The Economics of Water

Financing Strategies for Greater Water Resiliency

Jennifer Um (B.S.'17) & David Poli (M.B.A.'18)

Institute of the Environment and Sustainability, Corporate Partners Program

University of California, Los Angeles

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Introduction – The Future of Water

Climate change, population growth, increasing standards of living, and the widespread globalization of business are just a few of the trends that have put increasing stress on water resources. Current demand already outstrips supply, and many experts predict that by 2030, there will be a 40% supply gap; demand will reach nearly seven billion cubic meters versus the 4.2 billion we have available today.[1] In a survey done by the Carbon Disclosure Project, almost 40% of responding companies reported already feeling the pressure through operational disruptions, higher costs, and fines and legal action.[2] The perfect solution to this problem would be to implement strategies that drastically reduce demand, but even with a large coordinated effort, organizations and communities are still going to feel the impact of rising prices and greater scarcity. Mitigation of these effects, through greater resiliency, begins with understanding and responding to the true value of water today.

Many experts believe traditional market-based approaches undervalue water, and as this idea continues to grow in influence, authorities will begin to price water in such a way as to reflect its value to the environment and communities. Because the cost of water, especially in the United States, does not reflect its true value, there is very little business case to be made for incorporating resiliency strategies that reduce usage and demand. The argument can be made that over the long-term, given the anticipated rise in scarcity, there is opportunity for significant return on investment, but most organizations think in far shorter time horizons. If water was priced appropriately, these technologies would pay for themselves. As the situation stands, special financing strategies must be used in order to justify the upfront expense. Luckily, there are already many financing options available to large and small organizations willing to take the initiative, as this paper intends to show. Of course, before strategies and technologies can be implemented, an organization must have a firm grasp of the role water plays in their operations.

Auditing – Determining the True Value of Water

The essential first step in any water resiliency technology-implementation project for a business is to perform a water impact analysis using standard water auditing practices. Corporate water auditing begins with an assessment of water consumption and associated costs. This may sound simple, but given the myriad of local water utility pricing structures and usage measurement

methods, it can become an intensive process. Additionally, this activity should not be limited to internal operations; a business should work with suppliers to obtain this data throughout the supply chain in order to truly understand the water footprint of their output. Working with suppliers in this manner adds an additional dimension of complexity, especially given the globalized nature of today's businesses.

A complete water impact analysis will go further to include both the impacts of water inputs on local sources, and the downstream impacts of discharges on individual geographic areas. Analysis would include irreversible diminishing of local sources, or negative impacts on ecologies and public health, all of which can risk physical disruptions, reputations, and the threat of legal action. This is more specialized, but there are tools available to aid in the process. For example, the Global Water Tool [3] is an analysis platform from the World Business Council for Sustainability Development (WBCSD) which provides a rating for facilities based on local water stress. Also available is the Global Environment Management Initiative (GEMI) Water Sustainability Planner[4], an online tool that identifies risks of a business's operations on local communities.[5] Information obtained from these tools is a vital input for water impact disclosure reporting, which is increasingly required by shareholders and governing bodies. The United Nations Global Compact has been working to align standards for disclosure and water management best practices in order to solidify the business case for water accounting and encourage more businesses to report.[6]

Only when a thorough water impact assessment is completed can the business begin to identify areas where operations can be adjusted and technologies can be implemented. First and foremost, companies should use the assessment to identify opportunities for water use reduction. Often, there are low hanging fruit options for reducing a company's water footprint without large capital investment.

Before retrofitting or installing new technologies, companies should first consider employee education and the repair of older, in-use infrastructure. Education through channels such as workshops, informational brochures, and signage can increase awareness of water scarcity and water savings and will motivate agency towards conservation. Even with new efficient water technologies, the lack of water conservation education can still lead to wasteful usage. Refer to the 2017 Corporate Partner Program Green Paper, "Techniques to Influence Corporate Water Behavior" for additional resources in on-site education. In addition to education, companies can

conduct audits to pinpoint opportunities for repairs or decreases in water pressure. Repairing older technologies that are leaking before purchasing newer, more efficient equipment can allow companies to save money immediately. Water pressure above 65 PSI may be unnecessary in water delivery, so pressure should be tested and lowered using pressure reduction valves without compromising water delivery.

For an example of avoided water purchases, consumer goods company Unilever PLC used insights from water impact assessments to reduce internal water use, work with suppliers to reduce their usage, and design less water intensive products. The business ultimately saved $26 million in water costs over six years just from operations optimization.[7]

Once opportunities for usage reduction have been identified and acted upon, the water impact assessment can further contribute to the business case for the implementation of water resiliency technologies. This is achieved by backing up savings estimates and identifying and prioritizing risks, which go beyond higher infrastructure and utility costs to include business disruptions, increasingly stringent regulation, and negative effects on public and environmental health. However, as discussed above, the low price of water typically means the savings gained through the implementation of these strategies and technologies does not justify the cost. The remaining pages of this paper will discuss the financing mechanisms, such as local funding, performance contracting, and incentive and rebate programs, that will help overcome that cost barrier and set your organization on the path to greater water resiliency.

Financing: overcoming the barrier of payback

While companies can fund water conservation projects through loans or capital funds, there are alternative methods of financing with which companies do not have to pay upfront; two methods of financing are introduced in this section: property assessed clean energy (PACE) and performance based contracting financing. The entities that pay for the upfront costs, such as local/state governments, benefit from water conservation by ensuring a consistent supply of water that will prevent prices from drastically increasing. These types of financing may not be ideal for all projects; they are most beneficial when the savings from conserving water are significant. Contracts must be created between the lenders and the companies to ensure that a payback is guaranteed. Additionally, should a company wish to use their own capital to fund the project, many

rebates, credits, and other incentives exist to lower the expense. With a lower upfront cost, companies can overcome the barrier of a project's long payback and use their capital budget on other opportunities for investment in their business.

Municipal Programs - Land-Secured Financing Through Commercial Property Assessed Clean Energy (PACE)

Companies can finance their water conservation infrastructure by tying their project to the property and paying off the cost through property tax bills at a fixed interest.[8] As a result, the debt is connected to the property rather than the owner, so if the current owner sells the property, debt will be transferred to the new owners. Eligible water efficiency technologies include greywater systems, high efficiency toilets, and waterless urinals. PACE programs finance projects through warehoused, pooled bond, or open market finance structures that may affect how quickly a company's water improvement project can be installed.

Warehoused financing provides quick approval to companies. When an individual project applies for funding, the PACE program will reserve the specific amount of money requested from their line of credit and the companies can then begin construction immediately. Once the project is completed by the company, the PACE program issues the reserved amount to the companies.[9] An example of a PACE program that utilizes warehoused financing is the Sonoma County Energy Program.[10]

In pooled bond financing, the PACE program will wait until multiple companies apply for funding.[9] As a result, a company may have to wait longer for approvals. The PACE program will then reserve the total aggregated amount requested, issue bonds to fund all the projects, then send approval notices to the all companies so that they may begin their implementations. An example of a program that utilizes this type of financing is the Boulder County, Colorado PACE Program.[11]

In open market/owner arranged financing, individual companies can apply for PACE funding through financial institutions, allowing for flexibility. The financial institutions determine the interest rates and property owners can choose which financial institution they want to work with.[9] An example of a company that works with local governments to offer open market PACE financing is Renew Financial.[12]

PACE Case Studies

CivicPACE and the Phyllis Weatley Young Women's Christian Association

Oftentimes, PACE programs can be combined with other programs to finance multiple types of energy conservation technologies in addition to water resiliency technology. The Phyllis Weatley Young Women's Christian Association (YWCA) is a nonprofit low income housing complex in Washington D.C with eighty-four rental units. Dantes Partners, a real estate developer, secured financing from CivicPACE of $70,000 upfront, along with Low Income Housing Tax credits, subsidies, and other financial resources for infrastructure upgrades in solar photovoltaics, HVAC systems, heat recovery systems, LED lighting, ENERGY STAR appliances, and low-flow water fixtures. The YWCA now saves almost $7,000 in operation costs per year and reduced water consumption by 47%.[13]

dusitD2 Hotel Constance Pasadena

In 2014, the dusitD2 Hotel Constance Pasadena, a 62 thousand square foot hotel with 161 guest rooms, partnered with the K2 Clean Energy Capital PACE project developer and Structured Finance Associates, LLC. These partners and project developers provided guidance in potential improvements and the submission of documentation required by the city. Combining the installation and implementation energy conservation technologies in addition to water resiliency, PACE financed $6.8 million of the project cost upfront with repayment over a twenty-year term. Notable water conservation retrofits included the installation of an improved HVAC system, centralized control of energy, heating, and cooling, and water saving fixtures in each bathroom. Now the property is saving 3.2 million gallons annually.[14]

Hilton Los Angeles Universal City Hotel

In 2014, the Hilton Los Angeles/ Universal City Hotel, a 477 thousand square foot hotel with five hundred guest rooms upgraded plumbing and other water fixtures as part of a massive energy and water retrofit by partnering with the ReNewAll PACE program, other sustainability firms, including BKi, The Energy Coalition, Renewable Funding, and O'Rorke, and the financing firm Structured Finance Associates, LLC. The project cost $7 million, covered upfront by PACE, and saved $1 million in the first year on utility cost, operations, and maintenance, in addition to increasing the property's value by $30 million. Notable water conservation retrofits

included upgraded HVAC control systems, replacement of 250 bathtubs and showers, replacement of 500 shower heads, and high capacity washers and dryers. Additionally, rebates from entities such as the LADWP, MWD, and state and federal programs totaled more than $1 million.[15]

Private Funding - Performance Contracting

Through on-bill repayment, companies can implement their projects without an immediate upfront cost. Financial institutions such as banks pay for the upfront cost and companies pay back the cost through charges on their utility bill. These projects expect to conserve water to such a degree that during each billing cycle, the cost of the avoided water usage is greater than the on-bill repayment charge.

As an alternative to banks, energy service companies (ESCOs), can pay for the immediate cost of sustainability projects. Companies can initiate a discussion with an ESCO on what energy or water conservation measures would be most desirable to implement. Then the ESCOs can audit the site and create a facility improvement proposal that generates savings within a term, typically a few years, that are ideally greater than project costs. Once agreed upon, ESCOs can provide upfront financial assistance and the company can use that money to implement the proposal themselves or pay contractors to do so.[16]

State legislation dictates that projects covered by ESCOs can often be bundled to include implementations that have both short-term and long-term payback periods. Financing methods can include lease-purchase agreements or bonds. This type of financing model is ideal for buildings and sites with long-term ownership because it is common that contract terms are as long as ten or twenty years.

Performance Contracting Case Study

University of San Diego

In 2008, The University of San Diego (USD) worked with the ESCO arm of engineering conglomerate Siemens to conserve electricity and water through a ten year, $8.2 million pay-for-performance contract. 30% of the project cost went towards water fixture upgrades, including low-flow washroom fixtures and upgraded sanitary water fixtures. USD was projected to save over $1.5 million total per year, $350,000 of which was from the washroom and sanitary

fixtures alone. Each year, more than forty million gallons of water were saved, reducing the campus water footprint to 1991 levels.[13]

Incentives and Rebate Programs

As an alternative or supplement to financing, incentives and rebate programs can help subsidize the costs of small and large-scale water technology projects that involve the installation of efficient fixtures that meet certain standards. Rebates must be applied for before the equipment is purchased, and because these programs are intended for commercial entities, many require the purchase of a large number of fixtures to qualify.[17] Similar programs at the municipal, utility, state, and federal levels exist all over the country. For example, the U.S. Bureau of Reclamation offers WaterSmart grants to businesses for efficient fixtures, and competitive funding through the Drought Response Program for contingency planning and resiliency projects.[18]

Often, rebates are only available when a company is within a utility's jurisdiction. As a representative example, this section limits the geographical scope to incentives available in Los Angeles, CA under the jurisdiction of the Metropolitan Water District of Southern California (MWD), and the Los Angeles Department of Water and Power (LADWP). A brief look at United States Federal programs follows.

Metropolitan Water District of Southern California

The MWD is a water wholesaler that provides an average of 1.5 billion gallons of water to 26 public agencies, including LADWP and the City of Santa Monica.[19] With the assistance of its member agencies, MWD provides conservation programs and rebates that agency customers can utilize to be more water conscious and thus save money. An example is the SoCal WaterSmart Commercial Rebate Incentive Program. This program allows for up to $100,000 worth of water technology rebates per one water service address per year.[20] Projects must first be reviewed, and once approved, the company must purchase and install the technologies within sixty days. Rebate estimates can be made on the WaterSmart website.[21] A list of technologies and their rebates available in 2015-2016 can be found in the Appendix.

Another offering of the MWD is the Water Savings Incentive Program (WSIP). Under this program, companies can apply for rebates for customized water efficiency projects based on the

amount of water conserved and up to 50% of project cost.[22] Companies may also hire contractors to apply on behalf of the company. WSIP covers project costs in agriculture, commercial, and industrial companies that are not already subsidized by the SoCal WaterSmart Program; this includes audits, design and engineering, construction, equipment and materials, hardware and software, freight, shipping, contracted water management services, third party labor, landscape plant material, and synthetic turf.

Under WSIP, there are two types of incentive rebates: monitored and unmonitored. Monitored rebates provide 60 cents per one thousand gallons saved in a lifetime (up to a maximum of ten years). Before applying for monitored rates, companies are required to have a year's worth of water usage data. Because there is more transparency, the MWD prefers monitored rebates. Before the water technology or infrastructure installation, rebates are estimated based on potential total lifetime savings. Companies may receive up to 50% of their total rebate amount after their project installation has been completed based on the amount of water usage data provided beforehand. Water use data is obtained after one year, and if the actual savings for that time frame equals or exceeds the established estimated savings, MWD will pay the company the remaining rebate in full. If the actual savings are less than projected, the final payment will be prorated and adjusted accordingly.[23]

Non-monitored rebates are 46 cents per one thousand gallons saved in a lifetime (up to a maximum of ten years). Companies can receive the full lifetime single rebate almost immediately after installing the project. While companies do not have to monitor their current usage after installation, they are more likely to qualify for this rebate if the MWD has worked with them in previous water projects or already have a sense of current water usage through engineering plans and specs. This type of rebate is ideal for projects in which water-based technologies are switched to non-water based alternatives where water monitoring is no longer needed after the replacement is completed.[21]

WSIP currently has over one hundred open agreements consisting of projects that are in the process of installing infrastructure or in the process of being rebated, has made payments to two hundred entities, and have completely closed around fifty agreements. Projects are considered closed once companies are paid back in full. While there are a large variety of projects of

different sizes and thus a large variety of time periods needed to complete a project, the average is around 2.5 years from the date of first contact with MWD to closing out.[24]

Additionally, the MWD offers the On-Site Retrofit Program, where companies can apply to receive rebates on project design, permitting, and construction, connections fees, and signage of up to $195/acre-foot for five years for greywater reuse.[25] This program is open until September 2017, or until funds have run out. Companies must get their application approved before being allowed to construct. Once approved, companies have three months to begin construction, seven months to operate, and nine months to submit invoices.

Finally, the MWD offers the Landscape Irrigation Survey, where companies with a minimum of one acre of irrigated land can apply to receive a free audit conducted by certified landscaper auditors. The audit looks at system pressure, controllers, site condition and irrigation scheduling, and high water use issues resulting from malfunctions.[26] Companies will then receive recommendations and information about financial rebates that can help improve irrigation tactics.

MWD Case Study

University of California, Los Angeles

UCLA utilized WSIP to implement and improve their water recycling.[27] Cooling towers at UCLA's electricity-producing co-generation plant utilize condensate from air conditioning, water from lab equipment, and water from uncontaminated sources. The total cost of water recycling has been around $370,000 (including a reverse osmosis process). This has decreased water expenses by $100,000 per year and saved 27 million gallons so far.[21]

Los Angeles Department of Water and Power

The LADWP is a member agency of the MWD and a municipal utility provider that provides water to over 600,000 customers and electricity to over one million customers.[28] Among the LADWP's incentive options is the **Water Technical Assistance Program**. This program offers a maximum of $250,000 to companies for the installation of water cooling towers, recycling, and recirculation equipment.[29] The actual amount rebated depends on what technologies are being installed. An application must be submitted and if approved by the Water Conservation Team, the company has

120 days to complete the project. Rebates are based on consumption before and after the project is completed. The LADWP also offers the **Commercial Free Showerhead and Aerator Program**, where commercial customers can receive free bathroom faucet aerators, break room and kitchen faucet aerators, or free showerheads.[30]

LADWP Case Study

Eagle Foods

Sun Valley, CA truck operation commissary and service center Eagle Foods reduced water use and sewer discharge by using flow control valves to slow flow to 3.5 gallons per minute from 7.5 gallons per minute. They also replaced hose-water tank connectors to prevent leaks, and used water brooms for their truck washes. Water consumption was reduced from 228.3 to 74.6 gallons per day, saving a total of 2.65 million gallons per year. Through the LADWP Technical Assistance program, the company received a rebate of $1.75 per 1000 gallons saved for either two years or up to the cost of the project, whichever was lower.[31]

United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) aids in securing rebates for the purchase of energy and water efficient products utilized in the residential, commercial, and industrial sectors, including ENERGY STAR certified products such as water coolers and water heaters. Companies can also seek out products that are WaterSense certified by the EPA. These technologies are guaranteed to use 20% less water when compared to uncertified models. Replacing older faucets and aerators with WaterSense certified products can save on average 700 gallons of water per year. [32]

Conclusion: water resiliency barriers are easy to beat

As long as the price of water does not reflect its true value, there will be little purely financial motivation for businesses to undertake projects that conserve water and increase resiliency. The argument that water stress and disruptions in supply are just around the corner can only go so far. A thorough audit of the role water plays in an organization can at least provide the impetus for the optimization of operations. But if infrastructure and technology implementations have paybacks

that are too long for risk-averse companies, operations and sustainability managers will have to look elsewhere. Luckily, the financing options discussed in this paper are readily available and bring down the barriers to resiliency success. There are innumerable other options available, and more are being devised and released every year. As we all march together toward the future, when it comes to water resiliency there really is no excuse, and only benefits for businesses willing to take the necessary steps.

Appendix

Table 1. Summary of Case Studies

Company	Industry	Technologies/ Projects Completed	Cost of Project	Type of Financing/ Rebate	Water Saved	Dollars Saved
Phyllis Weatley Young Women's Christian Association	Low income housing	HVAC system, ENERGY STAR appliances, low-flow water fixtures, other energy conserving fixtures	$17 million	$70,000 upfront through CivicPACE	47% of baseline use	$7,000 in operation costs per year (including energy improvements)
dusitD2 Hotel Constance Pasadena	Hospitality	HVAC system, centralized control of energy and heating and cooling, water saving fixtures in each bathroom	-	$6.8 million of the project cost upfront over a 20 year term though PACE financing by K2 Clean Energy Capital	3.2 million gallons annually	-
Hilton Los Angeles/ Universal City Hotel	Hospitality	20 HVAC fan motors, HVAC control systems, replacement of 250 bathtubs and showers, replacement of 500 shower heads, and high capacity washers and dryers	-	$7 million of the project cost upfront through PACE financing by ReNewAll PACE program and $1 million in rebates through LADWP and MWD	-	Total project return of $12.5 million with a 78% return on investment
University of San Diego	Education	low-flow washroom fixtures and upgraded sanitary water fixtures	$8.2 million; 30% of cost towards water projects	$8.2 million pay-for-performance contract with Siemens (ESCO)	40 million gallons annually	$1.5 million per year; $350,000 of which is from washroom and sanitary fixtures alone
University of California, Los Angeles	Education	Condensate cooling and collection	$370,000 (including a reverse osmosis process)	MWD Water Savings Incentive Program Rebate	up to 27 million gallons during the first phase of monitoring (one year)	$100,000 per year
Eagle Foods	Service	Flow control valves, hose-water tank connectors, and water brooms	-	Rebate of $1.75 per year 1000 gallons saved through LADWP Water Technical Assistance Program	2,651,660 gallons annually	-

Table 2. MWD rebates available through WaterSmart program in 2015-2016[33]

Appliance or Technology	Rebate
High-efficiency clothes washers	$85 per unit
Premium high-efficiency toilets	$40 per unit
Weather-based irrigation controllers	$80 per controller for less than one acre of landscape or $35 per station for more than one acre
Rotating sprinkler nozzles	$2 per nozzle
Rain barrels and cisterns	$35 per barrel or $250-$350 for a cistern
Soil moisture sensor systems	$80 per controller for less than one acre of landscape or $35 per station for more than one acre
Turf removal	Dependent on a company's water service agent

Additional Resources and Online Tools

Water Auditing

- LADWP Water Conservation Website contains links on rebates and free items, water savings tip, water use calculator, and information on the California Urban Water Conservation Council, and a water loss audit.

PACE

- Sample of commercial PACE Programs in CA
    - As of 2011, Sonoma County, Placer County, and Palm Desert PACE projects had similar interest rates of 7%, 20 year terms, and average PACE project costs of around $170,000. Sonoma County and Placer County are funded by the county treasury while Palm Desert is funded by city backed funds.
- Commercial PACE programs by state
- Additional Resources for Commercial Building Owners

Performance Contracting

- How to select an energy service company
- List of ESCOs

- More information about financing ESCO

Metropolitan Water District

- SoCal WaterSmart Available Rebates
- Additional Conservation Literature

WaterSense

- Water Conservation in Commercial Buildings
- Search for rebates on energy and water efficient products sold nearby
- Best Management Practices
- Water Sense Product Search

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