

**From:** [O'Connor, Kevin](#)  
**To:** [Downtown West Project](#)  
**Subject:** FW: District Systems FAQ  
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**Attachments:** [District Systems FAQ.pdf](#)  
[Untitled attachment 00867.htm](#)  
[District Systems Briefing Speaking Notes.pdf](#)  
[Untitled attachment 00870.htm](#)

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**Subject:** Fw: District Systems FAQ

Hi! Here are notes/anticipated FAQ from the DTW team.  
Sharing in case they are useful to you.

Thank you!

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## FAQs + BACKGROUND INFO

\*Indicates a question raised by a Councilmember in pre briefings.

### 1.0 General Questions

**Q. Why can District Systems not serve a wider area, DSAP, wider City?\***

A: This was considered early on in the project analysis. There were constraints, as Google would be required to serve lands outside of their direct ownership and this coupled with uncertainty on phasing/timing limits expansion.

There is some potential for the City via the optional City owned Microgrid to serve the broader DSAP area. The collective development work by the City and Google on the topic, does enable for these systems to be replicated in other areas of the City.

**Q: Will district systems be provided in affordable housing parcels?\***

A: One of the goals of the project will be to provide equitable access/opportunity to affordable housing.

The dedicated affordable housing parcels can connect to the system at their election, subject to regulatory approvals and phasing (availability of the service locally at the time of construction).

**Q: How is learning and innovation addressed relative to District Systems?\***

A: Google is committed to creating an interactive learning environment centred on District Systems. This commitment is outlined with the project DWDSG.

The technology is innovative, and this information will be shared with the Community to provide an understanding on how resources can be managed proactively. Onward Community engagement will be a feature of the District Systems project.

**Q: Will District Systems address heat islanding?\***

A: Yes, by providing recycled water to the project, it will support plants and trees and ecology. This will assist the efforts to reduce heat islanding.

Also the reduction in carbon emissions of 22% at a project level as a result of the District Systems will help the City in its overall efforts to offset climate change.

Further heat rejection on the project from the plant will be reduced due to the consolidation of the systems.

**Q: We see the Barangaroo example in Sydney relied on the harbour to generate its efficiency, we don't have that opportunity in San Jose?\***

A: We don't have such a resource available, however Google is including options that will provide similar outcomes such as geothermal energy, that will provide improved environmental outcomes.

**Q. Has Google shared their plans with the electrical unions? Are there plans to use union labor?**

A: Yes, Google has engaged the Labor Council, Building Trades Council and related IBEW locals. Google also plans to hire a qualified company to run the district systems and will expect qualified labor to support the functions to maintain a safe and reliable system.

**Q: Why and how is there more green space provided?\***

A: The systems are consolidated and that removes equipment (back of house systems) from each of the buildings in the project including cooling towers, chillers and heat pumps. This opens up space for green space at roof level, or alternatively more space for solar panels.

Furthermore service areas and maintenance points at ground floor are reduced, creating an improved ground floor, urban experience.

**Q: How is encroachment handled and are there easements?\***

A: The City and Google have worked on an encroachment agreement which allows for the utilidors to be developed below the ROWs, for specific street crossings. Easements and licenses for internal routing of services through the parcels will be addressed in the Vested Tentative Map and confirmed within the design stage before recording in the final map.

**Q: How are the District Systems Criteria embedded and committed in perpetuity?\***

A: The criteria are embedded in the transactional documentation for District Systems established within the implementation plan and recorded on the final map,, to run with the land.

**Q: Is Google considering Anaerobic Digestion?**

A: That is one option for the project, that will be reviewed in the design stage. The other option is to rely on the existing City plant. More work needs to be done on this within the detailed design stage - with careful consideration of the scale and impacts.

## **2.0 Microgrid Questions**

**Q. How do you make the choice of what microgrid option to take?\***

A: It depends on a number of factors, timing of the project, phasing and the readiness of each party to proceed. Google will work with each of the parties to determine the best path for the project.

Each of the options requires further development. Google and the City are supporting discussions on all, to ensure that the microgrid is delivered.

Google is agnostic on the choice of system, and is developing their own option as a potential back stop to achieve the project objectives. They have funded the investigation by the City on the municipal option and are supportive of this and the PG&E options.

**Q. What are the back up power options for the microgrid - at the Central Utility Plant (CUP) level or beyond?\***

A: The microgrid enables a range of options for power back up, beyond a business as usual network. The options are under review by the project and subject to further design development,

The options being explored include;

- consolidation of backup diesel generators to limit size,
- potential use of batteries to avoid back up via diesel generators and;
- increased use of renewable power via solar generation to provide base load during a power outage.
- The back up of the central utility plant to provide critical services during an outage.
- Power to be directed to Community facilities in an outage.

**Q: How is the City Option funded - now and in the future?\***

A: To date Google has funded the study by the Community Energy Department of the City. Google will work with the City through the DA to further support the City in its investigations. Noting its a matter for the City to decide to proceed with the system.

If the City municipalized option is taken then Google will develop and build the system and the City will then take over operation having agreed terms with Google on future electrical service supply.

**Q: Policy and City alignment, how will the Microgrid impact the Clean Energy business?\***

A: Google is directly working with the Community Energy business on the development of the City option. If this option is taken that will see an expansion of service provision by the City.

With the PG&E and Google options, there is potential for San Jose Clean Energy to provide energy supply across the Microgrid. The decision requires further research and development.

**Q: Why does the City commit to microgrids, what's the risk and reward?\***

A: The City from a policy perspective is committed to providing clean and resilient power to its Citizens. There is a great opportunity to build on the success of San Jose Clean Energy, and provide a microgrid service on Downtown West with Google. There is a vested interest for both parties, outlined in the MOU established in 2019. Securing the system here provides an opportunity for the system to be replicated offering benefits to other areas in the City.

**Q: Will all buildings have solar installed?\***

A: The majority of the buildings in the plan area will have solar installed as an integral part of the microgrid system.

There may be some limitations on historical buildings, but this will be a particular exception.

Largely the solar installations will be a roof level, with the potential for further solar at high level on vertical facades. In total Google is committed to installing 7.8MW of solar on the project, offsetting carbon emissions equivalent to 4,100 cars.

**Q: How does the Microgrid work, what is island mode and how much of power back up is provided?\***

A: If there is a local or regional power outage on the PG&E transmission system, then the system can switch off from the grid and operate on its own local resources including solar PV, back up generation and storage. The amount of back up power provided will be subject to further design, but approximately 20% to 25% of the capacity of the system will be provided for periods of time.

**Q. What is a Microgrid?**

Microgrids are 'localized electricity networks' that support increased deployment of renewable energy (Solar PV) and back up power systems (including batteries).

They distribute and regulate the flow of electricity within a local neighbourhood or district seeking to increase resilience and environmental performance.

The proposed DTW systems will be tied to the PG&E grid, and in normal operation the systems will function like any other electrical system. When there is a failure of the electricity grid for example in a power safety, power shut off event (PSPS) the microgrid isolates from the PG&E grid and supplies power to the project from its own generation and storage assets.

**Q. Why are Microgrids important?**

With increasing occurrences of wildfires in California, power shutdowns have made it an important reminder that resilience and reliable systems for power generation and distribution are needed to not only allow businesses to operate during extended shut downs, but also to relieve the burden on the aging infrastructure. This is also important for equity, as underserved communities as usually the hardest hit by extreme weather conditions and associated loss of power.

One key benefit of microgrids is that they can disconnect from the utility grid through the integration of renewable sources of energy that can operate autonomously, strengthening the resilience and reliability of the regional grid, mitigating the use of fossil fuels (e.g., diesel generators) and producing a significantly lower carbon footprint. One objective will be to direct power to support 'places of refuge' within the project to support Community activities during Power Safety Power Shutoff (PSPS) events.

Microgrids maximise the use of local energy sources to produce and store power and therefore are less impactful on the environment than the utility grid as a higher proportion of the energy is created close to where it is utilized.

**Q. Assume that the Microgrid has regulatory barriers for PG&E/City?**

The PG&E option is an approved programme by the CPUC, but the project application is under review between Google and PG&E. The City option is subject to further detail review and will be addressed in the forthcoming Council review session.

The Google option is subject to review with the CPUC, and as currently envisaged requires further regulatory progress, but is being maintained as an option given the regulatory environment is evolving.

#### **Q. How do Microgrids work?**

The system largely mimics a normal grid with electrical distribution, transformation of power to lower voltages, switching and metering systems ensuring safe and managed supply.

In DTW it is proposed that the project secures power at 115kV from PG&E and then transforms down to 12/21 kV for distributions to the buildings via a project specific substation located in the south of the project area. The primary supplies will be provided by PG&E via existing 115kV networks in the area. The primary supply networks from PG&E that transverse the site and feed the microgrid will be undergrounded to renew these networks and to create an improved urban outcome for the Community.

There will be a specific switching station developed by PG&E to enable the safe supply of power of the project and to allow the system to be 'islanded' from the main power grid in the event of a power outage or PSPS event. The supply will be reconnected when the PG&E grid is returned to normal operation.

Individual solar PV, storage and generation facilities will feed into the grid and be routed to maximise environmental performance and to improve resilience. The facilities will be distributed across the buildings on the project.

A Microgrid controller will be used to manage the system through optimizing energy usage and seamlessly integrating renewable technologies. This will enable the project to harmonize supply and demand for electrical energy.

### **3.0 Thermal**

A district energy system is an integrated platform of energy production and network of pipes that distributes heating and cooling fluids to buildings across a neighbourhood, district or entire city. A district systems approach looks at optimizing systems at the right scale: in the case of thermal, it realizes the benefits of larger scale with mixed use buildings by capturing diversity in loads and consolidated operations and maintenance.

#### **WHY IS IT IMPORTANT?**

District energy reduces carbon, which is by recovering, storing and reusing heat rather than burning fossil fuels to generate heat. Further, district energy systems provide economies of scale and better energy management opportunities compared with building-level systems. These systems can create efficient synergies between the production and supply of heating, cooling, domestic hot water and electricity, and can be integrated with municipal systems such as power, sanitation, sewage treatment, transport and waste. From a cost perspective, compared with building-by-building technologies, district energy is frequently more cost effective by up to 50 percent.

### **4.0 Recycled and Waste Water**

District recycled water means locally treating wastewater to reuse for a beneficial purpose. All non-potable water uses can be supplied directly with non potable water generated onsite, offsetting potable water from the utility and reducing the constraints on the wider system.

#### WHY IS IT IMPORTANT?

California currently consumes more water than any other state; using the equivalent of its largest reservoir, Lake Shasta, every 40 days; compounded by the fact that California's population is expected to grow upwards of 30% by 2050. To mitigate water shortages, it is important that communities within the Bay Area work together to promote water conservation through the use of alternative sources of water treatment and reuse to help improve quantity and quality of recycled water. For example, water reuse (treated wastewater, or "reclaimed" water), for beneficial purposes such as irrigation, or industrial uses is an effective option that has helped some communities significantly maintain, conserve and expand their water supplies.

#### HOW IT WORKS

Through a combination of onsite wastewater collection, treatment and reuse, as well as leveraging regional partnerships for broader participation, a district recycled water system can enable the implementation of various strategies and opportunities to improve quantity and quality of recycled water usage.

#### **Q. Does the wastewater treatment plant smell, is their noise?\***

**A:** District water reuse systems are prevalent in many cities across the US and globally and operate safely while producing a new water supply. Two examples shown in the presentation include Salesforce Tower in San Francisco and Barangaroo in Sydney where facilities with waste water treatment are integrated into the development adjacent to offices and residential buildings. The technology is safe and reliable and Google is developing its buildings adjacent.

#### Odors

- Local wastewater treatment is different from regional facilities
  - Local treatment is much closer to the source, which avoids unpleasant odors (i.e. those caused by uncontrolled low-oxygen conditions & open-air drying of solids)
- Compliance with air quality regulations & standards
  - Regulations & standards set by Bay Area Air Quality Management District (BAAQMD)
- Appropriate design and controls will be established
  - Permit to operate will be issued by the BAAQMD
  - Engineering design will provide control and monitoring of odors
  - Odor controls will be designed using the 'best available technology'

#### Noise

- Standard equipment will be used at the water-reuse facility (e.g., air blowers, air compressors, pump systems)
- Noise levels will be attenuated down to acceptable levels

**Q. How are you interfacing with the City's system - how is this impacting the regional plant, are you treating all waste?\***

**A.** The onsite wastewater system is not an island, it is interconnected to the City system. The amount of waste water treated will be matched with the demand for recycled water on the project. This means that a proportion of the wastewater on the project will be discharged to the City system as normal, ultimately to be treated by the Regional Plant.

In the very unlikely event of a failure of the system the system will discharge fully to the City's system. Ensuring that this local network is resilient. This operation has been analysed by the City. Circa 40 to 50 % of wastewater will be treated onsite.

Although Google is only discharging a portion of its wastewater to the City's system, it is paying full connection fees as outlined in the municode. Use charges will either be based on standard use charges or via a monitored industrial waste charge.

**Q: What the onsite water treatment plant, why not the City system? Isn't the network there?**

**A:** The onsite system was chosen as there is alignment between the City policies and Google's environmental objectives on seeking wastewater to be treated and reused.

The local plant is lower carbon and also avoids network upgrades locally that can be problematic and require potential upgrades of sewer siphons across the Guadalupe River.

The system will work in tandem with the City system to provide a sustainable and resilient outcome.

**Q. Will there be rainwater harvesting included?**

**A:** Yes Google were appropriate will install rainwater harvesting to best manage the water balance on the project.

**5.0 Waste - Automatic Waste Collection System**

District waste refers to strategies to deal with waste in order to: reduce its environmental impact through preventing pollution, reducing the source to landfill and reuse of waste for a positive purpose such as waste-to-energy.

**WHY IS IT IMPORTANT?**

The average size of landfills in the United States continues to increase year by year. Landfills produce emissions that negatively impact the environment, such as carbon dioxide, methane, volatile organic compounds and other hazardous offgasses. The United states is the third largest contributor of methane emissions (which the global warming potential is 28 times more potent than carbon dioxides over 100 years). By finding ways to divert waste from the landfill, energy and carbon impacts are reduced through both a reduction of methane off-gassing to the atmosphere and saving trucks from moving from the source of waste to the landfill.

**HOW IT WORKS**



Through a combination of innovative waste management, treatment systems (both onsite and offsite) and/or regional partnerships; waste can be treated, reclaimed, recycled for other purposes and/or processed to be used as a purposeful energy source.

Further back ground questions

**Q. What is the central utility plant, how does it work, and will it smell?**

A central utility plant (CUP) or “Energy Facility” creates and distributes chilled and hot water to multiple buildings. A CUP maximizes the opportunity for heat recovery and higher efficiency low-carbon all-electric heating and cooling, without relying on fossil fuels. This system harnesses clean energy from a variety of ‘plug and play’ technologies, including geothermal, building waste, and wastewater heat (sewage). A CUP operates via the use of electric heat pumps, which eliminate the need for boilers that use natural gas.

The CUP does not produce any odors or any emissions beyond steam emissions, and the operation will fully comply with San Jose’s noise ordinances.

The CUP can be operated remotely, with vehicle traffic to the site only for routine maintenance (typically monthly) or quick repairs. This can be scheduled at off-times relative to peak traffic, and will usually consist of small vehicles rather than large trucks or other nuisances.

**Q: Where will the power for this development come from?**

A: Per the City’s green building codes, all building rooftops will have solar photovoltaic (PV) panels with a minimum amount of 7.8 MW across the project. Our project team experts are exploring the possibility of the use of improving the efficiency of this solar PV by adding battery storage and real-time metering to reduce the burden on the PG&E electric grid. The benefit would be that the solar PV could offset energy consumption until after peak daily demand.

**Q: Where is the water for all this development (office and housing) coming from? What kinds of water management and conservation strategies are proposed?**

A: This plan provides a strategy for reducing potable water use, via efficiency measures in combination with diversifying supply. Conservation will be practiced at all levels of design from low flow fixtures, to efficient cooling systems and native/adapted landscape plantings. Extensive use of site-recovered alternate water sources will contribute to offsetting potable water demands. Maximizing the reuse of water whenever possible is not only key to preserving the region’s potable water for the highest and best use but also adds resilience to the development via site-sourced, diversified water supplies.

The plan also calls for managing site water ecologically: using low-impact technologies, with attention to creating development that operates in harmony with natural water flow and environmental patterns of the area. The plan integrates water features (utilizing recycled water in all cases) into urban design to create a sense of joy, and reinforce the life-giving nature of water.

Thoughtful water management will be practiced throughout by utilizing the latest techniques in water efficiency, reclamation and reuse. In addition, treating contaminated water on site prevents the flow to nearby water bodies that would have otherwise been affected.

**Google approaches water efficiency systematically by (includes potential strategies):**

Data Tracking to understand performance over time

Sub-metering where possible to understand the sources of demand by use type, eg. food-prep, fitness, other amenities

Using data as a way to educate and encourage employees to become more aware of their behaviors

Using more real-time data to understand leaks and inefficiencies within the system

Identifying opportunities to eliminate water demands and/or increase efficiencies - both within and outside buildings:

low flow fixtures

water efficient mechanical equipment and operational strategies

Matching remaining water demands with the appropriate water supply (e.g. using a non-potable water source for irrigation and other non-potable uses):

use of on-site treatment of alternate water sources for irrigation, flush fixtures, mechanical needs, and other non potable uses where possible

treatment of all stormwater, with some captured for use in buildings

**Q. If I'm a resident, what does district systems mean for me? Will I be charged? What do the connections look like in my unit?**

A: District systems will mean that you are connected to a district-scale infrastructure network via your building systems. This system allows your building to connect to other buildings to share resources such as heating and cooling and power, creating an ecosystem of shared resources. It significantly reduces waste and creates a much more sustainable utility system.

District Systems will connect at a building level only. The internal building systems will manage and provide service to your apartment. Billing will be providing via the building owner not via the District Systems operator. But the bill will be equal or lower than what is available in San Jose.

**Q. What is the impact on City systems, the regional San Jose Regional Wastewater Facility?**

A: Some of the key benefits of a district system are:

Can relieve the high upfront capital costs associated with infrastructure upgrades for large master plan developments such as this (especially given the size and timing)

It lessens the burden on existing systems and/or existing aging infrastructure

Can provide overflow / capacity mitigation to existing systems

Provides an alternative, green solution that helps to meet the City's ambitious sustainability goals

For the Regional Wastewater Facility, depending on the design for the upgrades to the existing system, an onsite water treatment facility can help to alleviate any capacity issues the system may face for increase density over the long-term.

**Q. Is there anything dangerous within the systems, do they run below the streets?**

A: The district systems utilities are extremely safe. What runs below the streets is typically a piping network and connection points. Other than piping networks and/or the connection joints, not much else will be below the streets. There is no adverse impact to the general public because of these systems, in fact they are safer than most conventional utility systems given how robust they are.

**Q. These district systems are utilities right, who will own them and how will they be regulated?**

The District Systems will be private systems run to benefit the Community. They are not publicly dedicated and are provided to the commercial tenants on the project.

Thermal - Owned and operated by Google

Water - Owned and operated by Google

Power: Options: Google owned and operated, OR owned and operated by PGE, OR joint venture with City, Google and PGE

Automatic Waste Collection System - Owned and operated by Google.

Google will provide a supply of resources to its tenants as a landlord, it will not provide services directly to residents. Local services will be provided by the building systems/operators including metering and billing.

**Q. Where does PG&E fit? What have they agreed to pay for?**

A: PGE will be required to provide sufficient power to the project. Since it is anticipated (based on available information) that significant upgrades are required to the transmission and distribution lines to service the project densification, a microgrid as a mitigation alternative is an excellent opportunity for PGE to consider enabling. PGE currently has a program called the Community Microgrid Enablement Program that will investigate opportunities for microgrids. Google and PG&E have studied the project from a system impact perspective and both parties in collaboration with the City of San Jose are assessing cost sharing between transmission and distribution infrastructure.

**Q. What about crossing the public right of way?**

A: The district systems systems will cross the public ROW. Given it is a private utility system, Google will be applying through the City's Master Encroachment Process. It will simply be pipes that cross over at different locations to connect neighbourhoods to one another. From an operations/maintenance perspective, it is very rare that access to the pipes will be required but if a repair is required, it will have the same impact on the street network as typical repairs - close off a portion of the street for the worker to trench and access the pipes for repair.

**Q. Will residents/users of the district systems pay more or less for service? How can that be guaranteed?**

A: Residents and users of the district systems will be charged either market rates or better as a result of the District System. With the added benefit of scale (i.e., as the development increases in density), the efficiencies of the system only get better and therefore reflect on the rates.

## Speaking notes for Downtown West District Systems briefing

- Slide 2: What We Will Cover
- Slide 3: Next 90 Days
  - (Read on-slide milestones as appropriate, Planning Commission in April, City Council planned in May)
- Slide 4: Overview & Status
  - Thank you for taking time with us ahead of the study session on Thursday; we'd like to use this time to provide you an overview of district systems, where they are generally in their development, how they support environmental objectives and more at Downtown West and also in the City, and we'd love to hear any thoughts or questions you might have.
- Slide 6: District Systems Alignment
  - San Jose has taken a strong leadership position on climate action and sustainability
  - Ambitious policies and guidance are set out in the General Plan, Climate Smart San Jose plan, recently reinforced by the adoption of the San Jose Reach Code.
  - We don't only focus on energy and carbon, we also have lofty goals to address water use, as set out in the South Bay Water Water Recycling plan.
- Slide 7: MOU
  - The MOU that Google and the City executed in December 2018 further memorialized specific targets around sustainability
  - And had a specific principle for studying the implementation of district systems, which implements efficiency by sharing resources across buildings.
  - District Systems work best in mixed use environments, and as a result provide an opportunity to address a range of broader objectives set out in the MOU.
  - In particular the environmental sustainability and innovation objectives.
- Slide 8: Addressing a Global Challenge
  - We're seeing rapid changes in climate patterns globally, with very serious and tangible local implications.
  - This is a global issue that the City has identified as requiring a significant commitment on, in terms of the proportion of our local economy
  
- Slide 9: District Systems Benefits

- There are myriad benefits that come out of district systems built in to Downtown West — and Google is building this at its own expense, and not counting it as part of its community benefits package
  - The implementation of district systems can also be a model that will be replicated in other projects across the city.
  - The systems provide not only environmental benefits but also contribute positively to social, public health and resiliency outcomes.
  - (Read through on-slide notes on Human and Social benefits, Public Health benefits, Resilience benefits)
- Slide 10: District Systems Outcomes
  - (Read through on-slide notes)
- Slide 12: Centralized Systems
  - District Systems represent best practice for managing resources efficiently within cities and urban communities.
  - District systems take “back of house” systems like heating and cooling, electric, wastewater, etc, which every building normally has, and centralizes and consolidates them in a central utility plant that serves the district
  - This saves a significant amount of physical space which can be adapted to provide ground floor activation, increase in green roof space or solar PV. The consolidated systems manage the energy and water flows more efficiently.
  - Increased efficiency means significantly higher environmental performance
- Slide 13: Urban Concept
  - This is another look at the concept, with a central utility plant on the left hand side of the image housing key infrastructure components like heating and cooling plants, an electric microgrid, and a recycled water plant.
  - There is an option for an automatic waste collection system for the project but if Google decides to take that path it will be subject to a separate City review and Council approval.
  - The centralized infrastructure via distribution networks hooks into each building to provide those services
  - California and the City have established goals to move to full electrification of buildings - including heating, cooling and cooking. All of the District Systems will be electrically driven and will help secure Downtown West’s carbon reduction commitments.
- Slide 14: District Heating and Cooling—An Example
  - As an example, in a traditional cluster of independent buildings, even one built out as part of a large mixed-use project, each building has its own air conditioning and heating systems on their rooftops
  - In a district systems scenario, these systems can be centralized in a single plant with a more efficient footprint, and this actually has multiple benefits

- The rooftops on those buildings can now be freed up and used for amenities, or they can be planted with green roofs, or they can be used for solar systems
  - This reduces noise and emissions levels across the entire project.
- Slide 15: Orientation
  - District systems are a more efficient way to support buildings on-site, and the systems themselves are hooked up to citywide systems
  - Wastewater is connected to the City system, electricity is connected to PG&E's transmission grid, and potable water is provided by the San Jose Water Company.
  - So the systems work in tandem with the existing networks, limiting the stress on the systems by operating more efficiently.
  - The systems add a layer of resilience to the project. There is more redundant capacity in the systems and the ability to island from the broader grid in the event of a power outage. If the broader grid shut down, the backup power will be provided from the project's energy and power systems.
  - A precedent image of a District System Central Utility Plant (CUP) is shown here from Elephant Park in London - read through.
- Slide 16: Systems overviews, options and precedent
  - We're going to talk a little about where this has been done, and how it can be implemented at Downtown West
- Slide 17: Thermal Systems
  - District thermal systems — which refers to heating and cooling systems — are pretty common now in major cities, and we're seeing Google implement these at their other South Bay projects.
  - Lendlease, who's working with Google, has also implemented these in other large mixed-use projects globally.
  - Barangaroo in Sydney is a great example achieving a carbon neutral outcome underpinned by a high efficiency thermal system.
  - District thermal systems are in their fifth generation now, a significant evolution from the old steam based systems in Cities such as New York.
  - Stanford has an innovative thermal system plant at their campus
- Slide 18: District Water
  - Water systems have likewise been established in large-scale mixed-use projects, many of the same projects as district thermal systems
  - District waste was also implemented at Dockside Green in British Columbia, Canada.
- Slide 19: District Water - Odor and Noise Treatment
  - District water reuse systems are prevalent in many cities across the US and globally. A couple examples noted here include Salesforce Tower in San Francisco and a mixed-use development in British Columbia.

- They operate safely, while producing a new water supply to support the Community
- Odors
  - Local treatment is much closer to the source compared to regional facilities, which avoids unpleasant odors (i.e. those caused by uncontrolled low-oxygen conditions & open-air drying of solids)
  - Regulations & standards set by Bay Area Air Quality Management District (BAAQMD)
  - Appropriate design and controls will be established -- engineering design will provide control and monitoring of odors
  - Odor controls will be designed using the 'best available technology'
- Noise
  - Standard equipment will be used at the water-reuse facility (e.g., air blowers, air compressors, pump systems)
  - Water-reuse facility will be enclosed within the central utility plant building
  - Noise levels will be attenuated down to acceptable levels
- Slide 20: Evolution and Growth of Established Market
  - Microgrids are somewhat newer in their adoption curve compared to thermal and water, but their adoption is accelerating even by the month
  - (Read on-slide notes)
- Slide 21: Sectors and Locations
  - A number of localities are implementing microgrids, and more states are approving programs that enable and support microgrids
  - We've counted 112 bills just in the U.S. addressing microgrids
  - (Read on-slide notes)
- Slide 22: Different structures for microgrids
  - There are three ownership options for the Downtown West microgrid that we'll go into a bit
- Slide 23: Microgrid Project Options
  - The project is committed to deliver a microgrid given the constraints on the network and the desire for a more resilient and sustainable future.
  - There are three options open to the project, and this is purposeful to ensure that we can execute on one to meet our objectives. The options for ownership include city-owned, PG&E-owned, and a Google privately owned.
  - The physical system will be approved at Council and through the subsequent process a choice will be made. This will allow time for each of the models to mature and the selection of one will be heavily influenced by timing and the business case for each party to proceed. Including the City.
  - Though it's not the primary plan for Google to own the system, and it would be conditional on approval from the state, for the sake of achieving the broader

project outcomes they are willing to own and operate their microgrid. In this scenario there would be an independent professional operator, and Google would be the owner.

- Slide 24: Gonzales Microgrid
  - Going to work through a number of precedent examples, one to address each of the options open to the Downtown West project. Starting with the Gonzales precedent.
  - An agricultural region where community and developers have established a need for a microgrid because of their experiences of outages over the years.
  - Established a municipal service to serve the customers, working with a microgrid developer and operator.
- Slide 25: Redwood Coast Microgrid
  - Working through PG&E's Community-microgrid enablement program — the Redwood Coast Airport and others have established a microgrid . PG&E would own and operate, establish their own service to that area when operating normally, but also have the ability to island the grid if there was an issue with the broader grid.
  - The ability to island means the microgrid can shut off safely from the broad grid and operate its entire network safely. When the grid re-establishes there's a safe mechanism to go back onto the broader grid.
- Slide 26: Hudson Yards Microgrid
  - They have a private network, a private system.
  - They established the microgrid as a result of the issues caused by Hurricane Sandy, and the need for a more reliable and sustainable solution.
  - Hudson Yards Microgrid Company owns
  - They can island and continue operating. They have been operating since March 2019.
  - A couple times they've lost the grid feed to their whole site and they were able to provide power.
- Slide 27: Project Approvals
- Slide 28: Entitlement
  - Similar to our design guidelines — there's a checklist and staff delegation to go through the checklist for conformance.
  - The Downtown West approvals package includes several components that address and enable district systems.
  - District Systems is integrated into each element including zoning, the infrastructure plan and the design guidelines.
  - And importantly they cover the three microgrid ownership options we just discussed



- There are specific conditions of approval setting out how the District Systems will be addressed through conformance review and how they will operate in the future.
- Slide 29: Checks and Balances
  - Staff set a series of priorities on how the systems would be set up.
  - We've created a set of criteria included in conditions of approval for the project that ensure that the project performs the way we want it to with respect to these critical services.
  - They cover things like service level, rate equity, safety, capital improvements, and also operation and ownership, for example a requirement for Google or the future office owners to step in to operate the system if the operator (assuming it's not Google) fails.
  - This step in provision will also be held in the future by the office owners, ensuring that the owners of those assets take responsibility for the systems in the very unlikely event of the failure of the operator.
- Slide 30: Conformance Review Implementation
  - The project is being approved this spring with more detailed implementation occurring later on, under a process called Conformance Review. This will apply to buildings, and also to district systems.
  - For district systems, an Implementation Plan addressing the performance criteria we just discussed would be part of a submittal for approval. The plan would identify the systems, discuss regulatory approvals, include an index of transactional documents, and also a schedule and plan for approvals for the rest of the process.
  - This plan would be issued early in the process ensuring adequate iterative reviews with staff prior to final approval.
- Slide 31: District Systems Outcomes
  - Again this all comes back to very ambitious, and very serious goals that the City has set on climate change, which is not just a sustainability issue, but an equity issue. And it's not just a global issue but a local one.
  - And it's something that we made a point of memorializing in our MOU with Google in 2018
  - They've put a lot of study into district systems at Downtown West and we know they're implementing them in other developments in the South Bay
  - And there are number of significant environmental benefits, not to mention some of the very important qualitative human and social, and public health, and resilience components we talked about earlier
  - (Read on-slide notes as appropriate.)