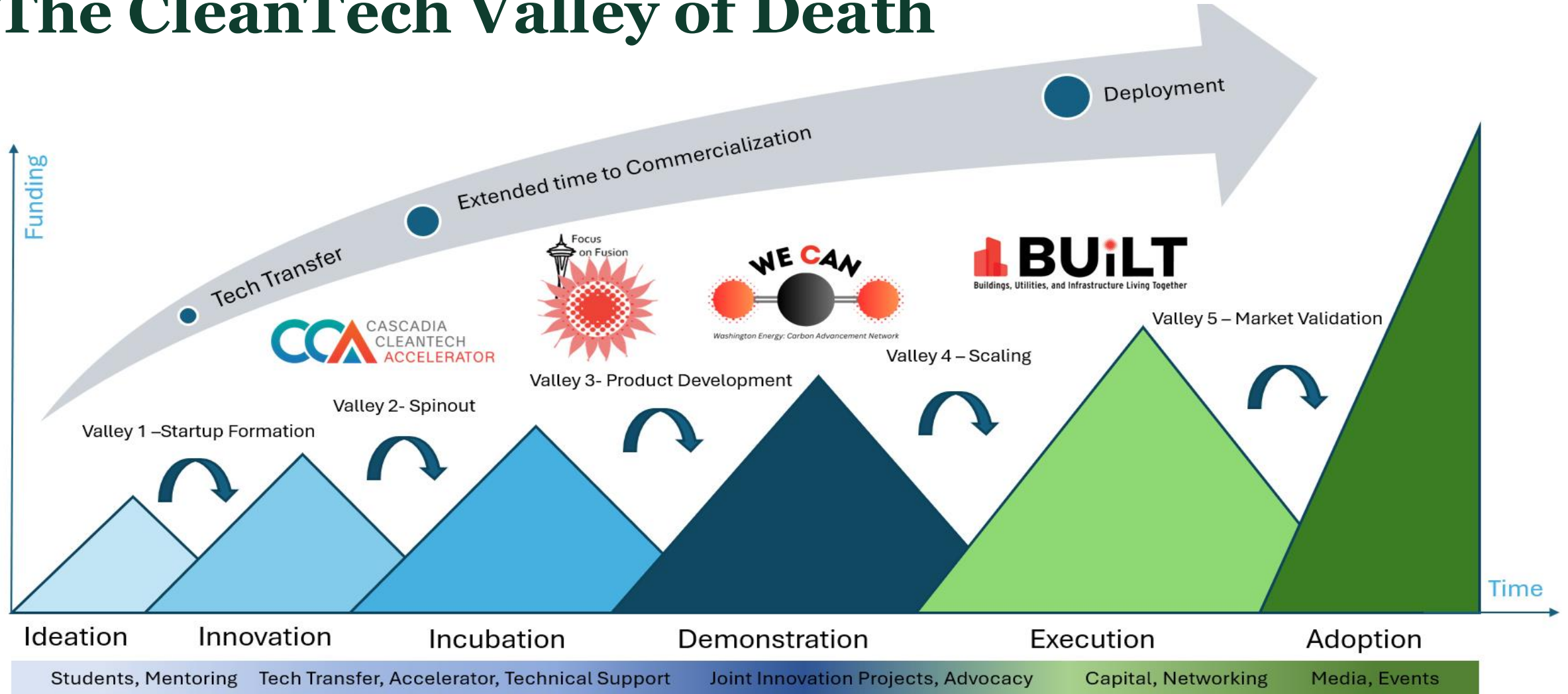
The CleanTech Alliance connects the clean technology ecosystem to drive innovation, economic development, and public policy to accelerate clean technology adoption, benefiting all communities.

1,000+

member companies across 17 states and 4 provinces



The CleanTech Valley of Death



|-----The CleanTech Alliance offers programming for every stop along the 'Valley of Death'-----|

Cluster Economic Development

HOW WE BUILD SECTORS

CleanTech Alliance leads multi-year cluster development efforts that help promising sectors assemble what they need to grow.

- Cluster Economic Development Projects Bring Partners and Competitors Together
 - Coopetition = Cooperative Competition
 - Challenges One Company Can't Solve Alone

Where industry comes to network and grow.

Where policymakers and partners come to work smarter.

Where research and academia come for connections and tech transfer.

Where communities come to understand what's possible.

Why We Built a Data Center Project

Home to one of the first hyperscale campuses and two of the four largest operators

GOAL ONE

Show the wins so far

- New builds specify closed-loop water, liquid cooling, and heat recovery
- Operators are among the largest corporate buyers of carbon-free power
- Little of this reaches the public conversation
- Documenting it shows clean tech innovation, jobs, and economic development

GOAL TWO

Bring more cleantech in

- Gigawatt-scale clean energy demand
- Heat recovery, load flexibility, water reuse, clean firm power
- Entrepreneurs need a route to procurement
- Clusters shorten that route

US Data Center Power Demand

Demand nearly doubled in two years, concentrated in large campuses

US Demand

66 GW

by 2027, from 31 GW in 2025

- US capacity reaches roughly 95 GW by the end of 2027.
Consumption was 176 TWh in 2023, 4.4% of US electricity.
- Projected at 325–580 TWh by 2028.

Pacific NW Demand

4 GW

projected by 2030

- Roughly five times the load of the city of Seattle.
- Regional forecasts show an energy gap near 9 GW by 2030 on current trajectories.

Corporate Buying

49%

of global clean power deals

- Contracting totaled 55.9 GW globally in 2025, down 10%.
- Meta, Amazon, Google, and Microsoft signed 49% of it.
- US volume hit a record 29.5 GW, driven by nuclear, hydro, and geothermal.

The largest sources of new load are also the largest corporate buyers of clean power.

Assumptions and Emerging Solutions

Where public coverage and current practice diverge

COMMON ASSUMPTION

EMERGING SOLUTIONS

WATER AND COOLING

Data centers are draining local water

Closed-loop cooling, recycled and reclaimed water

POWER

New load is met with fossil generation

Nuclear, geothermal, hydro, and gigawatt-scale wind and solar

IMPACT

Host communities carry the costs

Community benefits: tax base, wages, and local infrastructure

Water and Cooling

Where the engineering has moved on new builds

1

Closed-Loop Water

Common on new builds

New designs circulate water rather than evaporating it, cutting withdrawals sharply.

2

Liquid Cooling

Driven by AI rack density

AI racks passed what air cooling can carry. Direct-to-chip and immersion are remaking the mechanical supply chain.

3

Heat Recovery

Emerging opportunity

A data center is a large, steady source of low-grade heat.
Common in northern Europe. Rare in North America.

Power

Data center operators are among the largest corporate buyers of carbon-free electricity

FIRM CLEAN POWER

- Meta contracted up to 6.6 GW of nuclear in January 2026, including two advanced reactor developers.
- Microsoft signed a 20-year nuclear agreement with Constellation. Google contracted enhanced geothermal in Nevada.

UTILITY SCALE

- Microsoft contracted 10.5 GW from renewable developer Brookfield, the largest corporate renewables deal to date.
- Amazon reports more than 40 GW across over 700 projects.

FIRST OF A KIND

- Helion's Orion plant in Chelan County, Washington: 50 MW targeting 2028.
- The first commercial fusion power agreement. Microsoft is the offtaker.

Four buyers signed half the world's corporate clean power contracts in 2025.

Impact

Twenty years in Quincy, Washington

Property Tax

Grant County, 2006–2025

Mostly paid by data centers

\$54M

up from \$4.24M in
2006

Local property owners paid an estimated 71% less than they otherwise would have. The revenue funded a new hospital, police department, city hall, and a \$110 million high school.

Poverty Rate

City of Quincy

Roughly cut in half

~15%

down from above
30%

Seasonal agricultural workers moved into year-round employment. More than 10% of the town now works directly at a data center.

Population

City of Quincy

Growth, not decline

+57%

since 2006

Microsoft bought land here in 2006 and opened its first building in 2007, on former farmland. At least 26 data centers have followed, drawn by fiber the local PUD had already put in the ground.

Water Use

Metered, not modeled

Recycling system on site

5%

of local water use

Agriculture accounts for 57% and homes and small business for 33%. These figures come from meter readings rather than estimates.

The origin of the power-first rural siting model now used nationwide.

Constraints and Challenges

Three limits on how fast any of this gets built

THE CONSTRAINT

WHY IT MATTERS

WORKFORCE

Not enough skilled trades to hold schedules

Labor availability can affect site selection

POLICY

300+ bills across 30+ states this year

New policy can create opportunity for more cleantech solutions in data center supply chains

DEPLOYMENT

Interconnection is often slow and uncertain

Projects are built where they can be powered

Workforce Is a Constraint

Construction labor limits how fast campuses get delivered

The numbers:

On site at peak	A typical large data center runs up to 1,500 workers on site. Peak hyperscale crews have gone from roughly 750 to 4,000 or 5,000.
Trades in demand	Electricians, pipefitters, ironworkers, HVAC and controls technicians, commissioning agents, and high-voltage substation crews. Not interchangeable labor pools.
The shortfall	The construction industry needs roughly 349,000 additional workers in 2026, near half a million in 2027, with 41% of the current workforce retiring by 2031.
What is changing	Operators now fund training directly. Apprenticeship capacity and community college programs are competitive advantages for a region.

The same labor constraint applies to solar, storage, and nuclear construction.

State Policy Is Moving Quickly

Incentive-focused policy is shifting toward regulatory oversight

WHAT MOVED	SCALE
Bill volume	300+ bills in 30+ states, in six weeks
Large-load tariffs	24 states approved, 4 more pending
Water disclosure	Spreading reporting rules, state by state
Moratoria	12 states considered pauses; most failed
Tax incentives	Under review credits cut in several states
Rate design	Oregon proposal pending PUC approval

Deployment Constraints

Policy ambition is running well ahead of generation and grid capacity

0.2%

*Bonneville Power Administration
interconnection success rate for
large projects*

250+

Stalled clean energy projects sitting in the Northwest queue

\$149B

Estimated economic activity waiting on interconnection

9 GW

Projected Pacific Northwest energy gap by 2030

28%

Comparable interconnection success rate in Texas (roughly 10% in the Midwest)

Speed to Power Decides Siting

Build time and grid access, not fuel preference, are setting the generation mix

Time to Build

18

months to a simple-cycle gas plant

Solar and storage build as fast, but cannot serve firm load on their own. Advanced nuclear is a 2030s proposition and enhanced geothermal takes years to drill and prove.

The Queue

356 GW

of data center requests in ERCOT, March 2026

On-site gas skips interconnection entirely. Grid-connected clean generation does not, and only about 10% of queued capacity is ever built. The queue filters one set of resources and not the other.

Actually Running

2 GW

of on-site generation online, mid-2026

Planned on-site gas has grown from 24 GW to 64 GW in a year, but most of what is running is one company's turbines outside Memphis. Air permits are emerging as the constraint on the rest.

Two factors: how fast a resource can be built, and how long grid access takes.

Six Gaps in the Sector

CleanTech Opportunity

THE GAP	WHAT IT NEEDS
Waste heat	Capture and reuse for buildings and industry
Flexible load	Controls and on-site storage
Water	Reuse, treatment, and monitoring
Clean firm power	Geothermal, nuclear, fusion
Faster construction	Modular parts and cleaner concrete
Recycling and reuse	Recover equipment and materials



Community portal

Next Steps

THREE WAYS TO ENGAGE



Newsletter

THE PROJECT

Our event series connecting all interested parties in the data center sector, sponsored by Ashurst Perkins Coie.

DATA GROUP

Decarbonization, Adaptation, Technology and Action. Initial meetings this fall. We are seeking advisory board members to scope and sequence projects.

EDUCATION

Connect with us to contribute to ongoing resources.

WHERE WE CONVENE

Data Center Series — August 12, October 14, and November 10, 2026

CleanTech Innovation Showcase — September 3, 2026 · PNNL Discovery Hall, Richland, WA

Cluster gatherings — year-round

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Thank you

Questions welcome

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Sources

CleanTech Alliance Data Center Series, sponsored by Ashurst Perkins Coie

Demand and load

Goldman Sachs Research, US Data Center Power Demand Projected to Double by 2027 (May 2026)

Lawrence Berkeley National Laboratory, LBNL-2001637 (Dec 2024)

Northwest Power and Conservation Council (2026); Energy + Environmental Economics (E3) via OPB (Apr 2026)

Bonneville Power Administration queue data; Grant County PUD

Procurement and projects

BloombergNEF, 1H 2026 Corporate Energy Market Outlook (Feb 2026)

Company announcements: Meta, Microsoft, Google, Amazon

Energy Northwest, X-energy and Amazon, Cascade Advanced Energy Facility; Helion Energy and Constellation Energy, Orion

Global Energy Monitor, Cleanview and RBC Capital Markets (on-site gas); ERCOT queue data (Mar 2026)

Community and workforce

Washington State data center workgroup via Puget Sound Business Journal; The Center Square interview with Rep. Alex Ybarra

McKinsey (construction headcount); Associated Builders and Contractors (workforce shortfall)

Data Center Dynamics and IDEA (heat reuse)

Policy

MultiState and ArentFox Schiff state legislation trackers (2026)

Edison Electric Institute, Large Load Projects and Tariffs (Jun 2026)

Oregon Public Utility Commission docket, Portland General Electric rate proposal, pending approval; Germany Energy Efficiency Act (EnEfG)

Full source mapping is maintained in the internal-cited versions of the Data Center Series papers.
