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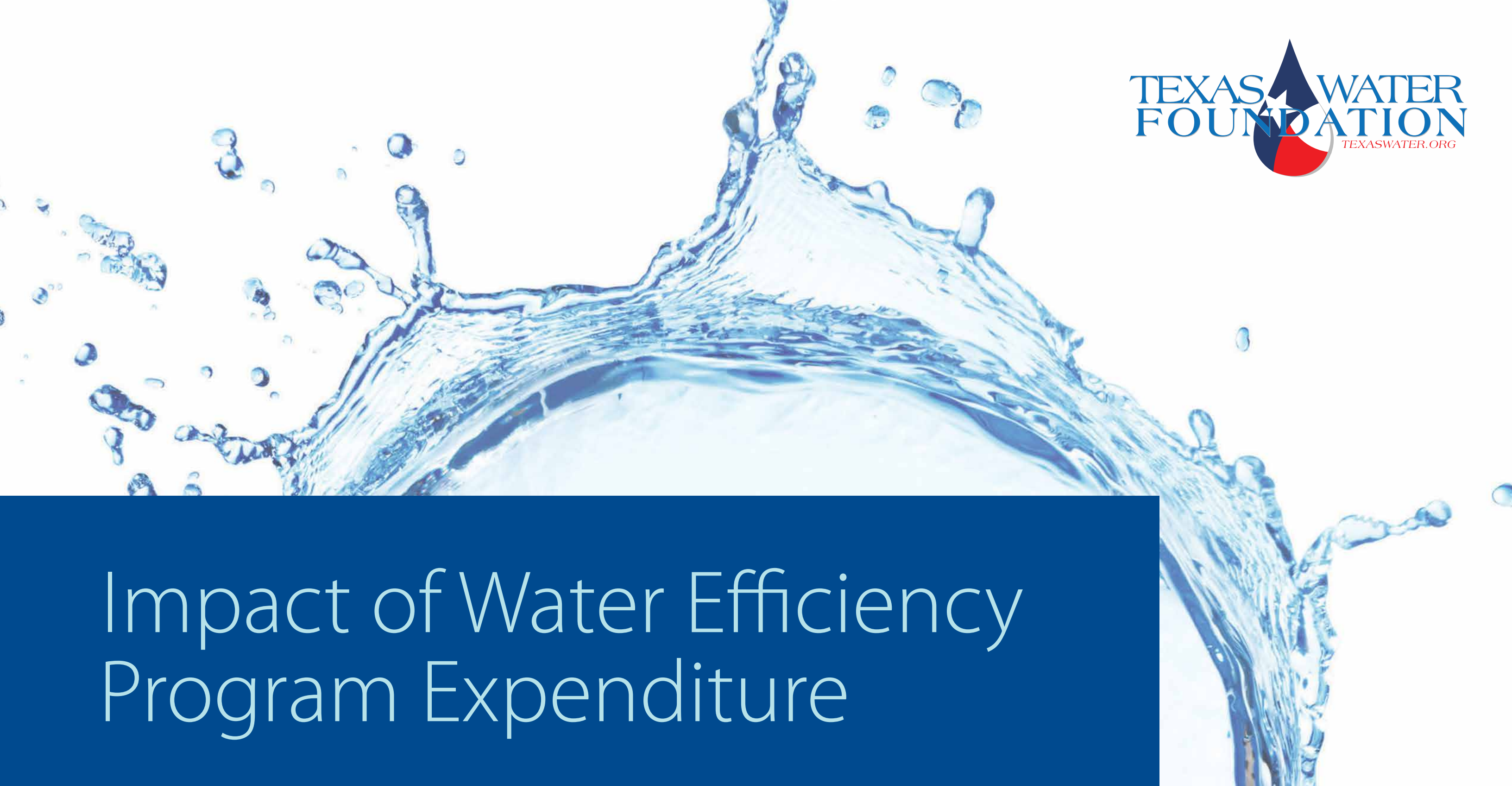


Impact of Water Efficiency Program Expenditure

On the Texas Economy

December 2017

Foreword

Water runs through the Texas economy as its rivers run through the land.

If you read the economic projections from the Dallas Fed or the Annual Economic Outlook from Texas A&M, the focus will be on the energy sector rebound from low oil prices, and manufacturing jobs, and housing starts. But water is behind all of those jobs — whether for oil exploration and production, steam electric generation or cooling for manufacturing, or the growing appetite for water in new homes and neighborhoods. And how much water Texas has — and will continue to have — shapes our economic growth.

This report, however, is not about the importance of maintaining Texas' water for Texas' businesses. It is about the very real business of maintaining Texas' water.

Texas investments in water efficiency — whether on old, water-wasting toilets, landscape irrigation, commercial kitchens, industrial process, or reducing water losses — create jobs for Texans. As this report shows, every dollar invested by the state on water efficiency yields $1.30 to state output and $0.80 to gross state product, a solid return. A $2 billion investment in water efficiency would not only provide $2.6 billion in state output and $1.6 billion in gross state product, it would also create thousands of jobs. These positions are utility staff, builders, plumbers, irrigation contractors, retailers, and many others.

We believe that this report demonstrates that significant investment in water efficiency is a sound, "no regret" strategy for the State of Texas. The lessons learned in the most recent drought — which cost Texas billions of dollars in economic losses and damages — all show that helping the public to use water more efficiently can yield greater reserves of water, help us manage another drought more effectively, and sustain economic growth for years to come. All while lowering the cost of water services and providing real jobs to real Texans.

Carole D. Baker
President/CEO, Texas Water Foundation

William Mellor
Vice President, AngelouEconomics

Mary Ann Dickinson
President/CEO, , Alliance for Water Efficiency

Author

David Mitchell
General Partner, M.Cubed
mitchell@mcubed-econ.com

Impact of Water Efficiency Program Expenditure on the Texas Economy

Summary

Water efficiency programs have an established track record as cost-effective long-term public resource investments. These programs can also help local and state economies by boosting employment and output. This paper uses a Texas case study to examine state-level short-term economic impacts of water efficiency investments, specifically in terms of employment, economic output, and total value added.[1]

The Texas case study considers the statewide economic impacts of $2 billion of investment in a broad range of urban water conservation programs addressing indoor and outdoor water uses in the residential, commercial, and industrial sectors, including programs to replace old, water-wasting toilets, programs to upgrade inefficient landscape irrigation systems, programs to improve commercial kitchen water use efficiency, programs to increase industrial process water use efficiency, and programs to reduce water losses within water distribution networks.

The Texas case study finds that each dollar of direct investment in water use efficiency programs adds $1.30 to state output and $0.80 to state value added. Each million dollars of direct investment supports 8.7 job-years in the state.[2]

A statewide water conservation investment program on the order of $2 billion spread over five years would therefore be anticipated to generate approximately $2.6 billion in state output and support 17,400 job-years. The corresponding increase in state value added would be $1.6 billion. Such a program would be expected to reduce statewide water use by 300 to 400 million gallons per day (MGD) with water savings having an average duration of about 10 years – roughly enough water to serve 1.2 to 1.6 million single-family homes in Texas for 10 years.[3]

The Texas case study finds that each dollar of direct investment in water use efficiency programs adds $1.30 to state output and $0.80 to state value added.

The impacts on state output, value added, and employment from water efficiency investments are comparable to those from other water infrastructure investment, with the important added advantage that innovative water efficiency projects can be deployed in short time frames and can be readily scaled according to need. The long-term strategic, economic, social, and environmental benefits of these programs also make them "no-regret" investments in the state's future.

1 Value added is comprised of employee compensation, taxes on production and imports (less subsidies), and gross operating surplus (or profit). It is equal to the difference between the value of output and the cost of intermediate inputs to production. At the state-level, value added is often referred to as gross state product. At the national level it is termed gross domestic product. This paper uses the terms value added and gross state product interchangeably.

2 A job-year is equivalent to 2000 hours of employment. For example, 100 full-time jobs with a duration of one year is equivalent to 100 job-years, as are 20 full-time jobs with a duration of five years.

3 Based on average use of 246 gallons per day per single-family household, per 2015 estimates of average residential water use in Texas prepared by the Texas Water Development Board.

Introduction

When considering water infrastructure-related investments, it is important for states and localities to avoid thinking too narrowly in terms of reconstructing existing infrastructure. Indeed, some amount of investment in system reconfiguration can offer improved efficiencies. This paper labels these investments as "water efficiency" programs, and includes:

- **Investments in improved indoor water use efficiency** that yield the same or improved customer benefits while using less water—such as high efficiency toilets (or HETs), clothes washers, dishwashers, showerheads, and faucet aerators.
- **Investments in improved outdoor water use efficiency**—such as smart irrigation controllers, improved irrigation equipment, and real-time irrigation efficiency monitoring.
- **Investments in commercial/industrial/institutional water use efficiencies**—such as cooling tower retrofits, plumbing fixture replacement, commercial kitchen upgrades, and process water improvements.
- **Water utility efficiency improvements**—including system leak detection and control, energy efficiency audits, and water rate reform.

Though this paper primarily focuses on quantifying state-level economic impacts of investments in water efficiency programs—in terms of changes to economic output, value added, and employment—there are also important qualitative benefits of water efficiency investment:

1. Water efficiency will be a 21st century growth industry, and these programs provide a testbed for local manufacturers with respect to water efficient technology innovation in product design.
2. Water efficiency programs can help reduce long-term political conflicts between regions where water scarcity is increasing.
3. Water efficiency programs can be designed to assist distressed communities, where water distribution infrastructure has not been adequately maintained or replaced and where household and commercial appliance stocks tend to be older and less efficient.
4. Increasing water efficiency can forestall the need for energy-intensive new water supply development.
5. Water efficiency programs help water customers manage their water and energy bills.
6. Water efficiency programs can reduce the use of energy to pump, treat, and pressurize water systems.
7. Water efficiency programs connect directly to communities, necessitating citizen involvement.

Methodology

An input-output (I-O) model of the Texas economy was used to evaluate the near-term economic benefits of large-scale investments in water efficiency programs. Near-term economic benefits were measured in terms of employment, state output, and total value added. Impacts were evaluated with IMPLAN I-O software and the 2015 Texas state totals data file.

Several types of water efficiency program investments were evaluated. These included:

- Rebate and direct install programs aimed at replacing older, less efficient appliance and plumbing fixture stock;
- Outdoor water use programs involving landscape surveys and equipment upgrades;
- Commercial/industrial cooling tower water/energy retrofits;
- Industrial process water improvements; and
- Water utility leak detection and system water loss reduction programs.

In all cases, program specifications and cost estimates were based on actual water efficiency programs developed for municipal water utilities.

Program expenditures were divided into the following categories:

- Expenditures for repair, maintenance and new construction;
- Expenditures for new physical assets;
- Expenditures for site inspections, installation, and other services; and
- Expenditures for program administration.

The category-specific unit expenditures developed for each program (e.g. physical asset costs per toilet replaced or per cooling tower retrofitted) are provided in Attachment 2.

The category-specific unit expenditures were then mapped to the appropriate economic sectors in the IMPLAN I-O model.[4] Separate mappings were done for each water efficiency program to account for the different expenditure patterns across the programs. In cases where program expenditures involved purchases from retail or wholesale suppliers, IMPLAN's margining capability was used to account for the entire value chain from manufacturing to transportation and warehousing and then to wholesale and retail distribution. In situations where product manufacturing involved multiple stages or processes, expenditures were further divided to account for all manufacturing steps (e.g. high efficiency toilets involve both ceramic and plumbing fixture and fitting manufacturing processes).

4 The IMPLAN model includes 536 separate economic sectors. IMPLAN sectoring is based on the North American Industry Classification System and the Bureau of Economic Analysis U.S. Benchmark Tables.

Methodology, *Continued*

The IMPLAN model accounts for trade flows between states and the rest of the world through regional purchase coefficients. These coefficients estimate the amount of final demand in the model region (in this case the state of Texas) that is met by producers within the region versus imported into the region. A significant fraction of the material inputs that would be purchased for water efficiency programs deployed in Texas would be manufactured outside of the state, and this is taken into account in the estimates of the state-level employment, output, and value added impacts.

In cases where programs involve cost-sharing with end-users (e.g. a rebate program that covers half the cost of a new appliance) it was assumed that end-users would offset program-induced expenditures by an equivalent reduction in expenditures on other goods and services. In other words, the analysis took the stance that these programs would redirect business and household expenditure into efficiency investments, but would not increase overall spending by households and businesses beyond already planned or anticipated levels. In this way, the methodology only counted the economic activity associated with water efficiency program expenditures, and does not include household and business expenditures that would likely have occurred anyway.

The changes to sector final demands resulting from the program mappings were run through the IMPLAN I-O model to determine the impacts to employment, output, and value added. Total impacts estimated with the model consist of the direct and indirect impacts of program expenditures. The direct impacts include employment, output, and value added associated with the direct spending on the water efficiency programs. The indirect impacts result from the ripple effects of this expenditure on industries further down the supply chain and household disposable income.

Results

Changes to state output and value added per dollar of direct investment, and employment per million dollars of direct investment, for a representative set of water use efficiency programs are shown in Table 1. State output impacts range from $0.79 to $1.98 per dollar of direct investment, with an average impact of $1.32. State value added impacts range from $0.49 to $1.20 per dollar of direct investment, with an average impact of $0.82. State employment impacts range from 4.6 to 13.4 job-years per million dollars of direct investment, with an average impact of 8.7 job-years.

The programs in Table 1 were selected for illustrative purposes only. Other programs of similar design focusing on other aspects of water efficiency would be expected to provide similar benefits to the economy.

Table 1

State-Level Economic Impacts per Dollar of Direct Investment in Water Use Efficiency Programs

Total impact per billion dollars of direct investment	*Billion $, except employment*		
Program Option	*Output (Billion $)*	*Value Added (Billion $)*	*Job-Yrs (Million $)*
Water System Loss Control	$1.98	$1.20	9.0
Landscape Irrigation Upgrades	$1.38	$0.86	13.4
HE Toilet Replacement Program	$1.12	$0.71	7.8
Industrial Water/Energy Upgrades	$0.79	$0.49	4.6
Cooling Tower Upgrades	$1.51	$0.97	8.9
Restaurant Equipment Rebates	$1.12	$0.70	8.8
Average of Programs	$1.32	$0.82	8.7

Table 2 summarizes the impacts of a $2 billion investment program in water efficiency based on the average results from Table 1. The economic model indicates such a program would increase state output by $2.64 billion, state value added by $1.64 billion, and state employment by 17,400 job-years.

Table 2

State-Level Economic Impacts of $2 Billion Water/Energy Efficiency Investment

Total impact per billion dollars of direct investment — *Billion $, except employment*

Program Option	*Output (Billion $)*	*Value Added (Billion $)*	*Job-Yrs (Million $)*
Average of Programs in Table 1	$2.64	$1.64	17,400

The economic model also indicates that impacts would be broadly distributed through the Texas economy. Table 3 shows the distribution of output, value added, and employment impacts at the 2-digit NAICS level of sector aggregation per dollar of direct investment in water efficiency.[5]

5 Table 3 assumes direct investment is divided evenly across the programs shown in Table 1.

Table 3

Distribution across Texas Economy of Impacts to Output, Value Added, and Employment per Dollar of Investment in Water Use Efficiency Programs

2-Digit NAICS Sector	Output	Value Added	Employment
11. Ag, Forestry, Fish & Hunting	0.2%	0.1%	0.3%
21. Mining	0.6%	0.7%	0.3%
22. Utilities	13.9%	14.0%	5.5%
23. Construction	1.9%	1.5%	1.7%
31-33. Manufacturing	8.4%	4.5%	2.8%
42. Wholesale Trade	8.7%	9.6%	4.5%
44-45. Retail Trade	8.7%	9.3%	15.5%
48-49. Transportation & Warehousing	3.8%	2.9%	3.5%
51. Information	2.5%	1.8%	0.8%
52. Finance & insurance	5.4%	3.9%	3.8%
53. Real Estate & Rental	6.9%	7.4%	3.0%
54. Professional-Scientific & Tech Services	3.7%	3.9%	3.9%
55. Management of Companies	0.9%	0.8%	0.6%
56. Administrative & Waste Services	6.6%	6.7%	15.4%
61. Educational Services	0.4%	0.4%	0.9%
62. Health & Social Services	3.7%	3.7%	5.6%
71. Arts- entertainment & Recreation	0.5%	0.5%	1.0%
72. Accommodation & Food Services	1.8%	1.6%	4.3%
81. Other Services	16.4%	18.8%	17.6%
92. Government	5.1%	7.7%	8.9%
Total	**100.0%**	**100.0%**	**100.0%**

Water Savings

The water efficiency programs evaluated yield water savings at unit costs ranging from $800 per million gallons (landscape irrigation upgrades) to $2,000 per million gallons (HE toilet replacement), with an average of about $1,600 per million gallons (see Attachment 1). An accurate accounting of water savings depends on the mix of programs implemented, so savings estimates must be general until it is known what the programs are that will be selected. Plumbing fixtures cannot be replaced twice for double the water savings, for example. It is reasonable to expect that a well-implemented set of programs could yield water savings in the range of $1,200-$1,800 per million gallons with an average savings duration of 10 years.

Thus, a $2 billion water efficiency investment could generate water savings of:

- 400 MGD if program costs come in near the lower end of the cost range – roughly the daily water demands of all owner-occupied housing in the San Antonio MSA.[6]
- 300 MGD if program costs come in near the upper end of the cost range -- roughly the daily water demands of all owner-occupied housing in the Austin MSA.[7]

Aid for Distressed Communities

Some of the best opportunities for water efficiency investment are in lower-income areas where water distribution infrastructure has not been adequately maintained or replaced and where household and commercial appliance stocks tend to be older and less efficient. Los Angeles, for example, pioneered the use of community-based-organization (CBO) deployment models for ultra-low flush toilet installation in the early 1990s. Working with local CBOs not only helped the city to replace over 2 million toilets, but also created employment opportunities where unemployment rates were highest. Many water efficiency programs do not require highly skilled labor to implement. These types of programs are well suited for assisting communities suffering from endemic underemployment.

6 400 MGD is sufficient to meet the daily demands of 1.6 million households. The U.S. Census reports 1.46 million owner-occupied housing units in the San Antonio MSA in 2015.

7 300 MGD is sufficient to meet the daily demands of 1.2 million households. The U.S. Census reports 1.14 million owner-occupied housing units in the Austin MSA in 2015.

Water-Energy Nexus

The water and energy sectors are highly interdependent. Water utilities and water customers use large amounts of energy to withdraw, treat, and distribute water. Thus, saving energy becomes one of the most compelling reasons to save water: it is good for the economy and good for the environment in terms of reduced fossil fuel dependence as well as greenhouse gas reduction. Both water and energy efficiency reduce other negative externalities as well.

Water utilities can save energy with efficient pumps and efficient pumping practices, including off-peak pumping to storage. Water and wastewater utilities may also find ways to cogenerate energy onsite in order to reduce electricity demands. Infrastructure improvements that reduce leakage and losses also save both water and energy. Efficient water use by all customers (industrial, commercial, and residential) provides across-the-board savings by avoiding energy costs throughout the entire production cycle. Reductions in hot water use directly save both energy and water, with appreciable benefits to households. While water efficiency cannot displace water infrastructure, it can become an integral part of the infrastructure.

Consider these energy consumption facts:

A previous study documented that 4% of the nation's electricity use goes towards moving and treating water and wastewater, although that figure is deemed by most experts to be much lower than the actual national average.

Approximately 80% of the variable costs for processing and distributing municipal water supply are for electricity.

Groundwater supply from public sources requires roughly 1,800 kilowatt-hours per million gallons—about 30% more than supply from surface water, primarily due to a higher energy requirement to pump from groundwater.

Rapid Deployment Potential

Water efficiency programs can be rapidly deployed and scaled to need. These are key advantages compared to traditional water supply development projects, which can take decades to permit and construct. The feasibility of rapid deployment of water efficiency programs has been proven over many years by water managers in western states, including Texas, responding to periodic droughts and shortages. There now exists a range of demonstrated approaches for quickly deploying efficiency programs in the field, initiated in time periods of 180 days or less.

“No Regret” Investments

The long-term strategic, economic, social, and environmental benefits of water efficiency programs make them “no-regret” investments for Texas and other states confronting growing water scarcity. Investing in these programs now will, over the longer term, promote sustainable resource use and help to lessen conflicts over water resources.

Conclusion

While the primary motivation for investment in water efficiency is that it offers one of the most cost-effective means by which water-scarce states, such as Texas, can satisfy current and future water demands, it also is the case that investment in water efficiency offers near-term stimulative benefits for employment, output, and value added that are on par with other types of water infrastructure investment. In the case of Texas, input-output modeling indicates a statewide water conservation investment program on the order of $2 billion spread over five years could be anticipated to generate roughly $2.6 billion in state output, $1.6 billion in state value added, and support 17,400 job-years over the course of its implementation.

Attachments

ATTACHMENT 1

Water/Energy Efficiency Program Cost and Water Savings Specifications

Efficiency Program	*Units*	*Cost per Unit*	*Number of Units per Million $*	*Lifetime Savings per Million $ (MG)*	*Lifetime Savings per Million $ (AF)*	*Unit Cost ($/MG)*	*Unit Cost ($/AF)*	*Lifetime (Yrs)*	*Lifetime Savings/Unit (AF)*	*Discounted Lifetime Savings/Unit (AF)*
HE Toilet Replacement Program	Toilets	$368	2,719	771	2,365	$2,082	$678	20	0.87	0.54
Landscape Irrigation Upgrades	Site Inspection, Rebate	$817	1,224	1,639	5,029	$790	$258	10	4.11	3.17
Restaurant Equipment Rebates	Site Inspection, Rebate	$1,226	816	997	3,059	$1,450	$472	15	3.75	2.59
Industrial Water/ Energy Upgrades	Site Inspection, Rebate	$44,369	23	543	1,668	$1,881	$613	10	74	57.14
Cooling Tower Upgrades	Site Inspection, Rebate	$4,320	231	860	2,639	$1,506	$491	10	11.4	8.80
Water System Loss Control	System Audit, Leak Repair	$43,785	23	595	1,826	$1,765	$575	1	80.0	76.15

Unit cost (U) is the price per unit of water savings that fully recovers the present value cost of the investment:

$$\sum_{t=0}^{L-1} \frac{C_t}{(1+d)^t} = \sum_{t=0}^{L-1} \frac{Q_t \times U}{(1+d)^t} \; or \; U = \sum_{t=0}^{L-1} \frac{\frac{C_t}{(1+d)^t}}{\frac{Q_t}{(1+d)^t}}$$

Where L is the useful life of the investment, Ct is the cost in year t, Qt is the water savings in year t, and d is the real discount rate. A real discount rate of 5% is used to calculate the unit costs in the table above.

ATTACHMENT 2

Implan Sector Demand Specifications by Water Efficiency Program

HE Toilet Replacement Program (based on direct installation program targeting multi-family complexes)

Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Equipment Purchases	$156	$423,281	199	Pottery, ceramics, and plumbing fixture manufacturing	Industry	Yes
Equipment Purchases	$78	$211,640	255	Plumbing fixture fitting and trim manufacturing	Industry	Yes
Installation/Service	$70	$190,476	508	Personal and household goods repair and maintenance	Industry	No
Disposal/Recycling	$18	$47,619	471	Waste management and remediation services	Industry	No
Program Administration	$47	$126,984	533	Employment and payroll of local govt. non-education	Industry	No
Total Expenditure	$368	$1,000,000				

Margins for IMPLAN sector 199 – Pottery, ceramics, and plumbing fixture manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
199	Pottery, ceramics, and plumbing fixture manufacturing	0.6635
395	Wholesale trade	0.2193
408	Air transportation	0.0067
409	Rail transportation	0.0029
410	Water transportation	0.0020
411	Truck transportation	0.1056
Total		1.0000

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Margins for IMPLAN sector 255 – Plumbing fixture fitting and trim manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
255	Plumbing fixture fitting and trim manufacturing	0.8806
395	Wholesale trade	0.0990
408	Air transportation	0.0011
409	Rail transportation	0.0003
410	Water transportation	0.0000
411	Truck transportation	0.0191
Total		1.0000

HE Toilet Replacement Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*Regional Purchase Coefficient*	*In-State Expenditure*
199	Pottery, ceramics, and plumbing fixture manufacturing	Industry Change	$280,855.25	0.1418	$39,825.28
255	Plumbing fixture fitting and trim manufacturing	Industry Change	$186,376.30	0.2958	$55,130.11
395	Wholesale trade	Industry Change	$113,763.21	0.9986	$113,603.94
408	Air transportation	Industry Change	$3,056.15	0.7882	$2,408.85
409	Rail transportation	Industry Change	$1,302.41	0.7837	$1,020.70
410	Water transportation	Industry Change	$832.41	0.8507	$708.13
411	Truck transportation	Industry Change	$48,735.27	0.9802	$47,770.31
471	Waste management and remediation services	Industry Change	$47,619.00	0.9881	$47,052.33
508	Personal and household goods repair and maintenance	Industry Change	$190,476.00	0.9196	$175,161.73
533	Employment and payroll of local govt. non-education	Industry Change	$126,984.00	1.0000	$126,984.00
			$1,000,000.00		$609,665.38

ATTACHMENT 2, ***Continued***

Implan Sector Demand Specifications by Water Efficiency Program

Landscape Irrigation Upgrades (based on site inspections and rebates for smart irrigation controllers, high efficiency nozzles and spray bodies, drip irrigation systems, etc., with customer cost share)

Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Equipment Purchases	$409	$583,333	263	Lawn and garden equipment manufacturing	Industry	Yes
Installation/Service	$234	$333,333	469	Landscape and horticultural services	Industry	No
Program Administration	$58	$83,333	533	Employment and payroll of local govt. non-education	Industry	No
Total Expenditure	$701	$1,000,000				

Margins for IMPLAN sector 263 – Lawn and garden equipment manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
263	Lawn and garden equipment manufacturing	0.4567
395	Wholesale trade	0.1079
399	Retail - Building material and garden equipment	0.4226
408	Air transportation	0.0008
409	Rail transportation	0.0001
411	Truck transportation	0.0119
Total		1.0000

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Landscape Irrigation Upgrades Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*RPC*	*In-State Expenditure*
263	Lawn and garden equipment manufacturing	Industry Change	$266,462.62	0.0755	$20,117.93
395	Wholesale trade	Industry Change	$62,954.49	0.9986	$62,866.36
399	Retail - Building material and garden equipment	Industry Change	$246,566.90	0.9726	$239,810.97
408	Air transportation	Industry Change	$466.76	0.7882	$367.90
409	Rail transportation	Industry Change	$58.35	0.7837	$45.73
411	Truck transportation	Industry Change	$6,943.08	0.9802	$6,805.61
469	Landscape and horticultural services	Industry Change	$333,808.84	0.9496	$316,984.88
533	Employment and payroll of local govt. non-education	Industry Change	$82,738.94	1.0000	$82,738.94
RPC = Regional Purchase Coefficient			$1,000,000.00		$729,738.31

Restaurant Equipment Rebates (based on site inspections and equipment rebates for commercial kitchens, with customer cost share)

Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Equipment Purchases	$701	$800,000	328	Household cooking appliance manufacturing	Industry	Yes
Installation/Service	$117	$133,333	507	Commercial and industrial machinery and equipment repair and maintenance	Industry	No
Program Administration	$58	$66,667	533	Employment and payroll of local govt. non-education	Industry	No
Total Expenditure	$876	$1,000,000				

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Margins for IMPLAN sector 328 – Household cooking appliance manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
328	Household cooking appliance manufacturing	0.6149
395	Wholesale trade	0.0857
398	Retail - Electronics and appliance stores	0.2856
408	Air transportation	0.0019
409	Rail transportation	0.0023
411	Truck transportation	0.0096
Total		1.0000

Restaurant Equipment Rebate Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*RPC*	*In-State Expenditure*
3328	Household cooking appliance manufacturing	Industry Change	$491,920.00	0.1391	$68,426.07
3395	Wholesale trade	Industry Change	$68,560.00	0.9986	$68,464.02
3399	Retail - Electronics and appliance stores	Industry Change	$228,480.00	0.9809	$224,116.03
3408	Air transportation	Industry Change	$1,520.00	0.7882	$1,198.06
3409	Rail transportation	Industry Change	$1,840.00	0.7837	$1,442.01
3411	Truck transportation	Industry Change	$7,680.00	0.9802	$7,527.94
3507	Commercial and industrial machinery and equipment repair and maintenance	Industry Change	$133,333.00	0.9974	$132,986.33
3533	Employment and payroll of local govt. non-education	Industry Change	$66,667.00	1.0000	$66,667.00
RPC = Regional Purchase Coefficient			$1,000,000.00		$570,827.46

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Industrial Water/Energy Upgrades (based on site inspections and direct investment in process equipment upgrades)

Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Equipment Purchases	$35,028	$789,470	274	Other commercial service industry machinery	Industry	Yes
Installation/Service	$8,757	$197,368	507	Commercial and industrial machinery and equipment repair and maintenance	Industry	No
Program Administration	$584	$13,162	533	Employment and payroll of local govt. non-education	Industry	No
Total Expenditure	$44,369	$1,000,000				

Margins for IMPLAN sector 274 – Other commercial service industry machinery manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
274	Other commercial service industry machinery manufacturing	0.8076
395	Wholesale trade	0.1706
408	Air transportation	0.0018
411	Truck transportation	0.0200
Total		1.0000

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Industrial Water/Energy Upgrades Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*RPC*	*In-State Expenditure*
3274	Other commercial service industry machinery manufacturing	Industry Change	$637,593.84	0.1236	$78,806.60
3395	Wholesale trade	Industry Change	$134,682.74	0.9986	$134,494.19
3408	Air transportation	Industry Change	$1,432.80	0.7882	$1,129.33
3411	Truck transportation	Industry Change	$15,760.75	0.9802	$15,448.68
3507	Commercial and industrial machinery and equipment repair and maintenance	Industry Change	$197,367.53	0.9974	$196,854.38
3533	Employment and payroll of local govt. non-education	Industry Change	$13,162.34	1.0000	$13,162.34
RPC = Regional Purchase Coefficient			$1,000,000.00		$439,895.52

Cooling Tower Upgrades (based on site inspections and direct investment in cooling equipment upgrades)

Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Equipment Purchases	$1,226	$283,784	277	Air conditioning, refrigeration, and warm air heating equipment manufacturing	Industry	Yes
Installation/Service	$3,036	$702,703	507	Commercial and industrial machinery and equipment repair and maintenance	Industry	No
Program Administration	$58	$13,514	533	Employment and payroll of local govt. non-education	Industry	No
Total Expenditure	$4,320	$1,000,000				

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Margins for IMPLAN sector 277 – Air conditioning, refrigeration, and warm air heating equipment manufacturing

IMPLAN Sector	*Sector Name*	*Margin*
277	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.6798
395	Wholesale trade	0.3015
408	Air transportation	0.0015
409	Rail transportation	0.0003
411	Truck transportation	0.0169
Total		1.0000

Cooling Tower Upgrade Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*RPC*	*In-State Expenditure*
277	Air conditioning, refrigeration, and heating equipment manufact.	Industry Change	$192,918	0.2717	$52,415.80
395	Wholesale trade	Industry Change	$85,556	0.9986	$85,436.17
408	Air transportation	Industry Change	$437	0.7882	$344.38
409	Rail transportation	Industry Change	$79	0.7837	$62.26
411	Truck transportation	Industry Change	$4,806	0.9802	$4,710.91
507	Commercial and industrial machinery and equip. repair & maint.	Industry Change	$702,778	0.9974	$700,950.56
533	Employment and payroll of local govt. non-education	Industry Change	$13,426	1.0000	$13,425.93
RPC = Regional Purchase Coefficient			$1,000,000		$857,345.99

ATTACHMENT 2, *Continued*

Implan Sector Demand Specifications by Water Efficiency Program

Water System Loss Control (based on system audit, leak detection and repair, improved measurement)

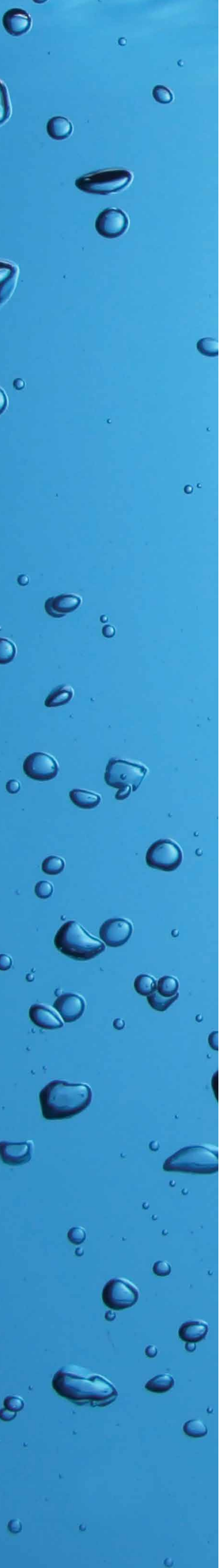
Utility Expenditure

Activity Description	*Unit Cost*	*Per Million $*	*IMPLAN Sector*	*Sector Name*	*Basis*	*Margined*
Repairs, Maintenance	$43,785	$1,000,000	51	Water, sewage and other systems	Industry	No
Total Expenditure	$43,785	$1,000,000				

Water System Loss Control Program Final Demands per Million $ of Expenditure

IMPLAN Sector	*Sector Name*	*Basis*	*Expenditure*	*RPC*	*In-State Expenditure*
51	Water, sewage and other systems	Industry Change	$1,000,000.00	0.9597	$959,700.00

RPC = Regional Purchase Coefficient



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This report was produced in partnership with the Alliance for Water Efficiency.

Texas Water Foundation
PO Box 13252, Austin, TX 78711
(512) 994-7260

www.texaswater.org

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