

From: [Phan, Johnny](#)
To: [Downtown West Project](#)
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From: Miller, Gregg <gmiller@coblentzlaw.com>
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Subject: Google - Diridon/DW - District Systems Briefing Deck

[External Email]

Johnny: here is the district systems deck.

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Downtown West District Systems

Briefing

March 12, 2021

Google



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AGENDA

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What We Will Cover

01

**Overview &
Status**

02

Why District Systems

03

What are District Systems

04

**System Overviews
Options and Precedents**

05

**Different Structures
for Microgrids**

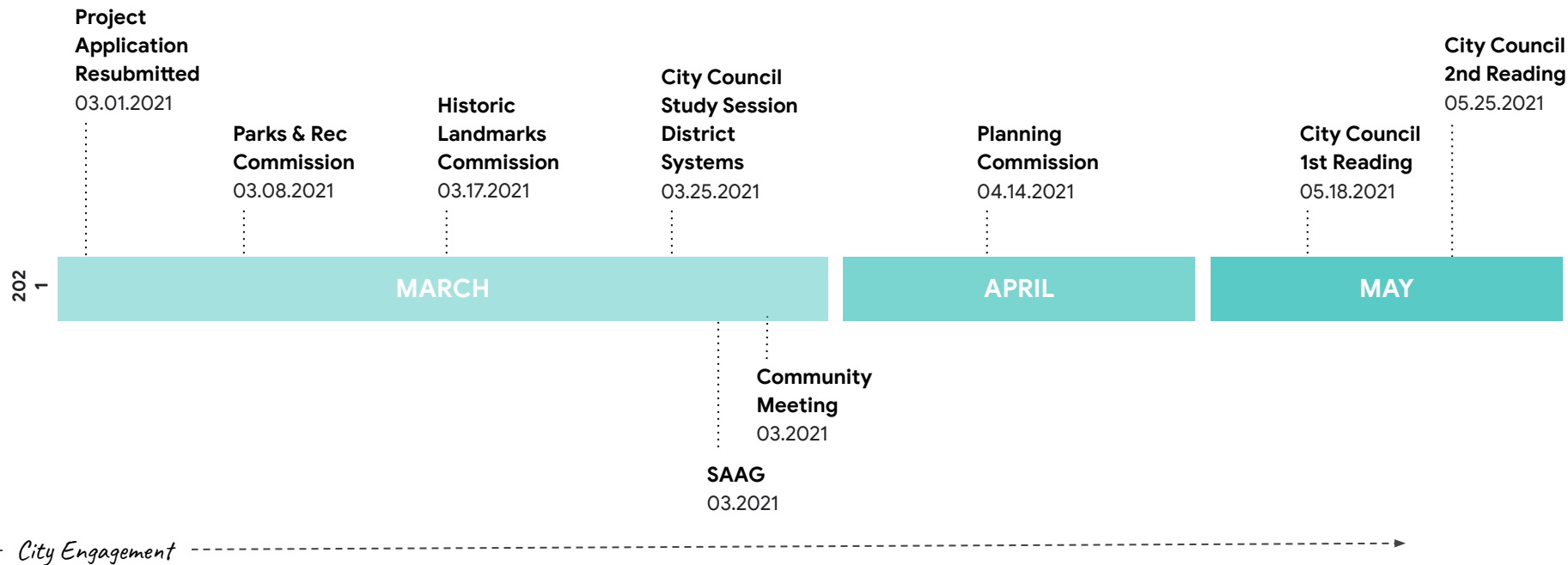
06

**How are the Systems
Integrated into the Project
Approvals?**

TIMELINE

Next 90 Days

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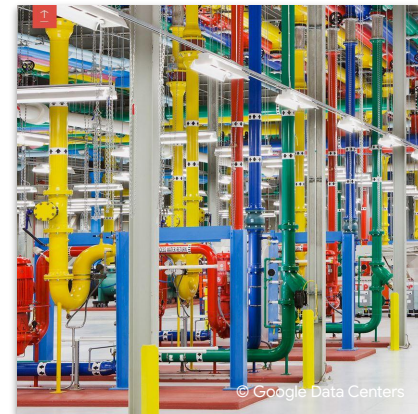


Overview & Status

To provide an update on **what are District Systems**, and how they integrate into the Downtown West.

Outline the **pivotal nature** of the systems, securing the innovation and environmental objectives.

Receive feedback and answer any questions ahead of forthcoming study session on District Systems.



Why District Systems



District Systems Alignment



Reduce per capita energy 50% by 2022

Facilitate 200,000 solar roofs by 2040

100 M sq ft green buildings by 2040

Recycle or beneficially reuse 100% of wastewater



Paris-compliant pathway

Renewable energy, density

Embracing the Californian climate

Creating local jobs and innovation



Strategic & Master Plan

Increase recycled water; to 40,000 AFY by 2025, and 50,000 AFY by 2035.



All-electric buildings with no new gas connections

Higher penetrations of electric vehicles for all building types

Solar-ready buildings

MOU – Realize the Potential

Mixed-use

Addressing the unique characteristics of Diridon, **maximizing the benefits** from mixed-use development.

District Systems

Collaborate in the study of shared utilities across all resources.

Open to Innovation

Approach for development plan – focus on **placemaking**, economic, social equity and environment outcomes.

Balanced Development

Create a vibrant urban destination, advancing economic opportunity, social equity and environmental sustainability.

Optimize Sustainability

Advance the City's sustainability goals, including reducing GHG emissions aligned with the Paris Agreement.

Excellence in Design

Create a new model urban tech workplace that is well integrated. Create innovative and replicable building design and scalable urban models.

Addressing a Global Challenge

Humanity is consuming natural resources at an astonishing rate. During the 20th century, global raw material use rose at about twice the rate of population growth. Every year, humanity consumes far more than what the planet can naturally replenish.*

The scale of transformation will be significant and may require a commitment of 2.6 percent of our city gross domestic product (GDP) each year through 2050. However, with climate action comes the economic benefits of energy independence, fossil fuel avoidance, and improved efficiency, resulting in a savings of 2.4 percent of our GDP. The result is a city that is sustainable and climate smart, vibrant and connected, and economically inclusive.**



* Google Environmental Report - 2019

** Climate Smart Plan, City of San Jose.

District Systems Benefits

Google is fully funding the systems to realize the project's potential — separate from the community benefits package — creating a model that can be replicated across the city.

Human and Social

Protection from rising utility costs through efficiency and local generation.

Engages and empowers the community in a collective effort to manage energy and water use.

Opportunity to provide low-cost services to affordable housing.

City can replicate and maintain its leadership position in protecting people from climate change.

Public Health

Minimizing noise impacts and reducing exposure to pollutants through system consolidation.

Making room for more green areas, enabling access for physical activity and social gathering, contributing to public health outcomes and belonging.

Community anchor or public-facing educational component can be designed into central utility plant.

Utility trenches (utilidors) minimize visual impact on City streets and networks.

Resilience

Reduced pressure on constrained existing networks.

Backup power for essential services during grid outages, creating shelter in a central downtown location.

System-wide upgrades enabled through central plants, allowing adaptation to climate, market and new technology.

Renewable future, relying on carbon-free energy (no net new greenhouse gases)

District Systems Outcomes

22%

carbon reduction,
equivalent to
taking **4,100 cars**
off the road

Zero

Net new
CO₂ emissions

10%

Geothermal energy
sufficient to service
large office building

7.8MW

Solar energy, sufficient to
serve **1,500 homes**

100%

Recycled water for all
toilets, irrigation, cooling

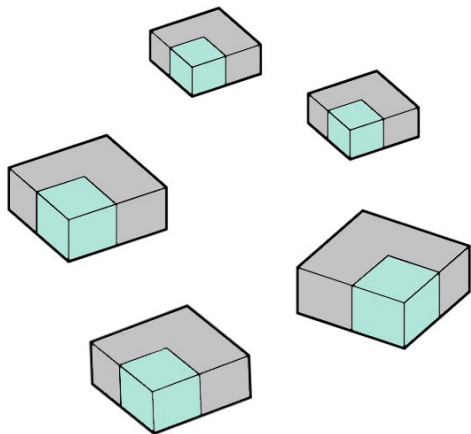
29%

Reduction in potable water
equivalent to **1,500 homes**

What are District Systems?

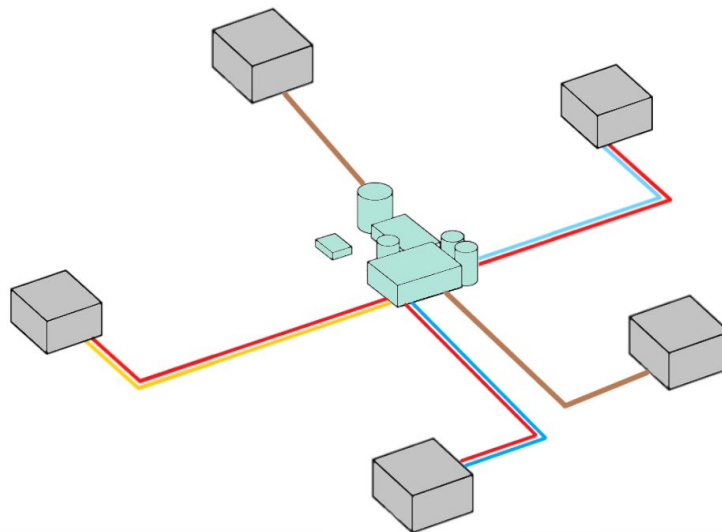
Centralized Systems

Individual “back of house” systems per building, each system sized for peak load



Typical systems

Central consolidation across district shares resources, is more efficient -- thus **enabling higher environmental performance**

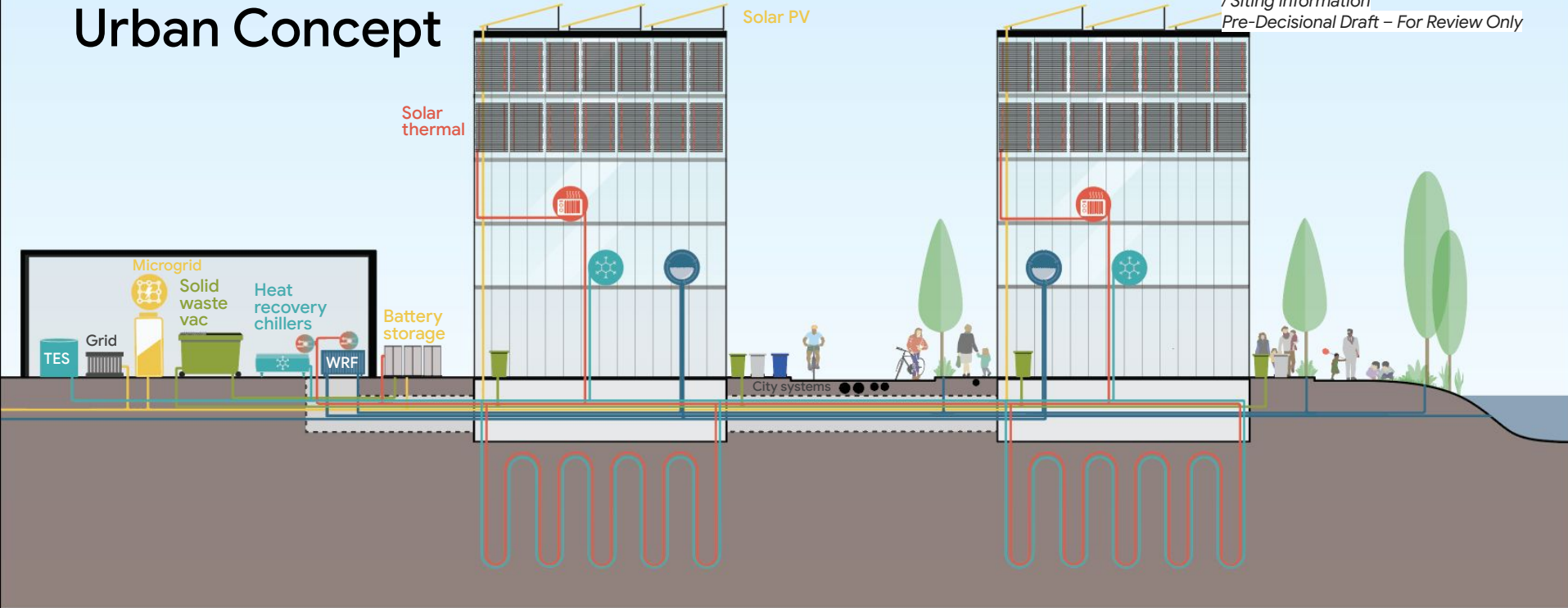


District systems

DISTRICT SYSTEMS INTRODUCTION

Urban Concept

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Heating

Heat recovery chillers
Wastewater recovery



Power

Microgrid
50% Rooftop solar
Battery storage



Cooling

Heat recovery chillers
High efficient chillers
Ground source heat pump



Water*

Water reuse facility
Reduction in potable
water

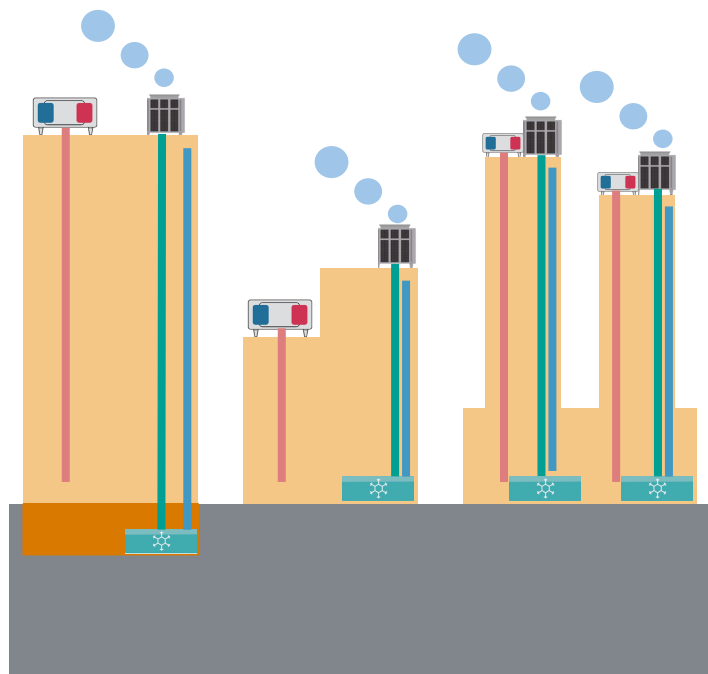


Waste*

AWCS
Anaerobic digestion
Solids management

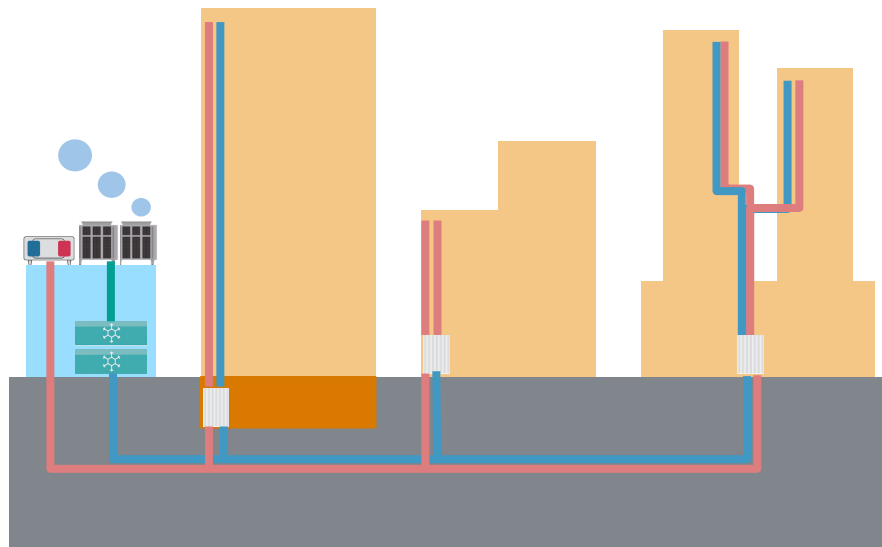
*City alternatives are maintained as options for the project

District Heating and Cooling—An Example



Conventional System

Heating + Cooling Systems by Building

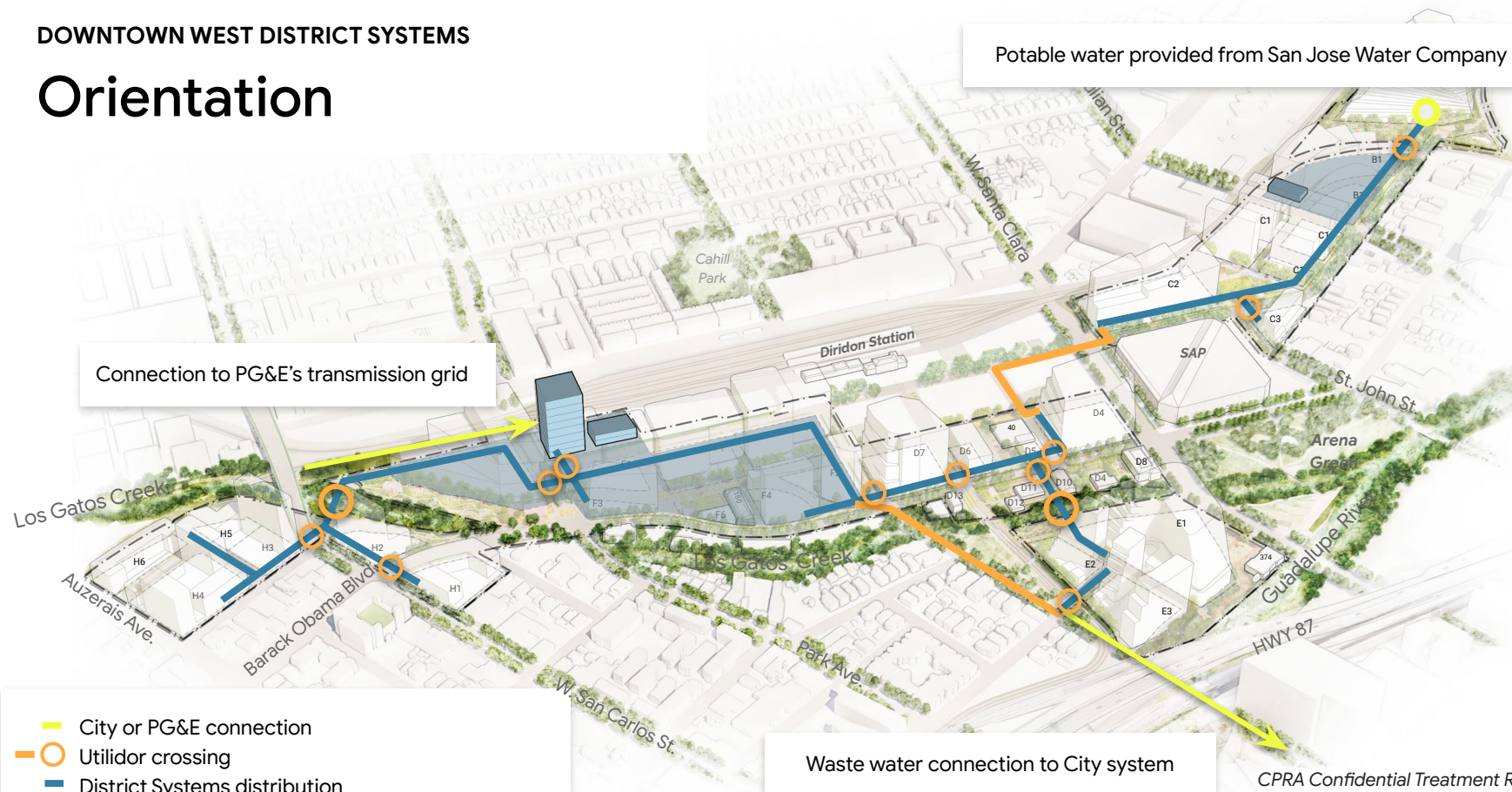


District System

Central Heating + Cooling, Distributed to Buildings via Pipes

DOWNTOWN WEST DISTRICT SYSTEMS

Orientation



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Systems Overviews Options and Precedent

DOWNTOWN WEST DISTRICT SYSTEMS

Thermal Systems

‘Mainstream’ infrastructure in major global Cities.

They are now in their 5th generation.

Barangaroo is a shining example, with cooling driven by Sydney Harbour, supporting a ‘carbon neutral’ district.

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1390 Borregas, Sunnyvale



Bayview, Mountain View



Barangaroo, Sydney



Elephant Park, London



Stanford University

DOWNTOWN WEST DISTRICT SYSTEMS

District Water

Established technology and infrastructure approach in large scale mixed use projects.

Safe and reliable operations, providing new sources of water as part of City plan.

Hudson Yards is a good example of how district water can be embedded in an urban context.

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1390 Borregas, Sunnyvale



Bayview, Mountain View



Barangaroo, Sydney



Hudson Yards, New York

MICROGRID

Evolution and Growth of Established Market

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Microgrids adoption is accelerating, with a doubling of the market up to **2026**.

Growth underpinned by maturing regulatory, technology & market mechanisms.

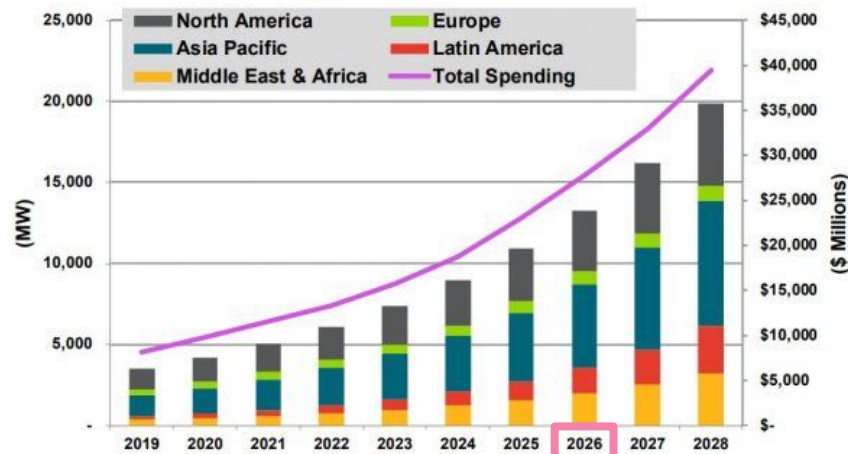
The US will remain the top market for grid-tied microgrids.

Significant market consolidation, a sign of a maturing market is occurring, with large corporations acquiring small innovators.

Microgrid capacity in the U.S. is forecasted to double between 2017 and 2022.

Downtown West is anticipated to be 0.25% of global microgrid capacity in 2026.

Chart 1-1. Annual Total Microgrid Power Capacity and Implementation Spending by Region, World Markets: 2019-2028



Sources: [Microgrid Market in the USA](#), [Microgrid Knowledge](#)

MICROGRID

Sectors and Locations, Legislative Reform

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In response to aging grid infrastructure and extreme weather events growing numbers of U.S. states have approved **microgrid support programs**.

112 bills have been proposed or enacted in 18 different states over the past 5 years - addressing Microgrids.

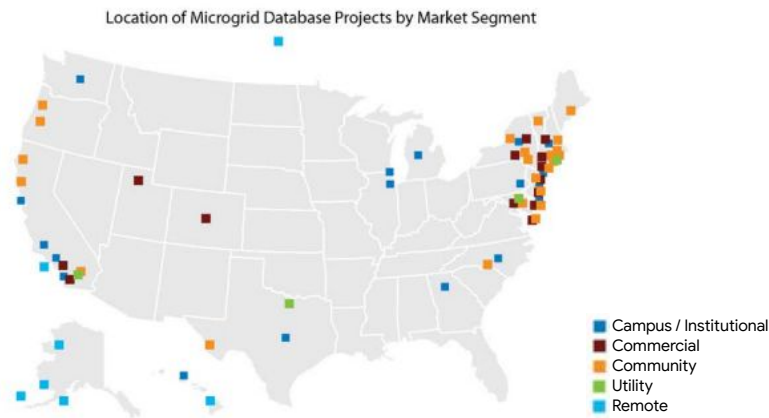


Figure 1. U.S. map of NREL microgrid project database locations per market segment

Different Structures for Microgrids

Microgrid Project Options

San José Owned

Municipal Supply

The City of San José is investigating the potential to provide a service to Downtown West

Gonzalez Industrial Business Park Microgrid

(Completion 2022)

Private power company owns and operates generation assets to sell to municipal-created utility for distribution.

Philadelphia Navy Yard

(Operational 2016)

Abandoned unregulated shipyard grid acquired by a public company (PIDC), which sought approval from PUC as an unregulated utility.

PG&E Owned

Incumbent Provider

PG&E has potential to service Downtown West via Community Microgrid Enablement Program (CMEP)

Redwood Coast Airport Renewable Energy Microgrid

(Complete Nov 2021)
CCA own and operates generation assets and sells wholesale to PG&E, which governs microgrid.

Google Owned

Privately Operated

Conditional on primary regulator approval. Unique circumstances and characteristics influence design

Hudson Yards Microgrid

(Operational 2019)
Unique utility Offset Tariff allowed distribution to neighboring loads on the same property

Apple Cupertino

(Operational 2017)
16 MW Solar, 4MW biomass
Fuel cell.

Municipal - Gonzales Microgrid

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Schematic of Gonzales-Concentric microgrid. Courtesy of Concentric

The microgrid will have the ability to fully island from the main grid, allowing the industrial park to self-generate. The project will help Gonzales meet its Climate Action Plan.

Location: Gonzales CA

Installed: 2022 COD

Utilities: Heating, Cooling, and Electricity

Owner: Gonzales Electric Authority / Bodega Microgrid Generation LLC

Operator: Bodega Microgrid Generation LLC

Area Served: TBD, 35 MW of electrical load supplied

Customer Types: Commercial office and industrial

Key Details

- The microgrid will use solar and energy storage with natural gas in a supporting role; specifically, 14.5 MW-AC of solar, 10 MW/27.5 MWh of battery energy storage, 10 MW of flexible thermal generation and a Concentric microgrid controller.
- Investment to be funded primarily through private developer \$70 million amortized over 30 years by selling power on a wholesale basis to the city's new utility. The new Gonzales Electric Authority will contribute about \$10 million, and take ownership of the distribution assets. Draft Energy Services Agreement has been publicized [here](#)
- The microgrid is expected to provide cost savings to its customers, by selling power to the authority at a wholesale rate of 11.75/kWh

PG&E - Redwood Coast Microgrid

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Location: Arcata CA

Installed: Ongoing

Utilities: PG&E/RCEA

Owner: Public Private Partnership - Redwood Coast Airport / Schatz Energy Research Center / Coast Guard and RCEA

Operator: RCEA/ PG&E

Area Served: Humboldt County

Customer Types: Commercial, industrial, EV charging, and military

Key Details

- First front-of-meter, multi-customer microgrid on the PG&E (DSO) system; 100% renewable
- RCEA (CCA), owns & operates generation
CCA controls generation in blue-sky mode
DSO dictates islanded operation
- 2.2 MW PV array DC-coupled to 2.2 MW/8.8 MWh battery storage
Blue-sky: CAISO market participation
Island mode: grid-forming generator
- 300 kWAC net-metered PV array reduces airport electric bills



Private System - Hudson Yards Microgrid

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Location: New York, New York

Utilities: Heating, Cooling, Electricity, Rainwater Harvesting

Owner: Hudson Yards Microgrid Company (HYMco) – Privately owned

Operator: HYMco

Area Served: 18 million square feet

Customer Types: Retail, hotel, schools, offices and residences

Key Details

- Grid tied Microgrid (similar to Downtown West), including two CHP/tri-gen plants (14.5MW capacity - serving circa 38MW peak demand) producing elect, cooling, & heating. ConEd provides primary grid connections.
- Electrical and thermal metering at each building managed by HYMco to bill tenants for heat, cooling, and electricity use based on published tariffs and submetering agreement.
- Cooling in pavement also used to cool trees and help offset heat of subterranean trains.
- There is a private operating model which controls the relationship between the commercial owners, condos and HYMco.
- There are provisions to address the failure of the business or service (microgrid and thermal), with a range of remedies, including temp solutions & self help.

How are the Systems Integrated into the Project Approvals?

Entitlement

Development Agreement

General Plan/DSAP

Municode/Zoning

Infrastructure Plan

DWDSG

DWIS

Encroachments

Vested Tentative Map

EIR

Covers three options for microgrid ownership, sets development standards for central utility plant, analyzes environmental effects of project including district systems, enables utilidor crossings, covers conditions of approval related to district systems.

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**City Council
Public Hearing on
Downtown West**



**Conformance
Review**

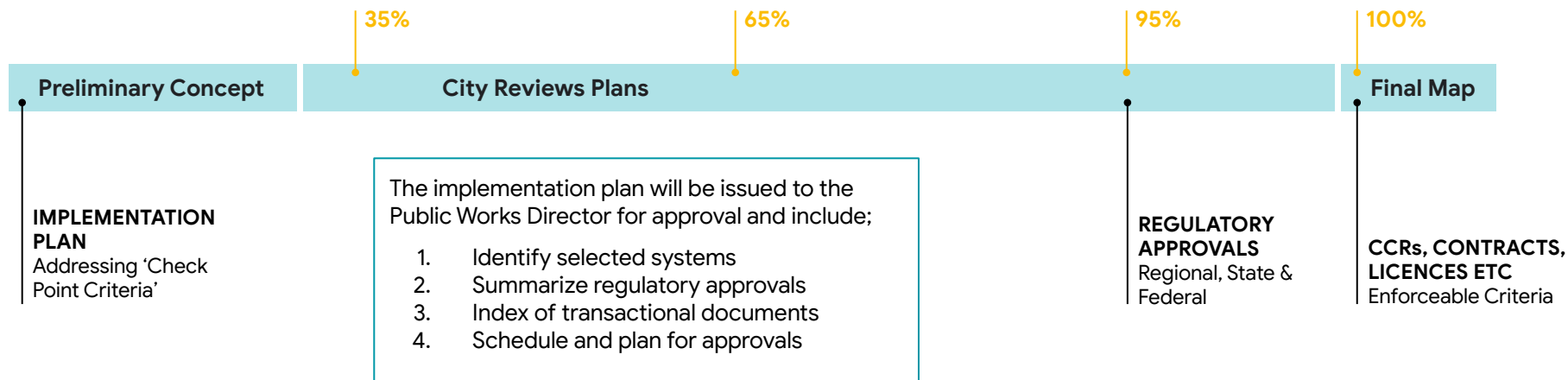
PROPOSED CONDITIONS OF APPROVAL

Checks and Balances

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Criteria	Check Point	Description
Service Levels Performance/Procedures	Customer & Service Standards	Criteria are included within Conditions of Approval within the Vested Tentative Map.
Rate Equity	Rates Guarantee	They address development and operation of the systems across the life cycle.
Safety Standards & Operations	Statement & Plan	Ensuring reliable, safe and equitable outcomes for the Community.
Capital Replacement & Improvements	Obligation & Right*	Checks & balances will be included within covenants, including obligations with respect to capital replacement and improvements.
Tenure & Exclusivity	Enforceable Covenant All connected assets	To underpin the private operation and ownership of the system there will be specific development commitments.
Continuity of Supply	Office Obligation Assume role in failure	Including an obligation for office owners to step in to operate the system should the operator fail. Ensuring capital is available to preserve the systems and provide continuity of service.
Qualified Operator	Minimum Experience Clause in documents	Provisions to address when and who the systems can be assigned to - with thresholds on experience in sector and credit worthiness.
Assignment Limits	Infrastructure & Asset Experience	

Conformance Review Implementation



District Systems Outcomes

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toilets, irrigation, cooling

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Reduction in potable water
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Thank You!

Google

San José