

## Candidate Technology 8: Above Ground Irrigation System<sup>8</sup>

Technology Name	Certa-Set Yelomine Piping: PVC Irrigation Piping			
<b>Technology Solution(s)</b>	<input checked="" type="checkbox"/> Water Use Efficiency	<input type="checkbox"/> Increase Water Supply	<input checked="" type="checkbox"/> Reduce Use of Potable Water for Non-Potable Uses	<input type="checkbox"/> Water Management Tools
<b>Sector(s)</b>	<input checked="" type="checkbox"/> Agricultural	<input type="checkbox"/> Commercial	<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/> Residential
<b>Industry Segment(s)</b>	<b>Agricultural:</b> Crop Irrigation <b>Industrial:</b> Mining			
<b>Drought Resilience</b>	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> Low
<b>Water Benefits</b>	<input checked="" type="checkbox"/> Reduces Water Use	<input type="checkbox"/> Increases Water Supply	<input type="checkbox"/> Produces/Uses Recycled Water	<input type="checkbox"/> Reduces Water Loss
<b>Electric Benefits</b>	<input checked="" type="checkbox"/> Energy Efficiency ( <b>Reduces kWh</b> )	<input type="checkbox"/> Demand Response ( <b>Ability to Shift Load?</b> )	<input type="checkbox"/> Distributed Generation ( <b>Increase Ability to Produce Clean Energy</b> )	<input type="checkbox"/> Increase Energy Storage ( <b>Ability to Store Energy</b> )
<b>GHG Benefits</b>	Yes, reduction of water consumption will reduce the amount of GHG needed to bring more water to a given location.			
<b>Implementation Timeline</b>	<input checked="" type="checkbox"/> <= 3 years		<input type="checkbox"/> 3-7 years	<input type="checkbox"/> > 7 years
<b>Estimated Simple Payback</b>	30 years.			

### What is the technology?

Certa-Set<sup>®</sup> is an above-ground, aluminum replacement solid-set irrigation system, made from proprietary impact resistant Yelomine compound modifiers and UV (ultraviolet) inhibitors. These modifiers and inhibitors provide higher impact strength over an extended period and allow product to be used in aboveground, exposed applications as well as in underground or buried applications. The piping is a UV coated PVC that is a 100% leak free during charge up and charge down periods. The Certa-Set system is capable of being 100% mechanized and has been shown to reduce labor costs, increase irrigation efficiency, and increase yields and profits over conventional irrigation methods.

Certa-Set<sup>®</sup> PVC piping systems can replace existing aluminum irrigation sets and are ideally designed for use in row crops such as carrots and turf grass applications. The system works

<sup>8</sup> California Department of Food and Agriculture project description retrieved from: [https://www.cdfa.ca.gov/oefi/sweep/docs/2015\\_Selected\\_Projects.pdf](https://www.cdfa.ca.gov/oefi/sweep/docs/2015_Selected_Projects.pdf); "California Drought Charge True Cost of Water", San Francisco Chronicle, <https://www.sfchronicle.com/opinion/article/California-drought-charge-true-cost-of-water-6319943.php>; Norum, E., *A Study of Operating Efficiencies Comparing Aluminum Pipe Systems to Certa-Set PVC Irrigation Piping*, The Center for Irrigation Technology California State University, Fresno, February 2004.

particularly well in drag, mechanical move and side-shift operations. Agricultural growers can benefit from the system's leak-proof and corrosion-resistant design.

### **How does it work?**

The product's pipe and couplings have precision engineered grooves that, when aligned, allow a spline to be inserted. This results in a continuous restraint with evenly distributed loading that locks the pipe and coupling together. Flexible elastomeric O-rings in the coupling provide a hydraulic pressure seal. Joints can be easily disassembled when system reconfiguration is needed.

Additionally, the product contains impact modifiers for higher impact strength over extended periods, and ultraviolet inhibitors that allow the pipe to be used in exposed above-ground locations allow for superior flow rates and greater pumping efficiencies compared to other non-metal pipe options.

### **What are the benefits?**

#### ***Builds drought resilience***

- Reduces potable water demand up to 9% through leak reduction during each irrigation cycle.
- Reduces amount of irrigation water, which reduces demand for potable water supplies (drinking water resources, including surface and groundwater).

#### ***Supports Electric Reliability***

- **Reduces electric consumption (kWh):** Product reduces energy consumption by reducing the charge up and charge down times of each irrigation cycle. As the time needed to pump a required amount of water is reduced, kWh savings are achieved.

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<b>Sector</b>	Agricultural, Industrial
<b>Industry Segment</b>	<b>Agricultural:</b> Crop Irrigation <b>Industrial:</b> Mining
<b>Water Benefits</b>	<p><u>Level of Drought Resilience:</u> Medium</p> <ul style="list-style-type: none"> <li>• Certa-Lok Yelomine pipe is a widely adopted technology in California's Central Valley. According to the Kern River Watershed Coalition Authority's November 2016 Update, Yelomine piping is used by 66% of irrigators in the Chanac Creek region. As 34% of irrigators have still not adopted this technology, there is potential to capture more water savings in the Ag sector. However, the annual water saved per acre is low.</li> </ul> <p><u>Type of Drought Benefit:</u></p> <ul style="list-style-type: none"> <li>• Reduces Water Use</li> <li>• Reduces potable water demand up to 9% through leak reduction during each irrigation cycle</li> <li>• Reduces amount of irrigation water, which reduces demand for potable water supplies (drinking water resources, including surface and groundwater)</li> </ul>
<b>Water Resources</b>	<p><u>Type of Water Resource Benefit:</u></p> <ul style="list-style-type: none"> <li>• Because water is used more efficiently, there is less demand for potable water used in non-potable settings.</li> </ul>
<b>Electric Benefits</b>	<ul style="list-style-type: none"> <li>• Reduces electric consumption (kWh) Product reduces energy consumption by reducing the charge up and charge down times of each irrigation cycle. As the time needed to pump a required amount of water is reduced, kWh savings are achieved</li> </ul>
<b>Cost-Benefit Analysis</b>	<ul style="list-style-type: none"> <li>• Total Costs: 150,000/142 acres = \$1056/acre</li> <li>• Annual Energy Cost Savings = \$30/acre</li> <li>• Annual Water Savings = .285 acre-ft, \$17 cost per acre ft = \$4.84/acre</li> <li>• Payback – 30.3 years</li> <li>• EUL: 20 based on plastic sewer piping</li> </ul>
<b>Other Benefits: Health and Safety</b>	<ul style="list-style-type: none"> <li>• Alleviating aged wastewater collection and treatment infrastructure reduces frequency of regulatory permit violations and inadvertent discharge of untreated and/or nondisinfected wastewater effluent to the environment, reducing risks to people, animals and plants</li> </ul>
<b>Other Benefits: Environmental</b>	<p>Reduces GHG Emissions</p> <ul style="list-style-type: none"> <li>• Reducing electric use and electric demand reduce production and/or purchase of marginal electric resources</li> </ul>
<b>Other Benefits: Economic</b>	<ul style="list-style-type: none"> <li>• Reduces costs of municipal water systems resulting from less groundwater pumping</li> <li>• Reduces costs of municipal wastewater system resulting from less wastewater being treated at the plant</li> </ul>