

CHAPTER 4: Changes to California Businesses

The proposed regulations will not lead to the specific creation or elimination of any California business. The proposed regulations require a minimum performance and may require manufacturers to shift product lines to accommodate increased demand for compliant products. However, the proposed regulations do not create the need for a new, nonexistent good or service. Instead, it requires the improvement of existing goods in the market. Therefore, no specific business is estimated to be directly created by the regulation, although secondary businesses may be created from expanded jobs and disposable income within the state.

The overall effect to California businesses will be positive: reduced water delivery costs and increased revenues through the manufacture of compliant spray sprinkler bodies.

Effects to Spray Sprinkler Body Manufacturers

The economic analysis showed that about one-third of spray sprinkler body manufacturing is located within California.⁴³ **Table 4-1** lists spray sprinkler body manufacturers identified by Commission staff with the headquarters locations and whether they perform sprinkler design or manufacturing in California.

⁴³ Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 21.

Table 4-1: Spray Sprinkler Body Manufacturers

Manufacturer	Headquarters	Manufacturing in California	Design Sprinklers in California
The Toro Company	Riverside, CA	Yes	Yes
Rainbird	Azusa, CA	No	No
Hunter	San Marcos, CA	Yes	Yes
Irritol	Riverside, CA	No	No
Champion-Arrowhead Brass	Los Angeles, CA	No	No
Signature-Nelson	Irvine, CA	No	No
Aqualine	Los Angeles, CA	No	No
Krain	West Palm Beach, FL	No	No
Orbit	Bountiful, UT	No	No
Weathermatic	Garland, TX	No	No
Hydro-Rain	North Salt Lake, UT	No	No
Buckner/Superior	Torrance, CA	No	No
HIT Products Corporation	Lindsay, CA	No	No

Source: California Energy Commission staff

Staff expects manufacturers will need to change product lines from noncompliant to compliant spray sprinkler bodies. Effects could include designing and procuring new tooling to add pressure-regulating devices to meet the proposed regulations.

Staff evaluated results provided by Evergreen Economics regarding the effect of the regulations upon in-state spray sprinkler body manufacturers. The effects will be positive as the incremental costs consumers and businesses pay to replace failed sprinklers will represent additional revenue for spray sprinkler body manufacturers.⁴⁴ Evergreen Economics estimates the additional revenue due to the incremental cost as \$39.7 million dollars per year. **Table 4-2** presents the Evergreen Economics findings.

⁴⁴ Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 22, Table 13.

Table 4-2: Annual Estimated Economic Impacts in California from Increased Spending on Compliant Spray Sprinkler Bodies

Incremental Revenue Received by California Spray Sprinkler Body Manufacturers (\$M)	Change in Employment (Jobs)	Change in Economic Output (\$M)
\$39.7	262	\$68.8

Source: Evergreen Economics

Impacts to Distributors and Retailers

Under the Appliance Efficiency Regulations (Sections 1608 and 1609), distributors and retailers are responsible for ensuring that the products they sell have been certified by the product manufacturer and appear in the Energy Commission’s Modernized Appliance Efficiency Database System (MAEDbS). Because spray sprinkler bodies are a newly covered product, Energy Commission staff assumes that retailers will experience some additional costs associated with verification, although this cost will be insignificant in comparison to their overall expenditure.

Some retailers may choose to incur additional costs if they rebrand an appliance that is not certified to Energy Commission and wish to sell it in California. These retailers are required to certify the appliances to California.

Effects to Commercial Building Owners

Commission staff estimates commercial building owners, including office buildings, retail outlets, and restaurants, that irrigate landscapes with spray sprinkler bodies will accrue similar savings as California residents. Evergreen Economics estimated that 63 million spray sprinkler bodies are used in these locations. Staff estimates the net savings growing over time and ultimately totaling \$155 million in 2029.⁴⁵

Effects to Government Facilities

Evergreen Economics estimated a stock of 9.5 million spray sprinkler bodies around government buildings. Using the same assumptions as for residential and commercial buildings, savings were estimated as accruing to \$23 million by 2029.⁴⁶

Effects to California Urban Water Suppliers

Urban water suppliers, both retail and wholesale, will have reduced sales of water due to increased efficient use under the proposed standard. The reduction is in line with the Governor’s Executive Order B-37-16 that directs the Department of Water Resources and

⁴⁵ Helvoight, Ted, Evergreen Economics, *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 19, Table 10, September 13, 2018

⁴⁶ Helvoight, Ted, Evergreen Economics, *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 20, Table 11, September 13, 2018

California State Water Resources Control Board to help water suppliers increase conservation through using water more wisely.⁴⁷ Reducing the demand for water may also benefit water suppliers by decreasing the need for investments in costly, large-scale infrastructure projects such as dams, canals, and reservoirs. Commission staff cannot identify any specific projects that would be cancelled or modified as a result of the water savings. Evergreen Economics notes that the complexity of the state's water policies when combined with the impacts of the proposed regulation are beyond the scope of the IMPLAN model.⁴⁸

Effects on California Electricity Generators

Sellers of electric power, both retail and wholesale, may experience slightly reduced sales of electricity due to the proposed standard as less energy is needed to extract water from the source; to treat, distribute, and use it; and to collect and treat wastewater for release back into the environment. Because California's investor-owned energy utilities' earnings are decoupled from energy sales, these utilities will see minimal effects from the proposed regulations.⁴⁹

Impacts to California Landscape Professionals

Energy Commission staff assumes that there will be no change in business consumer behavior. Landscape professionals will pass incremental costs on to end users, and building owners will absorb the incremental costs as a typical business expense.⁵⁰

47 California Department of Water Resources, State Water Resources Control Board, California Public Utilities Commission, California Department of Food and Agriculture, and California Energy Commission, April 2017. *Making Water Conservation a California Way of Life*, pg. ii, available at <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Conservation-Tips/Files/Publications/Making-Water-Conservation-a-California-Way-of-Life.pdf>.

48 Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 23.

49 California Public Utilities Commission, *California's Decoupling Policy*, available at https://fishnick.com/pge/Decoupling_Explained.pdf.

50 Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 22.

CHAPTER 5: Competitive Advantage or Disadvantage

The proposed regulation would apply to all businesses manufacturing the regulated products inside and outside the state and selling spray sprinkler bodies to California customers. It is, therefore, not anticipated that the regulation will have an adverse effect on the competitiveness of California businesses compared with businesses outside the state. Staff concluded the alternatives considered would apply to businesses in a similar manner to the proposed regulations.

The proposed regulations will, by design, give an advantage to manufacturers of more efficient products. The proposed performance standards are not based on any particular patent or technology and, therefore, give a broad advantage rather than a specific advantage. Compliant products are offered by many manufacturers.⁵¹ Assembly of spray sprinkler bodies does not occur in significant volume within the state – most are assembled in China. However, there are California-based SSB corporations, as shown in **Table 4-1**.

The decrease in overall water use estimated by the proposed regulation would create a slight competitive advantage for California businesses through lower operating expenses to maintain their landscapes.

⁵¹ Steffensen, Sean. 2018. *Final Staff Analysis of Water Efficiency Standards for Spray Sprinkler Bodies*. California Energy Commission, CEC-400-2018-005, pp. 40-43.

CHAPTER 6: Changes in State Investment

The overall result of conserving water with the proposed spray sprinkler body efficiency standards is an increase in gross state product (GSP). This modeled increase in GSP is the result of lower annual water bills and reallocation of spending by businesses and homes on other goods and services within the California economy, and they lead to an increase in California business proprietor income. Evergreen Economics estimated the change in proprietor income through the IMPLAN analysis. Because of uncertainty as to when the investment will occur and to present a concise number as to the effect, Evergreen Economics discounted the total value of the increases to proprietor income to the first year of implementation, 2021. The total change in income over the period analyzed discounted to 2021 is \$142 million.⁵²

Based upon a review of national data, Evergreen Economics estimates that 29.3 percent of the proprietor income will be reinvested as measured by net private domestic investment (NPDI).⁵³ This assumption leads to a change in NPDI of \$41.6 million. The level of increased NPDI is very small compared to the whole California economy and represents up to a 0.0015 percent change compared to the GSP. Staff finds the overall effect of the regulations on investment in California to be small compared to benefits of reduced water consumption, increased jobs, increased personal income, improved air quality, and reduced greenhouse gas emissions.

52 Helvoight, Ted. Evergreen Economics. October 23, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 17, Table 6.

53 Helvoight, Ted. Evergreen Economics. October 23, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 17, Table 6.

CHAPTER 7:

Changes in Incentives for Innovation

The technologies necessary to meet the proposed and alternative standards are widely available as a result of past and ongoing investments in research and development. There are many product models across multiple manufacturers that comply with the proposed standards and the alternatives considered. The proposed standards will cause the spread of existing, efficient technologies into products that may not currently contain them, thereby increasing the number of products that would comply with the proposed and alternative standards.

Future innovations in the products proposed to be regulated can be organized into three types: innovations that would decrease water use, innovations that are neutral to water use, and innovations that would increase water use.

The proposed standards clearly provide incentives for technologies and innovations that can reduce the water use of spray sprinkler bodies. The proposed regulations put pressure on manufacturers of existing products to adjust from status quo designs that would have difficulty meeting the efficiency standards. These changes lead to increased industry investment in technology and form the core of innovation. This investment also generates expertise and fuels secondary innovation. In addition, the regulations would add reporting and marking requirements that would make spray sprinkler bodies performance more transparent, thereby encouraging competition and innovation.

In some cases, innovation does not come with any change in water use. For example, changing the shape of a spray sprinkler bodies by adding or eliminating a flange may not change the efficiency, but may lead to easier installation or greater durability. Generally, these types of innovations are neither promoted nor hindered by water performance standards.

The proposed regulation will impose limits on the outlet pressure of the spray sprinkler bodies. By providing tighter control over the outlet pressure, spray sprinkler body designers may be able to optimize other parts of the design for cost savings or performance improvements.

Some innovations incorporate features that might require additional water consumption in regulated products. The regulations mandate lower water consumption, resulting in an upper limit for innovations that would otherwise increase the consumption of water. The result of the innovation can be positive, neutral, or negative with regard to water consumption. The proposed regulations would have a neutral effect on innovations that would increase consumption, but not in excess of the performance standard. The proposed regulations would have a negative effect on innovations that would cause water consumption to exceed the standard. This means that manufacturers will have to either modify the innovation to conform to the standard or forgo the innovation. The regulations would have a positive effect on innovation where the water-consuming innovation drives the demand for water-saving innovations to comply with the proposed standards.

The economic analysis of the proposed regulations shows an increase in personal disposable income. This income can be used to buy innovative products that are beyond what consumers consider baseline. Further, the utility bills of California businesses would decrease from the proposed cost-effective regulations. Reduced spending on utilities frees up capital for businesses to invest in research and development in other areas of innovation.

CHAPTER 8:

Benefits and Costs to Californians

The proposal and alternatives provide benefits to California households and commercial businesses. The benefits that were quantified for this assessment include water and electricity conservation, utility bill savings, more jobs, changes in household spending, reduced air pollution, and reduced greenhouse gas emissions. Estimates were made for the incremental costs to residential and commercial consumers of spray sprinkler bodies.

Water Savings

Water is conserved directly as the spray sprinkler bodies are made more efficient by adding a pressure regulator or, in the case of the alternatives, a drain check valve. The proposed spray sprinkler body efficiency standards yield total annual water savings estimated at 14 billion gallons in 2020 and 141 billion gallons in 2029. Total cumulative water savings over the 10-year period of analysis is 764 billion gallons or about 2.4 million acre-feet. These cumulative water savings are equivalent to the storage capacity of Trinity Lake.⁵⁴ More stringent standards would have more savings; less stringent standards would have less savings, directly correlating to savings on water bills. These savings are summarized in **Table 8-1**.

Figure 8-1: Cumulative Water Savings Equal to Trinity Lake, California



Illustration Credit: U.S. Bureau of Reclamation

⁵⁴ United States Geological Survey, Water-Year Summary for Trinity Lake, available at https://waterdata.usgs.gov/nwis/wys_rpt/?site_no=11525400.

Table 8-1: Comparison of Savings from Proposal and Alternatives

	Water Savings at Total Stock Turnover (Bgal/yr.)
Proposed	141
Alternative 1: More Stringent	151
Alternative 2: Less Stringent	10

Source: California Energy Commission staff

The value of annual residential water bill savings under the proposed standards is estimated to be \$60.3 million in 2020 and up to \$603 million by 2029. Residential consumers will see cumulative water bill savings of \$3.3 billion over the analysis period. Commercial businesses water bill savings over the same period range from a low of \$18.2 million to a high of \$182 million. Businesses will see cumulative water bill savings of \$1.0 billion between 2020 and 2029. Government water bill savings over the same period range from a low of \$2.7 million to a high of \$27 million. Government will see cumulative water bill savings of \$150 million between 2020 and 2029. Water utilities will have lower sales of \$4.5 billion over the analysis period. **Tables 8-2, 8-3, and 8-4** contain the annual undiscounted water bill savings for spray sprinkler bodies. These savings increase over time as more spray sprinkler bodies are replaced with higher-efficiency products.

Table 8-2: Annual Residential Water Savings

	Proposed (Million \$2018)	Alternative 1: More Stringent (Million \$2018)	Alternative 2: Less Stringent (Million \$2018)
2020	\$60.3	\$64.6	\$4.4
2021	\$120.5	\$129.2	\$8.7
2022	\$180.8	\$193.8	\$13.1
2023	\$241.0	\$258.4	\$17.4
2024	\$301.3	\$323.0	\$21.8
2025	\$361.5	\$387.6	\$26.1
2026	\$421.8	\$452.2	\$30.5
2027	\$482.0	\$516.8	\$34.8
2028	\$542.3	\$581.5	\$39.2
2029	\$602.6	\$646.1	\$43.5
Cumulative	\$3,314.0	\$3,553.3	\$239.3

Source: California Energy Commission staff

Table 8-3: Annual Commercial Water Savings

	Proposed (Million \$2018)	Alternative 1: More Stringent (Million \$2018)	Alternative 2: Less Stringent (Million \$2018)
2020	\$18.2	\$19.5	\$1.3
2021	\$36.3	\$38.9	\$2.6
2022	\$54.5	\$58.4	\$3.9
2023	\$72.6	\$77.9	\$5.2
2024	\$90.8	\$97.3	\$6.6
2025	\$109.0	\$116.8	\$7.9
2026	\$127.1	\$136.3	\$9.2
2027	\$145.3	\$155.8	\$10.5
2028	\$163.4	\$175.2	\$11.8
2029	\$181.6	\$194.7	\$13.1
Cumulative	\$998.7	\$1,070.8	\$72.1

Source: Energy Commission Staff

Table 8-4: Annual Government Water Savings

	Proposed (Million \$2018)	Alternative 1: More Stringent (Million \$2018)	Alternative 2: Less Stringent (Million \$2018)
2020	\$2.7	\$2.9	\$0.2
2021	\$5.4	\$5.8	\$0.4
2022	\$8.2	\$8.8	\$0.6
2023	\$10.9	\$11.7	\$0.8
2024	\$13.6	\$14.6	\$1.0
2025	\$16.3	\$17.5	\$1.2
2026	\$19.1	\$20.4	\$1.4
2027	\$21.8	\$23.4	\$1.6
2028	\$24.5	\$26.3	\$1.8
2029	\$27.2	\$29.2	\$2.0
Cumulative	\$149.8	\$160.6	\$10.8

Source: California Energy Commission staff

Electricity Savings

Electricity is conserved indirectly as less water is pumped to provide landscape irrigation. The proposed spray sprinkler body efficiency standards yield total annual electricity savings estimated at 50 gigawatt-hours (GWh) in 2020 and 501 GWh electricity savings by 2029. Total cumulative electricity savings over the 10-year period of analysis is 2.8 terawatt-hours (TWh). More stringent standards would have more savings; less stringent standards would have less energy savings. These savings are summarized in **Table 8-5**.

Table 8-5: Comparison of Savings from Proposal and Alternatives

	Electrify Savings at Total Stock Turnover (GWh/yr.)
Proposed	501
Alternative 1: More Stringent	539
Alternative 2: Less Stringent	36

Source: California Energy Commission staff

The value of annual electricity savings under the proposed standards is estimated to be \$7.2 million in 2018 and up to \$72.0 million by 2029 assuming a cost of \$0.143/kWh.⁵⁵ Water utilities will see the benefit through lower operating expenses. Electric utilities will have lower sales of \$396 million over the analysis period. **Table 8-6** contains the annual undiscounted electricity savings for spray sprinkler bodies. These savings increase over time as more spray sprinkler bodies are replaced with higher-efficiency products.

Table 8-6: Annual Electricity Savings (Monetary)

	Proposed (Million \$2018)	Alternative 1: More Stringent (Million \$2018)	Alternative 2: Less Stringent (Million \$2018)
2020	\$7.2	\$7.7	\$0.5
2021	\$14.4	\$15.4	\$1.0
2022	\$21.6	\$23.1	\$1.5
2023	\$28.8	\$30.9	\$2.0
2024	\$36.0	\$38.6	\$2.5
2025	\$43.2	\$46.3	\$3.1
2026	\$50.4	\$54.0	\$3.6
2027	\$57.6	\$61.7	\$4.1
2028	\$64.8	\$69.4	\$4.6
2029	\$72.0	\$77.1	\$5.1
Cumulative	\$396.2	\$424.3	\$28.0

Source: California Energy Commission staff

Household Spending Increases

In addition to the electricity bill savings described above, the proposed standards will decrease real disposable personal income by \$28 million in 2020 and increase it by \$514 million in

55 Marshall, Lynn. "California Energy Demand 2018-2030 Revised Baseline Forecast - Mid Demand Case, Form 2.3." California Energy Commission Supply Analysis Office, available at http://www.energy.ca.gov/2017_energy_policy/documents/2017-12-15_workshop/2017-12-15_middemandcase_forecst.php.

2029.⁵⁶ The increase in personal income is certainly beneficial for the California economy and will amount to about \$88 per year per household. This increase in disposable income results from consumers saving money on utilities and spending it on other goods and services, leading to a gain in employment levels within the state. As with employment and electricity savings, personal disposable income rises with increased stringency of the standards. For comparison, the lowest stringency alternative yields an increase of \$7 million in disposable income, while the most stringent efficiency alternative yields an increase of \$544 million.

Air Quality Improvements and Avoided Greenhouse Gas Emissions

Air quality and avoided greenhouse gas benefits of the proposed and alternative spray sprinkler body water efficiency regulations are significant as a result of avoided electricity generation but difficult to quantify given uncertainty in the mix of generation resources over the next 10 years. Evergreen Economics used the emissions factors and assumptions from the U.S. Environmental Protection Agency's (U.S. EPA) Avoided Emissions and Generation Tool (ADVERT) to model criteria emissions reductions associated with electricity savings of the proposed SSB standards. Cumulative benefits from reduced emissions over the 10 years studied total \$107 million.⁵⁷

Environmental Benefits to California

For homes and workplaces, reducing water consumption would reduce the demand for available and shrinking water supplies, which will help decrease the need of investing in costly, large-scale infrastructure projects such as dams, canals, and reservoirs. It will also result in reduced operating costs for water utilities, as it takes a significant amount of energy to get water to the spray sprinkler bodies at a home or business. Energy is needed to extract water from the source; to treat, distribute, and use it; and to collect and treat wastewater for release back into the environment.

Furthermore, reducing water consumption would improve water quality and help the state maintain higher water levels in lakes, rivers, and reservoirs. The decrease in water consumption will result in increased availability of water to other users, decreased need for diversions, decreased associated environmental impacts to riparian and wetland habitats from those diversions, and decreased drought impacts on California. Evergreen Economics estimated the value of the water conserved as \$12.6 million dollars per year assuming a value of \$30.17 per acre-ft. at full stock turnover.⁵⁸ The cumulative benefit would be \$63 million over the 10-year analysis period.

⁵⁶ Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 18, Table 9.

⁵⁷ Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 26, Table 15.

⁵⁸ Helvoight, Ted. Evergreen Economics. September 13, 2018. *Economic Impact Analysis of the Water Efficiency Standards for Spray Sprinkler Bodies*, pg. 24.

Costs

Residential incremental costs of spray sprinkler bodies that meet the proposed standard are estimated to be \$88 million per year. Incremental costs of spray sprinkler bodies to California businesses are estimated to be \$27 million. The incremental cost per spray sprinkler body remains fixed throughout the analysis period, meaning staff assumes that it does not increase due to a shortage in the supply chain, and it does not decrease due to learning curves or economies of scale. **Table 8-7** provides the yearly incremental costs for purchase of compliant SSB.

Table 8-7: Incremental Costs

	Residential Incremental Costs (\$M/yr.)	Commercial Incremental Costs (\$M/yr.)	Government Incremental Costs (\$M/yr.)
Proposed	88.4	26.6	4.0
Alternative 1: More Stringent	102.3	30.8	4.6
Alternative 2: Less Stringent	36.4	11.0	1.6

Source: California Energy Commission staff

CHAPTER 9:

Conclusion and Summary

The magnitude of economic impact is greater than the \$50 million threshold for conducting a standardized regulatory impact assessment, with savings to consumers and businesses exceeding \$4 billion over 10 years. As a percentage of the California economy, the scale of impact is relatively minor. The proposed regulations and alternative scenarios provide economic benefits to California across all metrics considered. These benefits include increased employment, competitiveness, personal income, and investment in the state.

The proposed standards will have a cost to California consumers, businesses, and government in 2020 of \$37.2 million. This net cost in the first year of the regulations is due to combined spending on higher incremental costs of more efficient spray sprinkler bodies and the payback period being roughly 1.5 years. The proposed standards yield significant positive savings to consumers from 2021 through 2029 that exceed the initial costs.

The proposed standards provide greater net benefits to California than the less stringent scenario but slightly fewer net benefits than the more stringent scenario. The proposed standards are estimated to provide \$3,967 million more net benefits than the less stringent alternative. The increased net benefits from the more stringent scenario total \$175 million and suggest that additional economic benefit could be achieved. However, more stringent levels were developed by staff that do not have performance test data to verify technical feasibility and cost effectiveness. Pursuing the more stringent levels could lead to significant delay in the implementation, as the Energy Commission would seek to vet the more stringent standards with stakeholders before proceeding to the formal rulemaking. This delay in itself would cause a loss of the economic benefit characterized for the proposed standards in the assessment. For these reasons, the Energy Commission is likely to support the proposed scenario and levels in lieu of an alternative analyzed in this standardized regulatory impact assessment.