# DOE Solid State Lighting Workshop

**Atlanta, GA**

# LED Cities – Investing in the Future

**David Konkle, Energy Coordinator**

**City of Ann Arbor, MI**

**January 30, 2008**

Energy--Ann Arbor
Putting It Together

# LED CITIES

## Public Testing and Implementation of LED Technologies

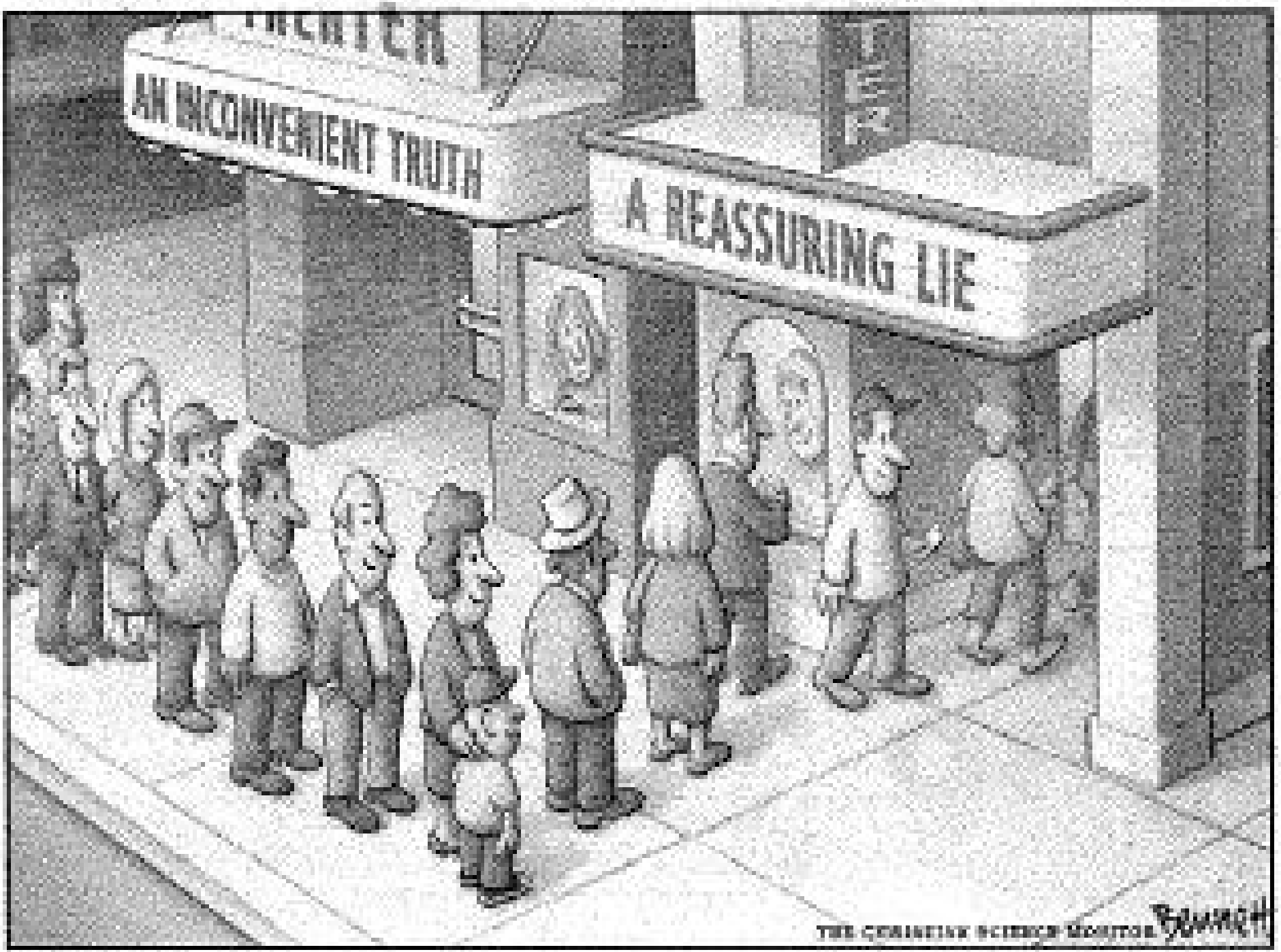
**Demonstrate that LED streetlights can meet customer demands for attractiveness and safety while saving the City money on energy and maintenance and reducing greenhouse gas emissions**

# ANN ARBOR ENERGY PLAN

## A Summary of Findings

A REPORT OF THE ANN ARBOR ENERGY STEERING COMMITTEE

June, 1981


AN INCONVENIENT TRUTH
A REASSURING LIE
THE CHRISTIAN SCIENCE MONITOR

SINGER

ALL NEW!
• SHOCKING!
• BIZARRE!
• INCREDIBLE!
and it's ALL TRUE!

WEEKLY WORLD® NEWS

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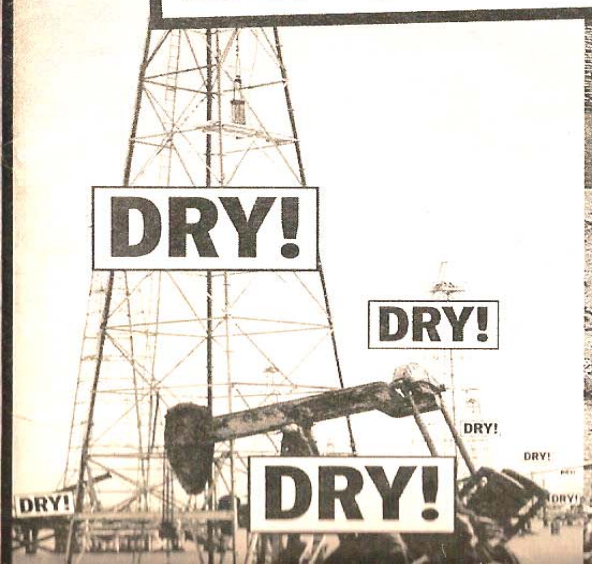
WHAT THE GOVERNMENT DOESN'T WANT YOU TO KNOW . . .

# NO MORE OIL!

## WORLD SUPPLY WILL BE GONE IN 6 MONTHS

- ECONOMY WILL COLLAPSE!
- MILLIONS WILL STARVE!



Mayor Hieftje

# Ann Arbor's Energy Challenge:

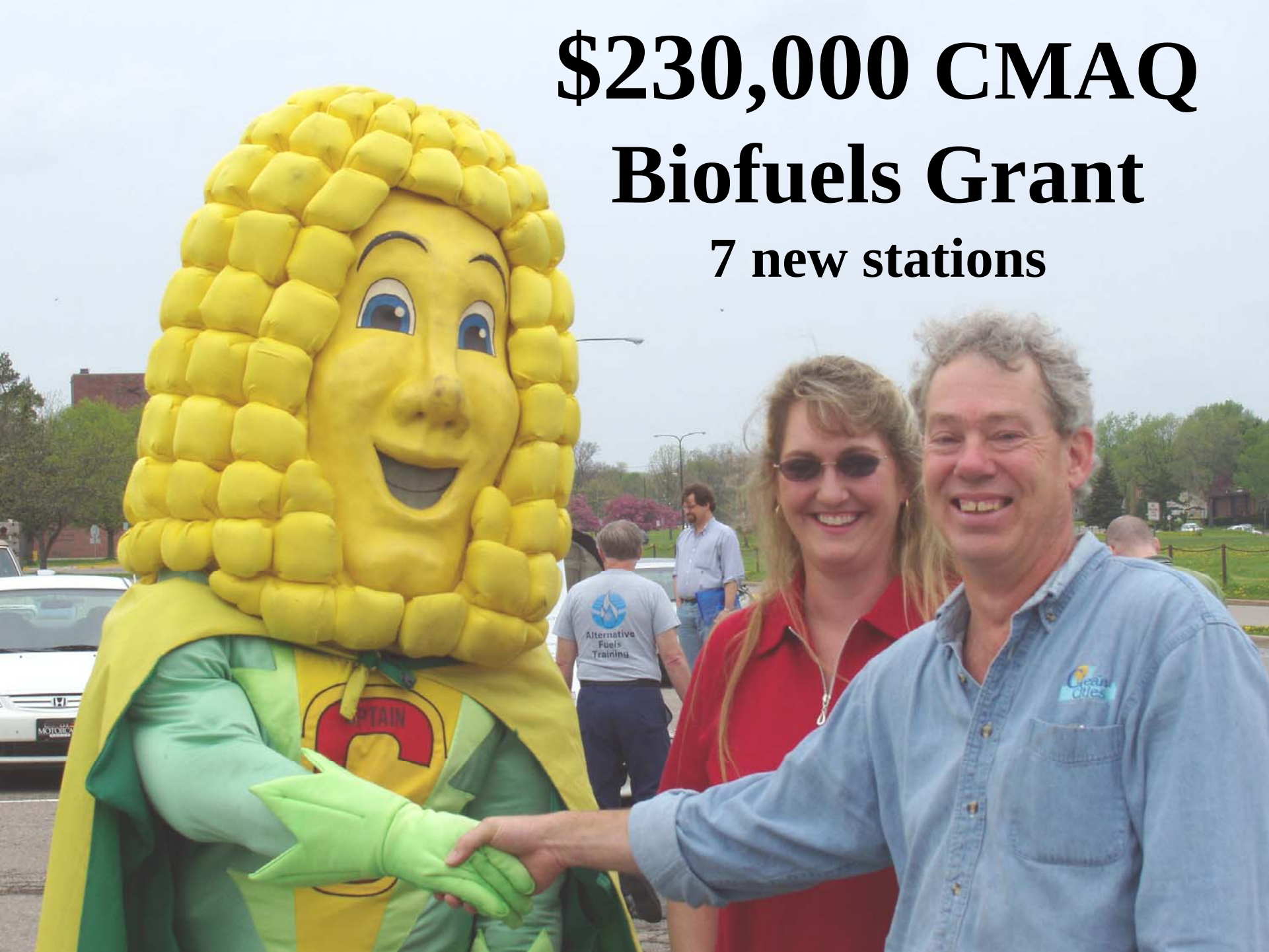
May 1, 2006

## ***30%Green Energy***

- ***by 2010 for Municipal Operations***
- ***20% by 2015 for whole City***
- ***reduce greenhouse gas emissions from year 2000 levels by 20% by 2015***

# $230,000 CMAQ Biofuels Grant

## 7 new stations



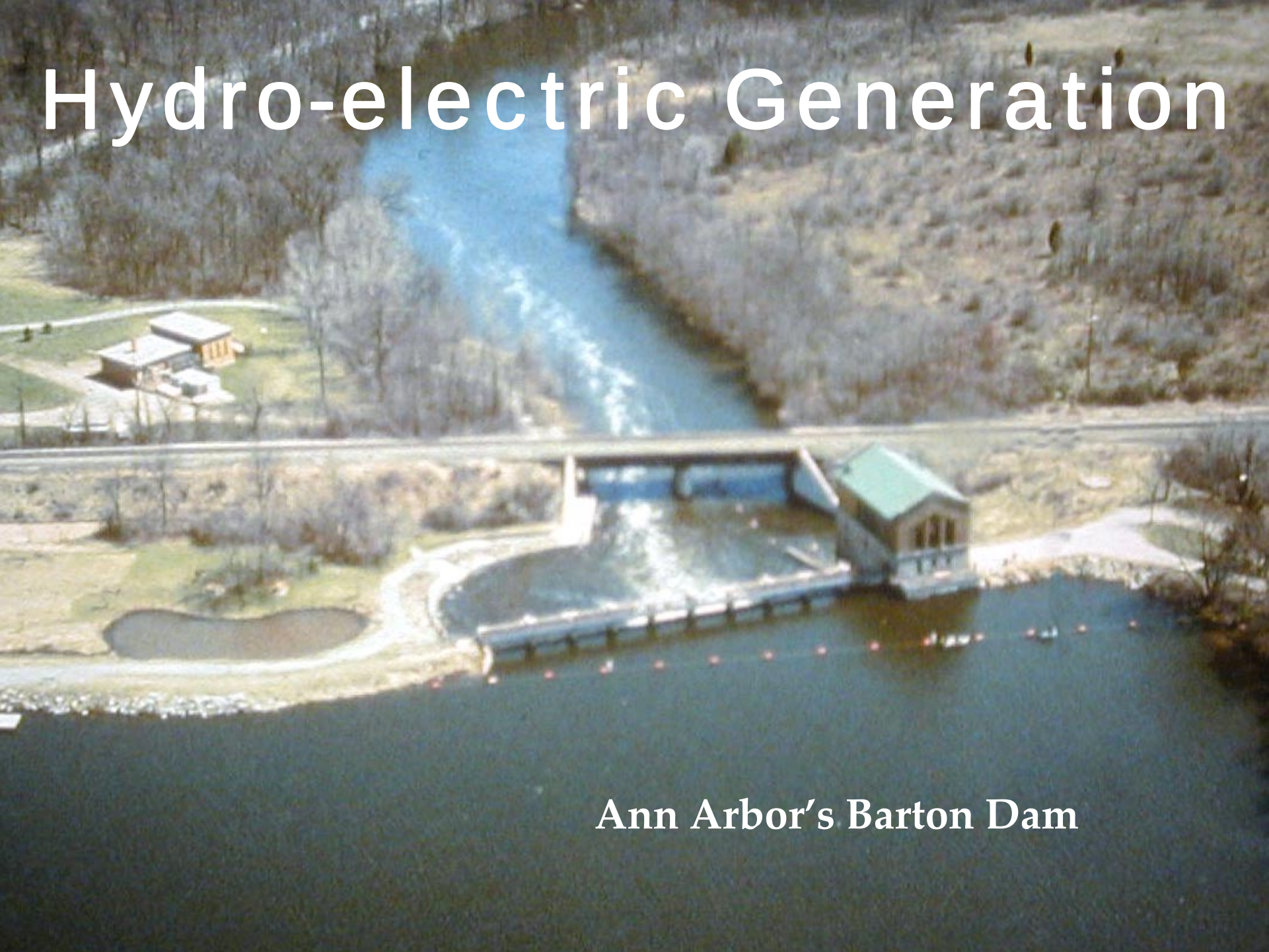
# Solar America Cities

## $2.6 Million in DOE Funding

- Ann Arbor, MI
- Austin, TX
- Berkeley, CA
- Boston, MA
- Madison, WI
- New Orleans, LA
- New York, NY
- Pittsburgh, PA
- Portland, OR
- Salt Lake City, UT
- San Diego, CA
- San Francisco, CA
- Tucson, AZ

# Farmer’s Market Solar Project

# Hydro-electric Generation

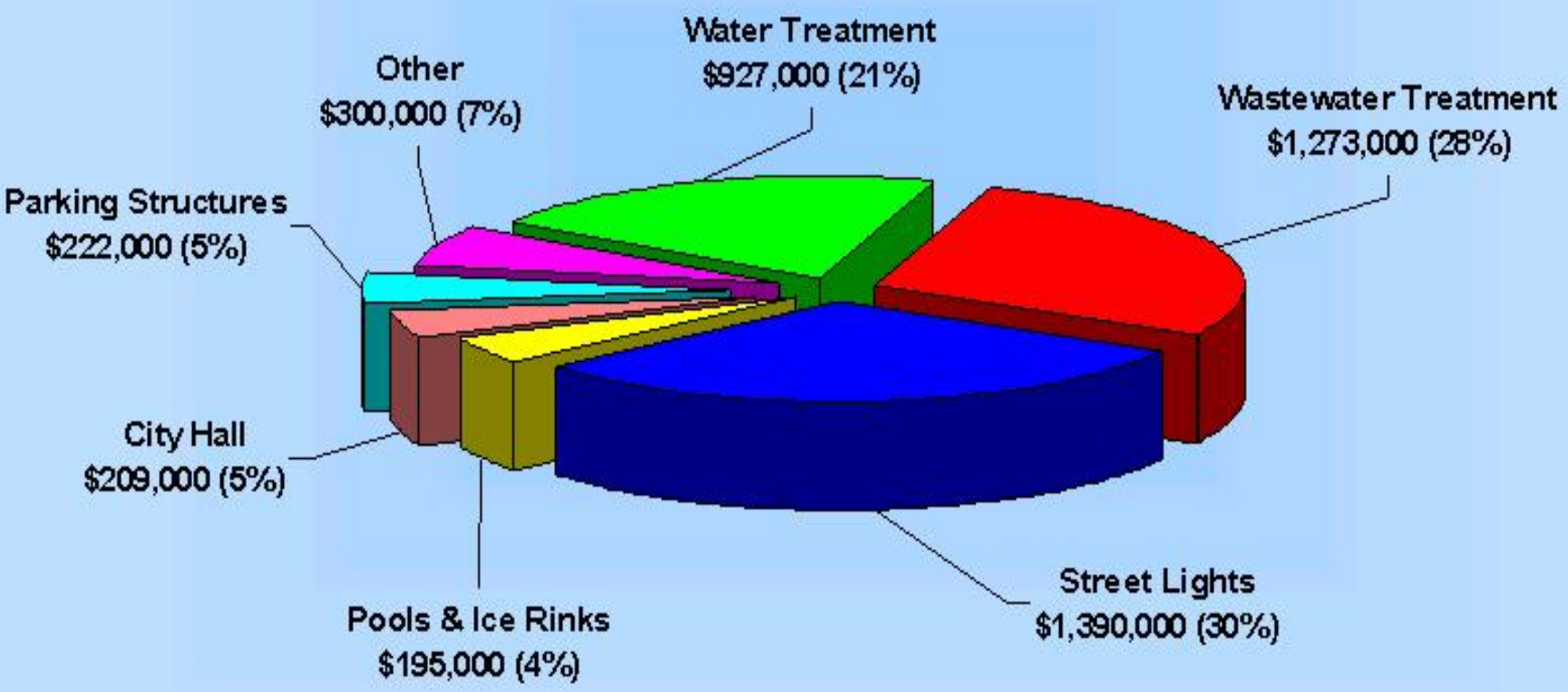


Ann Arbor's Barton Dam

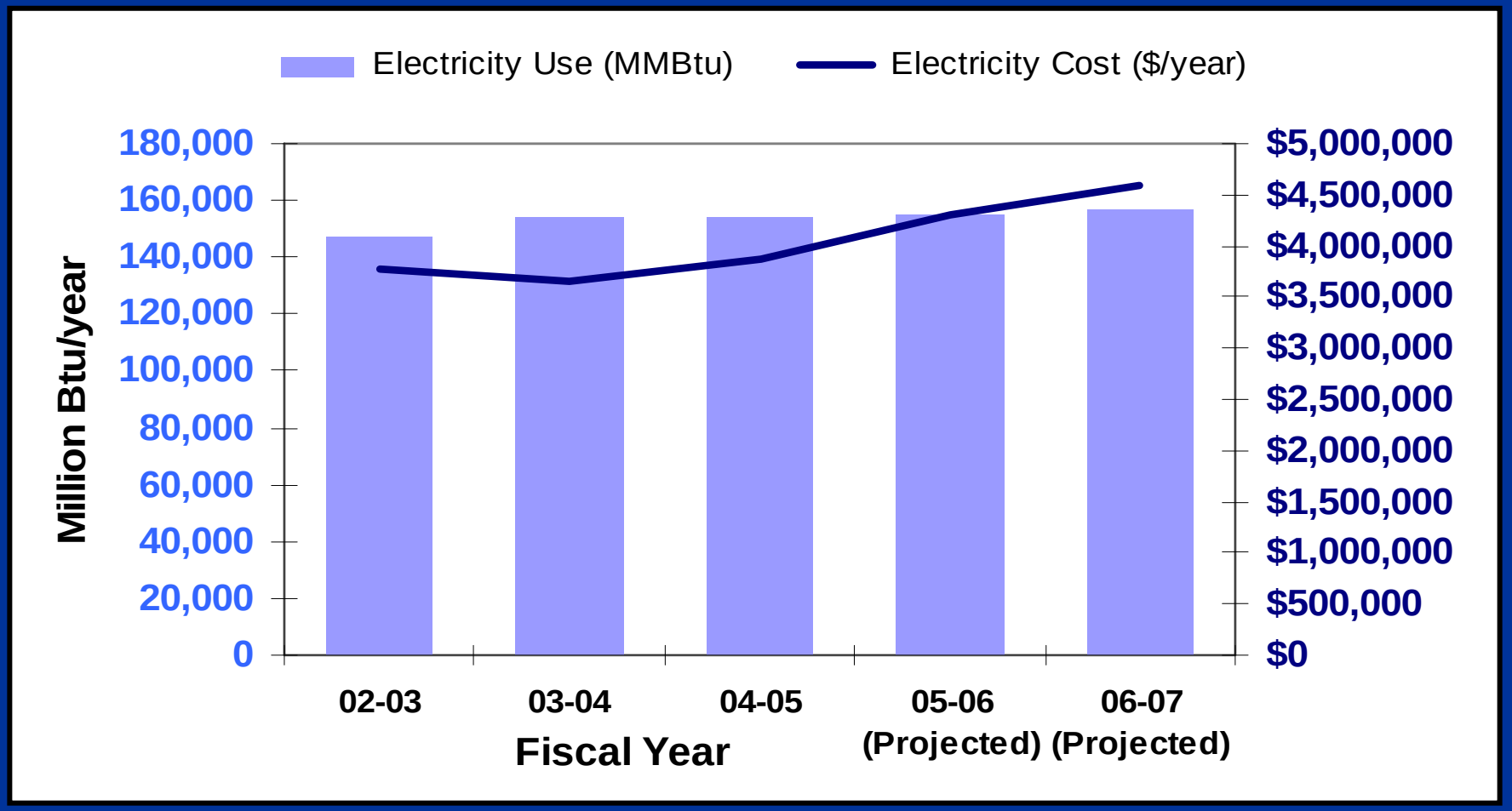
# City of Ann Arbor

## Municipal Energy Use

***Total Energy Cost = $4,516,000***

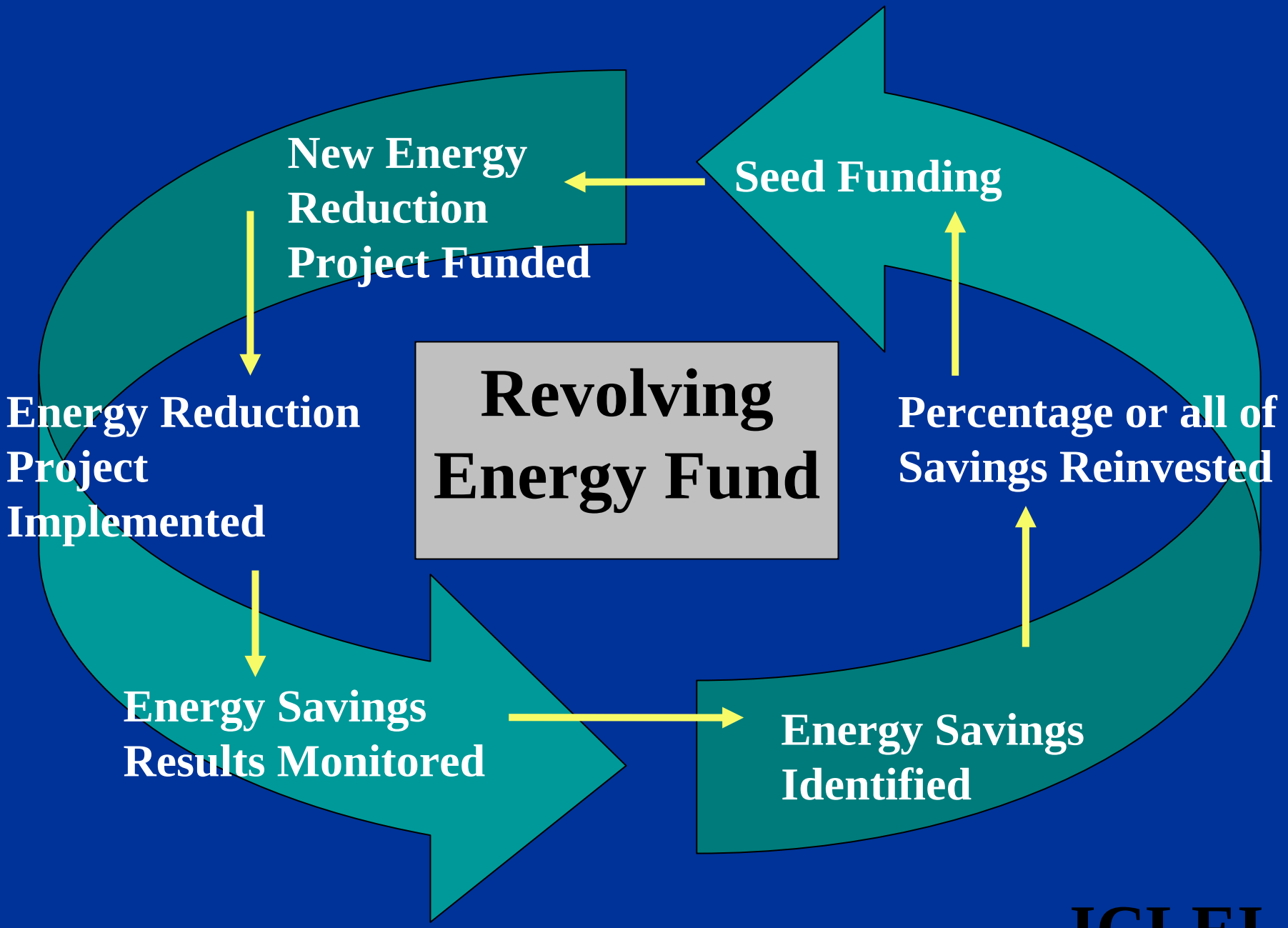


# Municipal Electricity (Cost up 20% in 3 yrs)

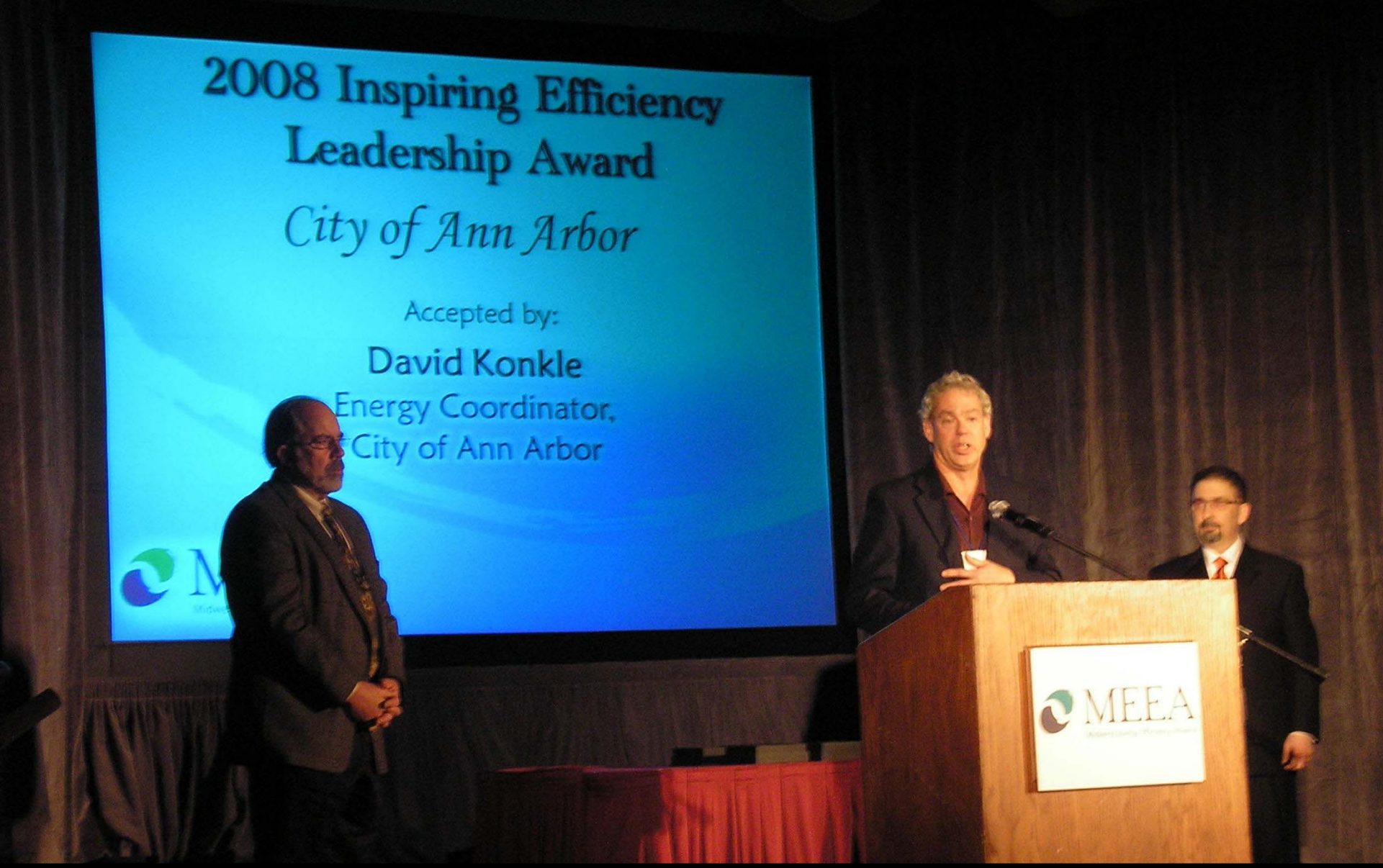


# LED Lighting (Light Emitting Diode)

- **less energy**
- **longer lifetime**


New Energy Reduction Project Funded
Seed Funding
Energy Reduction Project Implemented
Revolving Energy Fund
Percentage or all of Savings Reinvested
Energy Savings Results Monitored
Energy Savings Identified

ICLEI




# Midwest Energy Efficiency Alliance – Chicago, Ill

**January 10, 2008**

# Great Lakes Climate Protection Partnership

Ann Arbor, MI

Buffalo, NY

Chicago, IL

Duluth, MN

Milwaukee, WI

Minneapolis, MN

St Paul, MN

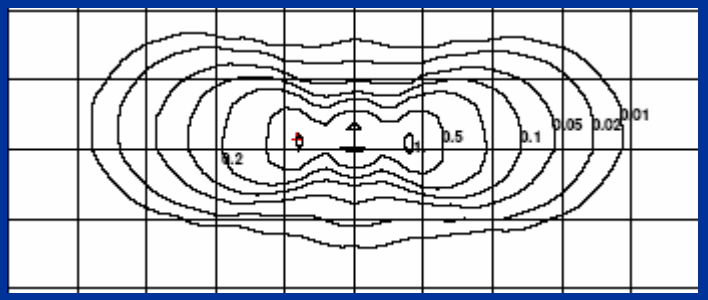
Toronto, ON

ICLEI Local Governments for Sustainability

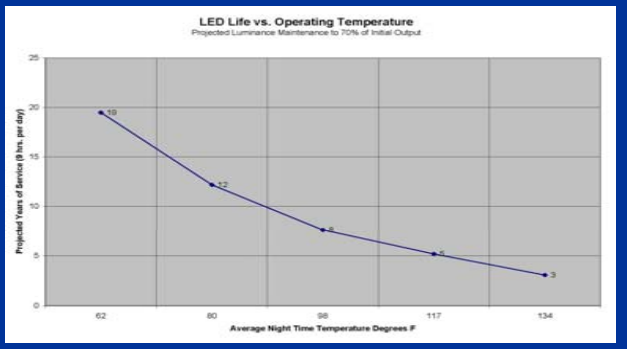
Collaboration for Climate Protection

# Four-part Test Process

light output



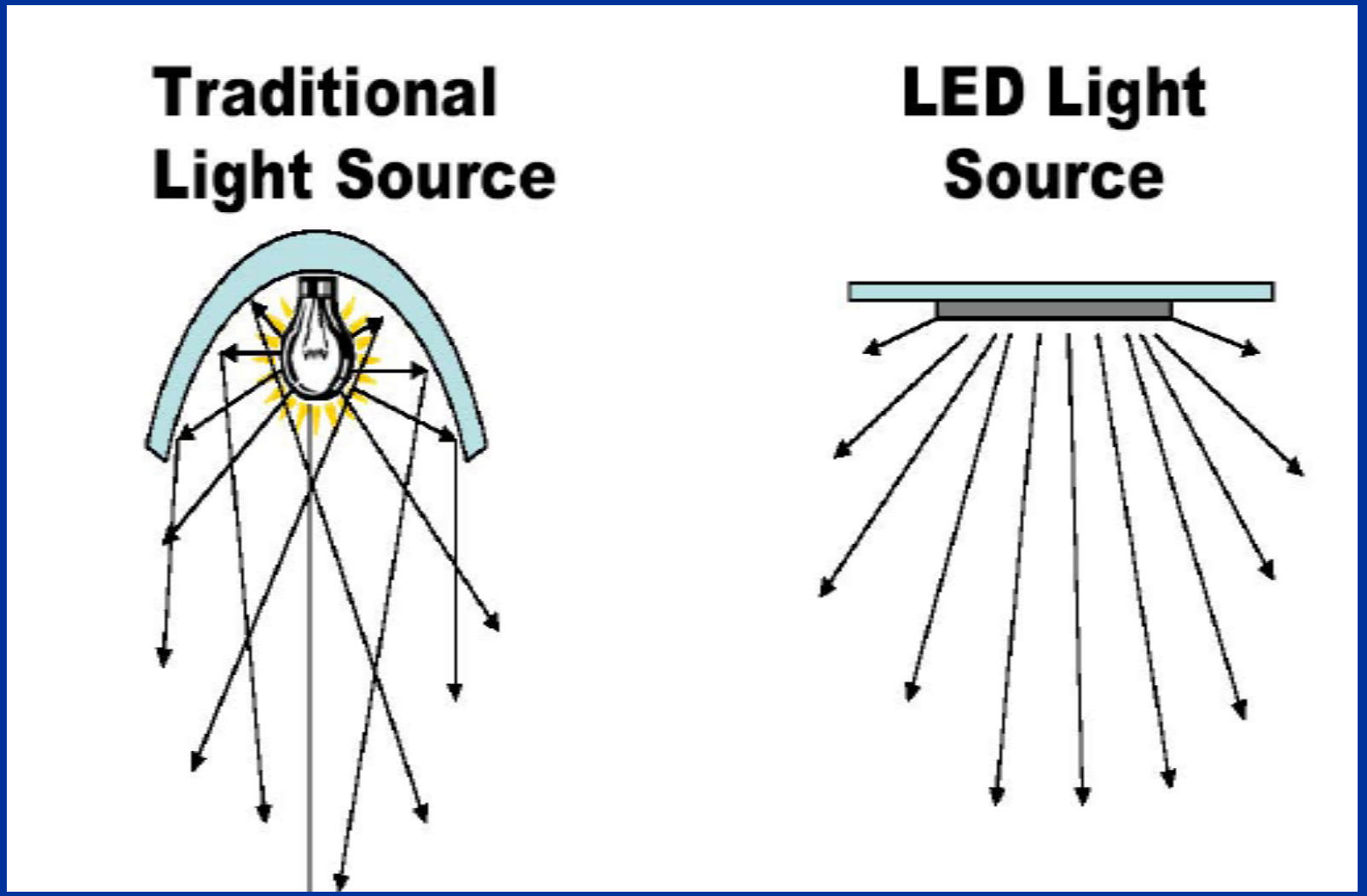

heat management – no fans




energy consumption

public input

# LEDs = point source, directional light



LuxBrite

# Holophane

# Millenium

# Intensity

# Leotech

# Relume Technologies

# Relume Technologies

# 1,100 Downtown Globe Lights

EATERY
BLUE NILE
ETHIOPIAN
CUISINE & BAR

# LED Retrofit Savings Analysis

**Existing Globe Lights are Metal Halide**
**100 watt bulbs + 20 watts ballast**
**Lights last 2 years – cost $37**

**LED Retrofits – use existing globes**
**56 watts total**
**Lights last ten years – cost $460**

**Energy savings = $14/yr**
**Maint. savings = $82/yr**
**Payback = 4.4 yrs**

**6.7 cents/kWh**

**Continue with existing bulbs (2 yr life) for 10 yrs**

| | # | Cost | |
|---|---|---|---|
| Bulb replacements | 5 | $37 | $186 |
| Bulb labor & equip | 5 | $211 | $1,056 |
| Ballast (10 yr life) | 1 | $59 | $59 |
| Igniter (10 yr life) | 1 | $35 | $35 |
| Energy cost (4,380 kWh) | | | $325 |
| | | | **$1,661** |

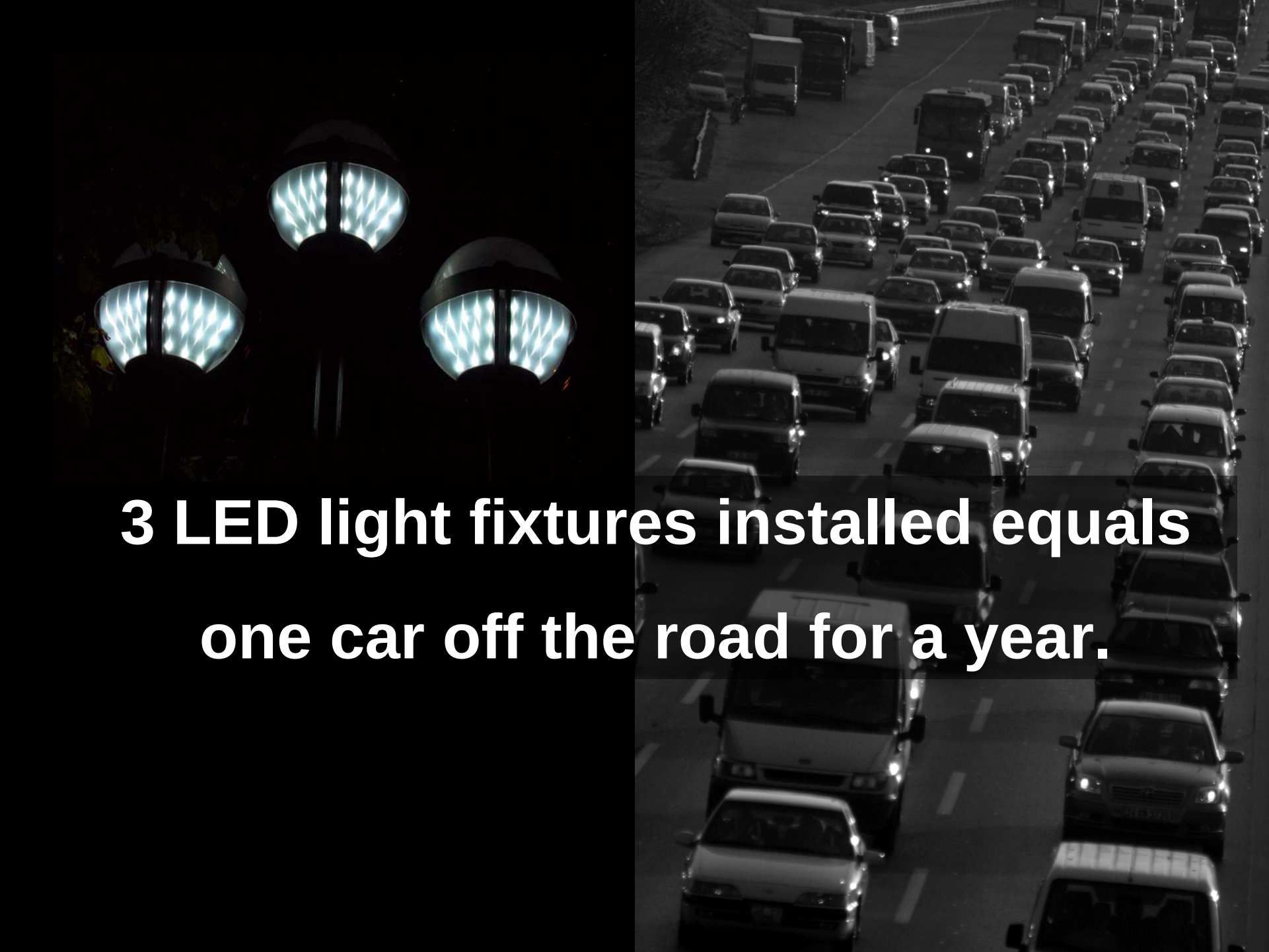
**Change to LED bulb (10 yr life)**

| | # | Cost | |
|---|---|---|---|
| Bulb replacements | 1 | $460 | $460 |
| Bulb labor & equip | 1 | $56 | $56 |
| Energy cost (2,100 kWh) | | | $182 |
| | | | **$698** |

Swisher
COMMERCIAL
TEREX TELELECT
206

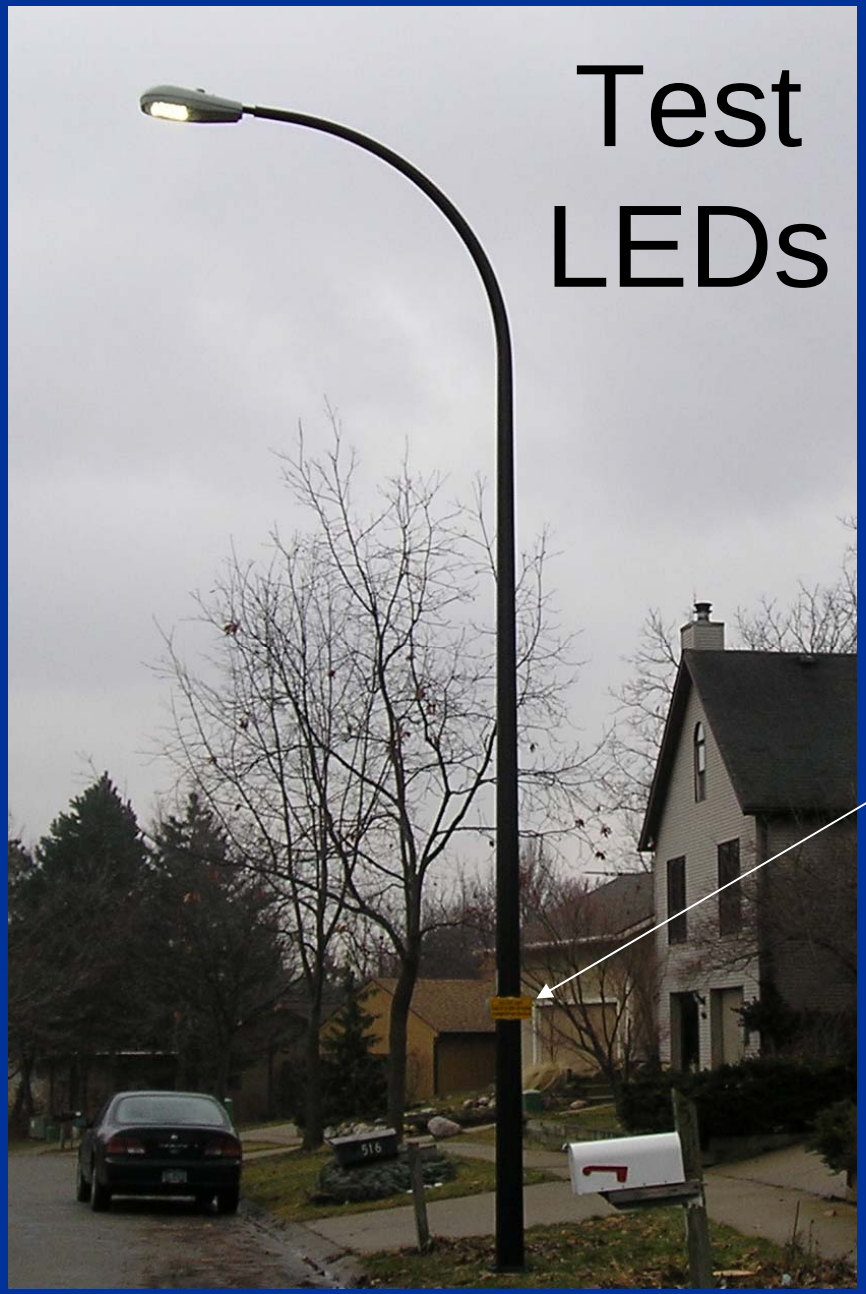
TIM

ONE
WAY



**3 LED light fixtures installed equals one car off the road for a year.**

# Test LEDs



LED TEST LIGHT
PLEASE LET US KNOW YOUR FEELINGS
streetlights@ci.ann-arbor.mi.us

# COMMENTS RECIEVED

**The block downtown with the LED lights looks fantastic. They look everything look cleaner and sharper, putting the landscape in starker contrast to the night sky. The color is more appealing than any of the other street lighting, too. I think the whole thing is really great.**

**I was born and raised here, and take pride in this city, its a great place, and want nothing more than to see the city taking initiatives like this. I REALLY like the proposed lights.**

# $630,000 Retrofit Program

**Reduce greenhouse gas by 267 tonnes CO2e/yr**

**Save the city over $100,000 annually**

# E-Mails and Letters of Interest

I’m an **Electric Engineer** who works for an energy distribution company in **São Paulo, Brazil.** I am very interested in getting information about your project to replace street lights by LED's.

**Chief, Mechanical/Electrical Division, City and County of Honolulu,** I am interested to know your experience with the LED roadway street lighting fixtures.

**Mayor’s office - Anchorage, AK. examining options for its 16,000 street lights.** We’re looking at converting all municipal street lamps to LED and I wanted to touch base with you and discuss your city’s project.

# E-Mails and Letters of Interest

Orlando, Florida
Annapolis, MD
Chihuahua, Mexico
Cambridge, MA

City of Oakland, California
Greenville, South Carolina
Kirkland Quebec Canada
Duluth, Minnesota

Hartford, CT
Maplewood, NJ
Tokyo, Japan
City of Salisbury, NC

London Borough of Brent
Kennebunk, Maine
Edmonton, Alberta
Lee's Summit, Missouri

# Climate Innovation Award - Fayetteville, AR

2007
SUNDANCE SUMMIT
A Mayors' Gathering on Climate Protection

# September 10, 2007


## David Konkle, Energy Coordinator
## City of Ann Arbor, MI


Energy--Ann Arbor
Putting It Together

# Ann Arbor Energy Commission

## Helping Ann Arbor decide its energy future

**Where does your energy come from?**
**Where will your children get energy in the future?**

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PUTTING IT TOGETHER

...meet the challenge
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GREEN ENERGY ANN ARBOR
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