King County

Wastewater Treatment Division

Executive summary

RWSP Update – Group #4, Policy Memo #7: Climate Impact Preparedness and Natural Hazard Resiliency

This executive summary provides a synopsis of the policy questions, problem statement, issues, challenges, and the options developed for the Climate Impact Preparedness and Natural Hazard Resiliency topic.

Policy question

1. How much should the Wastewater Treatment Division (WTD) reduce energy use and reduce greenhouse gas (GHG) emissions?

Problem statement

WTD is King County Government's largest operational energy user and is one of the County's largest emitters of greenhouse gases (GHGs). Reducing energy use and GHG emissions is critical to slowing climate change, minimizing its most severe impacts, and protecting residents, the economy, and the natural environment. Although WTD acknowledges the importance of this work and has made strong commitments to these efforts, climate change mitigation projects and efforts are often left under- or unfunded, due to resources being prioritized for the maintenance and building of new critical wastewater infrastructure.

Policy issues, challenges, and opportunities

The benefits of climate change mitigation are not always easy to identify, nor do they always directly correlate to changes in WTD's operation. While certain actions, such as installing solar power, have direct benefits to WTD's system, other actions have indirect benefits that can make it harder to demonstrate the tangible impact of WTD's efforts.

New technologies that do not rely on fossil fuels often require higher upfront investment, which can be challenging amid competing priorities like regulatory obligations, asset renewal and replacement, and capacity needs. However, these technologies can substantially reduce energy use and GHG emissions and are an important part of effective climate mitigation

The cost of not doing this climate work now will make the future costs to WTD's system much greater as our region experiences more climate impacts. WTD can do its part to mitigate

climate change, but it will take a collective effort to make progress in climate goals to reduce the climate impacts our region will face.

Policy options

WTD is assessing how much to reduce energy use and GHG emissions by considering a full spectrum of policy options. These range from maintaining current commitments to pursuing deeper reductions that would achieve ambitious net-zero emissions. More detail for the policy options that answer the questions are described below.

Policy question: *How much should WTD reduce energy use and reduce GHG emissions?*
For energy use reduction, the policy options include:

a. Maintain the existing approach to energy efficiency and solar implementation based on project-level, cost-effective decisions, consistent with current Strategic Climate Action Plan (SCAP) alignment.

   Outcomes: Marginally reduce the energy consumption and costs of WTD operations

b. Strategically scale up energy efficiency improvements and solar deployment to meet aggressive SCAP targets, requiring substantial additional investment.

   Outcomes: Further reduce the energy consumption and costs of WTD operations

c. Transform WTD facilities into net-zero or net-positive energy systems by prioritizing deep energy efficiency and expanding on-site renewable energy generation.

   Outcomes: Drastically reduce reliance on the energy grid and eliminate energy costs for WTD operations

For GHG emissions reduction, the policy options include:

a. Maintain current implementation of SCAP requirements to reduce GHG emissions and add reference to SCAP in wastewater policy language (KCC 28.86).

   Outcomes: Emissions reductions equivalent to the amount required by the 2025 SCAP

b. Add additional GHG reduction targets for WTD's O&M and capital projects and for the elimination of fossil fuels.

   Outcomes: Emissions reductions beyond what is required by the 2025 SCAP

c. Establish requirements to achieve net zero emissions across all areas (embodied, fugitive, and direct).

   Outcomes: Completely eliminate WTD's direct, fugitive and embodied emissions

Climate Change Mitigation Relationship to other RWSP topics

Climate Change Mitigation intersects with many RWSP topics as described below.

Asset Renewal and Replacement (R&R): Asset R&R investments provide an opportunity to replace equipment with alternatives that mitigate climate change, such as eliminating fossil fuel use of a particular system.

Resource Recovery: Reducing energy use cuts emissions, while recovering energy from wastewater creates a renewable energy source. Together, they lower WTD's overall climate impact.

Treatment: The process, technology, and strategic choices made regarding how WTD treats wastewater will affect the amount of energy it uses and GHGs it emits. These decisions could incorporate climate change mitigation as an evaluation factor to reduce WTD's impact on the climate.

Combined System Management and Separated System Conveyance: Much like the treatment category, how WTD chooses to build these systems can impact the climate through emissions, both during construction and operations. Thoughtfully incorporating climate concerns into new development or rehabilitation of these systems can support WTD's climate change mitigation efforts.

RWSP Update - Climate Impact Preparedness and Natural Hazard Resiliency

Group #4, Policy Memo #7

A. Policy Question

This memo is focused on the group of policy questions related to the Climate Impact Preparedness and Natural Hazard Resiliency topic of the Regional Wastewater Services Plan (RWSP) Update. The specific policy question explored in this memo below is related to Climate Mitigation:

i. How much should the Wastewater Treatment Division (WTD) reduce energy use and reduce greenhouse gas (GHG) emissions?

B. Problem Statement

WTD is King County Government's largest operational energy user and is one of County's largest emitters of greenhouse gases (GHGs). Reducing energy use and GHG emissions is critical to slowing climate change, minimizing its most severe impacts, and protecting residents, the economy, and the natural environment. Although WTD acknowledges the importance of this work and has made strong commitments to these efforts, climate change mitigation projects are often left under- or unfunded, due to resources being prioritized for the maintenance and building of new critical wastewater infrastructure.

C. Contextual and Baseline Information

i. What is known about the topic and current conditions

Climate change mitigation is the act of reducing the amount of greenhouse gases (GHGs) released into the atmosphere. These efforts in wastewater systems involve reducing emissions from two main sources: the construction of infrastructure and the ongoing operation of wastewater facilities. Construction-related emissions come largely from embodied carbon in materials and equipment, while operational emissions include both direct emissions from fuel and energy use and fugitive emissions released unintentionally during treatment processes. WTD is King County Government's largest operational energy user and is one of County's largest emitters of greenhouse gases (GHGs).

Figure 1. King County Government GHG Emissions by Division (2022)

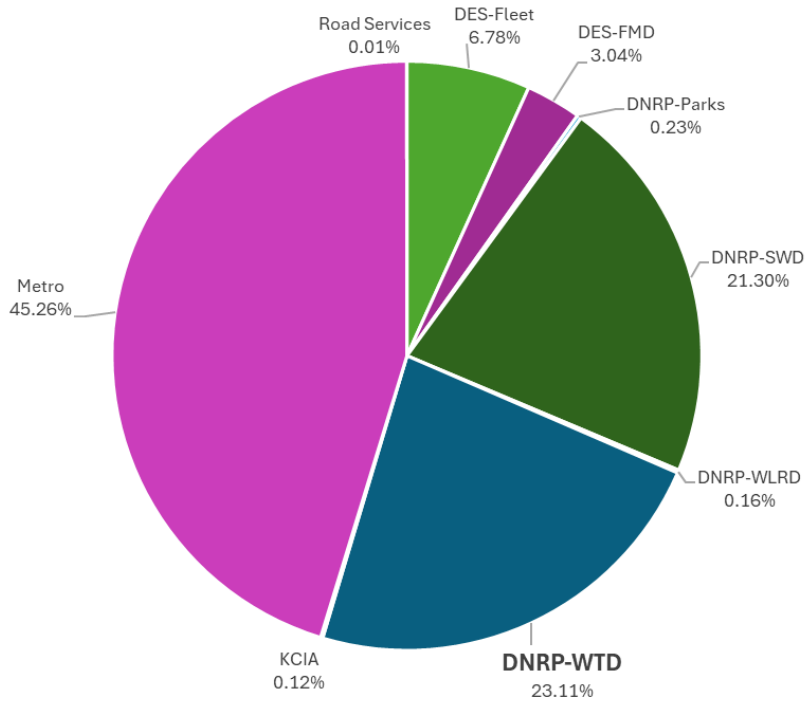
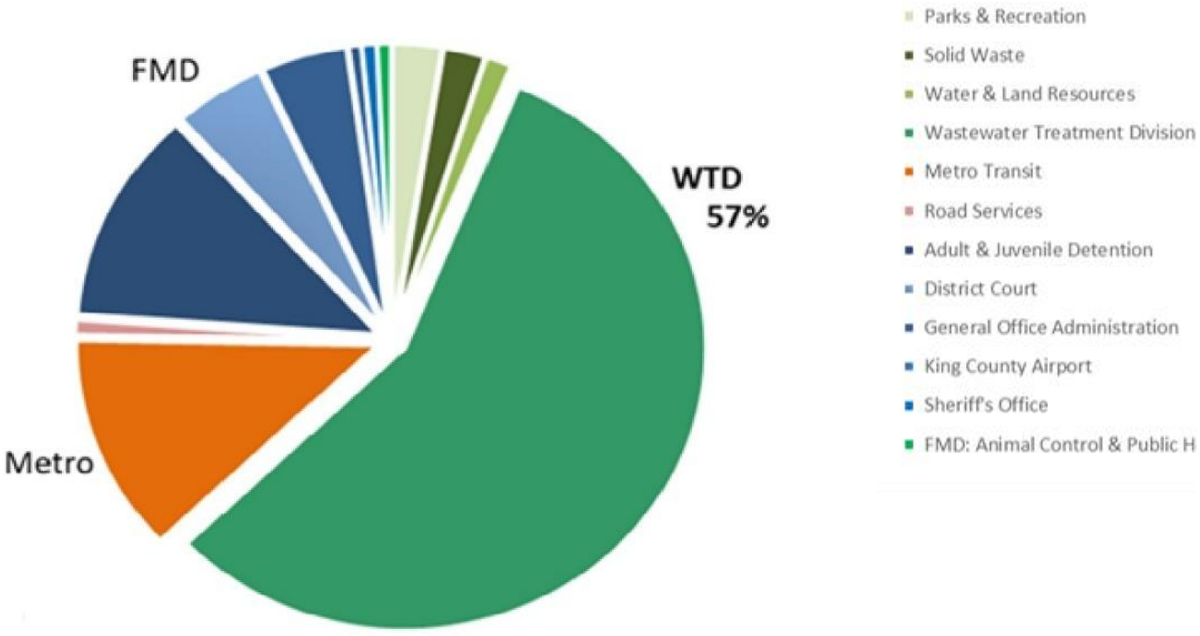


Figure 2. King County Government Energy Use by Division (2022)



In 2024, WTD's gross emissions amounted to 63,915 MTCO2e, which equates to annual emissions from 15,218 gasoline-powered passenger vehicles. Facility energy use amounted to 14% of these emissions; transportation fuel accounted for another 10%, while fugitive emissions were 75% of emissions. To account for its operational and fugitive GHG emissions, WTD uses offsets, renewable electricity, and its renewable natural gas (RNG) supply to create a net regional climate benefit.

Mitigation efforts include moving away from burning fossil fuels toward renewable energy, like solar; reducing the amount of energy consumed through more efficient technology; and reducing the amount of embodied carbon in WTD's construction materials.

Note: Other renewable technologies derived from WTD's waste products (i.e. biogas, sewer heat recovery) are covered in the Resource Recovery section of the RWSP.

ii. Current policies in code, contract, or in practice

Table 1. Current policies

Relevant Plans and Policies in K.C.C.	Description
2025 SCAP GHG PM 19	Reduce operational greenhouse gas emissions.
2025 SCAP GHG PM 23	Reduce energy use in County-owned buildings and facilities.
2025 SCAP GHG PM 24	Reduce Fossil Fuel Use in County-owned facilities.
2025 SCAP GHG PM 27 and 28	Reduce GHG Emissions from County Fleets and increase County zero-emission fleets.
2025 SCAP GHG 67	Reduce embodied carbon of materials used in capital projects.
2025 SCAP GHG 74	Update and accelerate carbon reduction approaches for WTD.
2025 SCAP GHG 76	Optimize biogas and reduce fugitive methane at wastewater facilities.
2025 SCAP GHG 77	Purchase greenhouse gas-neutral electricity and pursue cost-effective renewable power for King County facilities.
2025 SCAP GHG 78	Accelerate installations of solar electricity systems at County facilities.

King County Code 2.93.060	Sets considerations and analysis requirements for greater energy efficiency as well as reductions in greenhouse gas emissions in capital improvement projects.
King County Comprehensive Plan Chapter 5	Reducing energy use and greenhouse gas emissions associated with new construction, additions, retrofits, and remodels in all buildings.

** Note: Other renewable technologies (i.e. biogas, sewer heat recovery) are covered in the Resource Recovery section of the RWSP.*

iii. The system "must-dos"

The King County Strategic Climate Action Plan (SCAP) is the primary policy driver for climate mitigation efforts at WTD. Adopted by King County Council, the 2025 SCAP is both a long-term plan and five-year roadmap for County climate action, integrating climate change into all areas of County services, operations and work with agency partners and communities. It builds off the significant progress King County has made in several areas and sets a bold course to cut greenhouse gas emissions. The Greenhouse Gas Section of the SCAP includes over 15 requirements and commitments that directly guide WTD climate mitigation decisions. Commitments cover the following topics: energy use (efficiency and reduction), waste diversion, fossil fuel reduction, compost, sustainable materials, optimizing biogas, renewable energy, tree planting, a zero-emission fleet, and alternative fuels. Beyond the SCAP, the Environment Chapter of the King County Comprehensive Plan has commitments to reduce energy use and greenhouse gas emissions associated with new construction, additions, retrofits, and remodels in all buildings.

For energy considerations, WTD must adhere to the 2021 Washington State Energy Code (WSEC), which requires project elements such as improved building envelope performance and high efficiency HVAC systems. King County Code 2.93.060 sets considerations and analysis requirements for greater energy efficiency as well as reductions in greenhouse gas emissions in capital improvement projects.

Additionally, as required in the King County Sustainability Infrastructure Scorecard, WTD must also meet the equivalent energy performance of the stringent energy code in the County, regardless of the project's location. As of 2026, the most stringent energy code in King County is the 2021 Seattle Energy Code. The Seattle Energy Code, limits fossil fuel use, calls for high-efficiency electrical systems, and has renewable energy requirements.

iv. Current and budgeted expenditures

Currently, much of the work WTD does within the climate change mitigation space is low to no cost and occurs opportunistically. An example would be when selecting a new Heating,

Ventilation, and Air Conditioning (HVAC) system, WTD selects the more energy efficient one and ensures that the setpoints will derive the most energy reductions. This makes it challenging to extract costs specific to this work, since they are intertwined with other project decisions and costs.

Many greenhouse gas and energy reduction measures are delivered through broader rehabilitation, replacement, or process improvement projects where the incremental climate-related cost is not separately tracked. As a result, total expenditures in this area are often distributed across multiple capital and operating budgets rather than captured in a single program line item.

v. Summary of science/data

Climate science indicates that avoiding the most severe climate impacts requires rapid and sustained greenhouse gas reductions this decade, followed by continued progress over time. Because wastewater treatment can be a significant source of greenhouse gas emissions, and infrastructure assets often remain in service for decades, near-term capital decisions can either continue current emissions trends or create long-term reductions.

For wastewater utilities, emissions are often concentrated in a limited number of sources, allowing targeted actions to deliver significant benefits. For WTD, 2024 gross emissions were approximately 63,915 MTCO2e, with fugitive and process emissions representing roughly 75 percent, facility energy use 14 percent, and transportation fuels 10 percent. This suggests the greatest reduction opportunities are likely to come from reducing fugitive methane and process emissions, while energy efficiency, renewable energy, fleet transition, and other operational improvements remain important supporting strategies.

Sector experience also indicates that many efficiency measures can reduce lifecycle cost through lower utility and fuel expenses, particularly for continuously operated and high-power systems such as aeration, pumping, odor control, ventilation, and heating/cooling equipment. New facilities, major rehabilitation projects and equipment replacement cycles can provide cost-effective opportunities to incorporate lower-emission technologies.

Greenhouse gas inventories are valuable planning tools but contain uncertainty, particularly for fugitive emissions, process emissions, and changing electricity emission factors. For that reason, best practice generally supports prioritizing direct, measurable emissions reductions and periodic target review based on updated data, technology performance, and regulatory factors.

D. Example Practices from Other Jurisdictions/Industry

City of Gresham Wastewater Treatment Plant

The City of Gresham Wastewater Treatment Plant achieved net-zero energy consumption and is the first wastewater treatment plant in the Pacific Northwest to generate the same amount of electricity as it consumes on-site over a year. The 20 million gallons per day (mgd) plant achieved this through the energy-efficiency investments and the use of two, 395-kilowatt co-generation engines fueled by biogas produced from the anaerobic digestion of wastewater solids, a 420-kilowatt ground mount solar electric system, and increased production of biogas from the co-digestion of fats, oils and grease received from area restaurants and food processers.

Strongford (UK) Wastewater Treatment Plant, a Net Zero Hub

This wastewater treatment plant has been identified as a hub of innovation for reducing greenhouse gases. Beyond installing renewables, transitioning to electric vehicles and reducing operational emissions by traditional means, they are piloting new processes and technologies, like the recovery of cellulose, which mainly comes from toilet paper. They also developed and installed a new passive photocatalytic cover that covers the activated sludge. This converts the nitrous oxide from the wastewater treatment process to harmless nitrogen and oxygen gas as it passes through the permeable cover, thus reducing the plant's fugitive emissions.

E. Policy Issues, Challenges, and Opportunities

i. The benefits of climate change mitigation are not always easy to identify, nor do they always directly correlate to changes in WTD's operations.

GHGs are emitted into the atmosphere, and therefore, their reductions have regional and global impacts. While certain actions, such as installing solar power, have direct benefits to WTD's system, other actions will only have indirect benefits, which are difficult to connect the action to the benefit. The indirect nature of this relationship can make it challenging to show the effects WTD's actions are having on climate change, which can make it seem like less of a tangible benefit to the system. It also requires that other organizations, governments and individuals make progress in climate goals in order to reduce the climate impacts the planet will face.

ii. Technology and equipment are becoming increasingly more energy efficient and can improve WTD's processes.

Advancements in technology and equipment are both an opportunity and a challenge. These allow for reductions in WTD's energy use and GHG emissions, but there is sometimes an added cost, not just for the equipment, but also for converting our current

systems to this new technology. There are often challenges in getting buy-in from facility staff, who have limited capacity to learn a new system or a new piece of equipment. In the long run, many of these new technologies will help WTD operate more energy efficiently and more effectively, as much of the equipment requires less maintenance and is more durable. The obstacle stems from that transition period to something more innovative.

iii. The cost of not doing this climate work now will make the future costs to WTD's system much greater.

The more GHGs are emitted into the atmosphere, the more climate impacts this region will see. This will have greater impacts on WTD's system and require more costly upgrades and investments. Society can lessen those climate hazards by investing in climate mitigation in the present. The cost of not doing more now will not just affect the budgets but will cost the health of the community and the environment.

F. Range of policy options with associated actions and considerations (including qualitative description of costs)

The policy options presented below describe potential choices and mitigation-related actions that would be implemented to address the following policy questions:

i. How much should WTD reduce energy use and reduce greenhouse gas emissions?

For **energy use reduction**, the policy options include:

1. Maintain the existing approach to energy efficiency and solar implementation based on project-level, cost-effective decisions, consistent with the current SCAP alignment.
2. Strategically scale up energy efficiency improvements and solar deployment to meet aggressive SCAP targets, requiring substantial additional investment.
3. Transform WTD facilities into net-zero or net-positive energy systems by prioritizing deep energy efficiency and expanding on-site renewable energy generation.

For **greenhouse gas emissions reduction** and renewable energy, the policy options include:

1. Maintain current implementation of SCAP requirements to reduce GHG emissions and add reference to SCAP in wastewater policy language (KCC 28.86).
2. Add additional GHG reduction targets for Operations and Maintenance (O&M) and capital projects and for the elimination of fossil fuels.
3. Establish requirements to achieve net zero emissions across all areas (embodied, fugitive, and direct).

Summary of Policy Options – Reducing GHG Emissions

	Description	Goals/outcomes	Tradeoffs
#1	Maintain current implementation of SCAP requirements to reduce GHG emissions and add reference to SCAP in wastewater policy language (KCC 28.86).	**Meet GHG emissions reduction requirements** within King County's Strategic Climate Action Plan.	• Costs will increase as more GHG emissions are addressed and reduced. • Mitigating for WTD's GHG emissions also reduces its contribution to the climate crisis and lessens the climate impacts that its system and the community will face in the future. • The more WTD invests in this work now, the less it will cost in the future to adapt to higher climate impacts.
#2	Add additional GHG reduction targets for O&M and capital projects and for the elimination of fossil fuels.	**Reduce WTD's GHG emissions beyond current requirements** and improve upon mitigation efforts.	
#3	Establish requirements to achieve **net zero** emissions across all areas (embodied, fugitive and direct).	**Completely account for and address all of WTD's GHG emissions** and eliminate WTD's contribution to climate change impacts.	

Summary of Policy Options – Energy Reduction and Renewable Energy

	Description	Goals/outcomes	Tradeoffs
#1	Maintain the existing approach to energy efficiency (EE) and solar implementation based on project-level, cost-effective decisions, consistent with current SCAP alignment.	**Continue opportunistic energy savings**	• Lowest capital cost and minimal change to current practices • Not expected to meet SCAP targets • Slower progress on energy cost reduction, emissions, operational reliability, and resiliency
#2	Strategically scale up energy efficiency improvements and solar deployment to meet aggressive SCAP targets, requiring substantial additional investment.	**Meet SCAP energy reduction and solar installation requirements**	• Significant increase in capital investment • Increased project complexity and coordination requirements • Achieves SCAP targets • Reduces long-term energy cost exposure, emissions • Improves operational reliability and resiliency
#3	Transform WTD facilities into net-zero or net-positive energy systems by prioritizing deep energy efficiency and expanding on-site renewable energy generation.	**Achieve net-zero or net-positive energy** wastewater facilities.	• Highest capital cost and potential impacts to project scope • Requires new standards, culture change, and sustained investment • Maximizes long-term cost stability, emissions reduction, operational reliability and resiliency

G. Interested and affected parties WTD will engage to gather input

MWPAAC and the component agencies that WTD provides sewerage services to are one of the audiences that need to be engaged on the climate mitigation policy options. Additional engagement with tribes, community-based organizations (CBOs), and environmental non-governmental organizations (NGOs), businesses, industries, and the general public may be conducted during implementation planning.

H. Rate structure considerations (if applicable)

There are no known rate structure considerations for this policy question.

I. Relationship to contracts

There are no known contract implications for this policy question.

J. Equity and Social Justice (ESJ) impacts

The impacts of climate change are already being felt, and not all communities have the same ability to adapt and recover. Long-standing social, economic, and environmental disparities mean that some groups are at higher risk, facing greater exposure to climate hazards and more barriers to resilience. In King County, frontline communities—including Black, Indigenous, and People of Color (BIPOC), immigrant and refugee populations, people with low incomes, individuals with preexisting health conditions, unsheltered populations, and outdoor workers—experience the earliest and most severe climate impacts. Without strong climate action, like those of policy options 2 and 3, these communities will face even worse consequences due to our inaction.

Socially vulnerable communities will also be more sensitive to any further rise in the rate. The more aggressive policy options will have a bigger impact on the rate, and therefore, have a bigger impact on these communities. If these policies are selected, special attention should be paid to keeping the cost burden from impacting the communities that are already facing the largest burdens due to climate change.

K. Summary of how MWPAAC/RWQC input was addressed

This section will be added into the policy memo as “Step 1” memos are finalized.

L. Planning-level cost estimates

This section will be added into the policy memo as the “Step 2” analysis later.

M. Evaluation of outcomes: identify impacts and outcomes of each option

This section will be added into the policy memo as the “Step 2” analysis later.

Appendix A: Policy options and actions

Reducing GHG Emissions

	Description	Climate Mitigation Actions
#1	Maintain current implementation of SCAP requirements to reduce GHG emissions and add reference to SCAP in wastewater policy language (KCC 28.86).	• **Emissions –** Reduce GHG emissions and fossil fuel use from operations and capital projects when a low- to no- cost opportunity arises.
#2	Add additional GHG reduction targets for O&M and capital projects and for the elimination of fossil fuels.	• **Emissions –** Identify opportunities in operations and capital projects with the highest GHG emissions and pursue targeted actions to minimize these emissions. Eliminate fossil fuel use.
#3	Establish requirements to achieve **net zero** emissions across all areas (embodied, fugitive and direct).	• **Emissions –** Achieve net-zero emissions in all areas (embodied, fugitive and direct).

Energy Reduction and Renewable Energy

	Description	Climate Mitigation Actions
#1	Maintain the existing approach to energy efficiency (EE) and solar implementation based on project-level, cost-effective decisions, consistent with current SCAP alignment.	• **Energy Use Reduction – I**ncorporate energy efficiency into capital project designs and operations when cost-effective • **Renewable Energy –** Install solar production to meet code or when a project's budget allows
#2	Strategically scale up energy efficiency improvements and solar deployment to meet aggressive SCAP targets, requiring substantial additional investment.	• **Energy Use Reduction –** Systematically prioritize and implement energy efficiency improvements in capital & O&M • **Renewable Energy** – Expand solar deployment where feasible • **Decision/Implementation** – Incorporate EE based on impact vs. cost-effectiveness
#3	Transform WTD facilities into net-zero or net-positive energy systems by prioritizing deep energy efficiency and expanding on-site renewable energy generation.	• **Energy Use Reduction –** Implement deep EE improvements & establish energy performance expectations across facilities • **Renewable Energy** – Maximize on-site renewable energy generation to offset facility energy use • **Decision/Implementation –** Integrate EE as a standard requirement in capital projects and operations