



## Project Summary

The City of Ann Arbor has installed LED streetlights in order to reduce lighting costs and greenhouse gas emissions. After successfully piloting RVLT's LED replacement for their downtown decorative "globe" lights, the city received a grant to retrofit 1,400 downtown cobra-head lights. The eventual goal is to replace all public lighting with LEDs. Full implementation will cut Ann Arbor's public lighting energy use in half and reduce greenhouse gas emissions by 2,200 tons CO<sub>2</sub> annually.

**End User:** City of Ann Arbor, Michigan

**Application:** Street lighting

**Product:**

- RVLT R-series street lamps (test installation)
- RVLT decorative post top luminaires

**Benefits:**

- \$100,000 annual savings
- 10-15 year lifespan of new LED light engines vs. 2-year lifespan of traditional fixtures
- Half the energy use of prior HPS lighting
- Estimated 3.3 year payback
- 267 tons annual reduction in carbon emissions
- Less light trespass
- Improved light output and color rendition for enhanced business district safety

## Project Overview

Funding for public lighting is increasingly difficult as electric costs rise and available municipal funds get tighter. In a recent budget, the City of Ann Arbor established a moratorium on new street lighting to help keep costs under control. City staff members were tasked with finding ways to reduce public lighting costs.

The initial phase used LED replacements for downtown pedestrian "globe" lights. The retrofit globe from RVLT houses LEDs on four panels that face down and out, directing the light toward the street and away from the sky. Each

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**Project Overview (con't)**

fixture draws just 48 watts and is expected to last ten years, replacing fixtures that use over 100 watts with bulbs lasting only two years. Initial tests on the replacement globes have been extremely successful, saving the city over \$100,000 per year, reducing annual greenhouse gas emissions by 267 tons CO<sub>2</sub>. A portion of the savings from the retrofits is paid back to a city fund to pay for future retrofits.



The second phase of the project is a test installation consisting of cobra-head street lighting in a residential neighborhood. These fixtures are on loan from RVLT Technologies. Wattages vary from 50 to 80-watts for fixtures that replace 250-watt fixtures. The "instant-on" and dimming ability of LEDs offer additional energy savings through control strategies that can brighten and dim based on time of day, ambient light, or any other control parameters desired. Motion sensors turn LEDs on or off instantly, allowing lighting to be used only when needed.

All Ann Arbor installations have signs requesting public input, and the response from the community has been overwhelmingly positive (81 positive of 83 total responses). The positive responses emphasized dramatically improved light trespass, the lack of light spilling out onto yards and house faces.

Ann Arbor continues to test RVLT LED replacements for the remainder of their streetlights. By retrofitting all of the streetlights in Ann Arbor, the annual greenhouse gas emissions reduction is expected to be around 2,200 tons CO<sub>2</sub> annually, and the maintenance savings alone are sufficient to make LED fixtures cheaper on a lifecycle basis than conventional fixtures.



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## Cost Analysis



### 10-Year LED Life-Cycle Cost Analysis

#### Continue with Existing Bulbs (2 year life)

|                               | Number | Cost/Unit | Total Cost      |
|-------------------------------|--------|-----------|-----------------|
| Bulb replacements             | 5      | \$ 35     | \$ 175          |
| Bulb labor & equip            | 5      | 268       | 1,341           |
| Ballast (10 yr life)          | 1      | 59        | 59              |
| Igniter (10 yr life)          | 1      | 35        | 35              |
| Maintenance Total             |        |           | <b>1,610</b>    |
| Energy cost (4,380 kWh)       |        |           | <b>325</b>      |
| <b>Total Costs for Period</b> |        |           | <b>\$ 1,935</b> |

#### Change to RVLT LED Light Engines (10 year life)

|                               | Number | Cost/Unit | Total Cost    |
|-------------------------------|--------|-----------|---------------|
| LED replacements              | 1      | \$ 400    | \$ 400        |
| LED labor & equip             | 1      | 268       | 268           |
| Maintenance Total             |        |           | <b>668</b>    |
| Energy cost (2,100 kWh)       |        |           | <b>156</b>    |
| <b>Total Costs for Period</b> |        |           | <b>\$ 824</b> |

#### Savings

|                                      | Savings         |
|--------------------------------------|-----------------|
| 10-year Maintenance saving           | \$ 942          |
| 10-year Energy saving                | 169             |
| <b>Total Savings per LED Fixture</b> | <b>\$ 1,111</b> |

Each RVLT LED light engine saves \$1,111 in energy and maintenance costs over its ten-year lifetime. At this savings rate, the investment pays for itself in 3.3 years (\$365 / \$111). This analysis is based on Ann Arbor's downtown globe lights, but initial testing of RVLT cobra-head fixtures suggest that the results will be even better.