

Landscape Efficiency Optimizer “LEO”

Pilot Study Concept



Purpose



- The LEO program was developed under premise it is likely easier and sustainable to convince homeowners to:
 - stop wasting water by over-irrigating (no sacrifice needed) rather than to
 - remove a portion of their turf, (e.g., cash for grass sacrifice required)
- No homeowner will ever purposely choose to waste water/money by over-irrigating

Value Proposition Example:



- Family of 3 replaces all their 3.5gpf toilets with 1.28gpf models
 - Saves 33 gallons/day
- Reduce irrigation by 1/4 inch/week (0.036 inch/day)
 - Saves ~ 55 gallons/day
 - 67% more than by installing efficient toilets

Market Perceptions:



- Many contractors offer mid-season maintenance audits
 - identify maintenance issues, broken/misaligned heads, leaks
- Customers reluctant to pay for audit
 - some see audit as “cash grab” by contractor
 - “If you audit you will find something to repair – it will cost me”
 - Don’t see/believe the advantage.
 - See the cost, don’t see the benefit
- There are often deficiencies, but maintenance should lower overall costs
 - Spend a little \$ on maintenance vs. a lot of \$ on major repairs

Improperly Adjusted Systems Can Waste Large Volumes of Water



- Weather-based controllers good at reducing/eliminating watering when not required
- But, savings only maximized if runtimes are properly adjusted in first place
- If, for example, runtime should be 20 minutes per day but set to 30 minutes, 50% waste of water

LEO Pilot: Logistics



- Software program provided at no cost to contractors
- Pilot includes:
 - training and materials for contractor
 - audit reports for customers
 - data management and summary reports for water agency
- EBMUD pays for data storage/management and monthly reporting

Pilot Program Concept



- EBMUD selects 2 to 3 contractor volunteers
- LEO staff trains contractor(s) how to use program
- Contractors complete 10 to 20 audits (with support from LEO)
- All review LEO program features, usability, satisfaction, etc. for as needed modifications
- Estimate costs/savings and benefit to customer and EBMUD
- Make decision on more formal program offer to customers/contractors

LEO Pilot: Data Management



- Number of contractors in program
- Number of audits per contractor
- Address of participant
- Number of zones
- Area of zones
- Pre-depth and volume
- Post-depth and volume
- Water savings, cost savings
- Value to customer, contractor, EBMUD
- Other?

LEO - Landscape Efficiency Optimizer

Pilot Concept:



- 6-9 month study
 - Nov.-Dec. 2018 – select participants
 - Jan.-Feb. 2019 – conduct LEO training
 - Mar.-Apr. 2019 – introduce to customer sites
 - Apr.-July 2019 – collect/report data, summary findings
- Program needs to be easy for customer/contractor to use; allow flexibility for site-specific judgment
- Audit of existing clients – no ‘cold calling’
- Program must generate “easy to understand” report for customer that highlights the benefits of the audit, i.e., the water and cost savings
- Program must collect/manage data from audits and provide costs/savings information to EBMUD

LEO Pilot: Flexible Design



- Generated customer report identifies
 - volume of water savings
 - cost savings
- Settings based on target weekly depths (e.g., 1-inch per week) but allows contractor to adjust either higher or lower, e.g.,
 - target 80% of ET
 - If zone is inefficient, contractor may increase depth (runtime) by 10%, 15%, etc.
- Customer might prefer additional \$ savings vs. a “lush & green” lawn – e.g. decrease runtime by 10%, 15%, etc.

Software Screens



Landscape Efficiency Optimizer

Start a New Audit

View/Edit Saved Audit

Upload Audits

Default Values

Settings

The screenshot shows the 'DEFAULT VALUES' screen within the LEO application. The interface is organized into several sections with adjustable sliders:

- PLANT TYPE VALUES** (light blue background):
 - Turf: 1.00
 - Annuals: 0.90
 - Perennials: 0.80
 - Shrubs: 0.50
- MICRO-CLIMATE VALUES** (green background):
 - Full Sun: 1.00
 - Partial Sun: 0.85
 - Shade: 0.65
- CONTROLLER VALUES** (light blue background):
 - Weather-Based Smart Controller: 0.65

At the bottom of the screen, there is a 'MAIN MENU' button and the LEO logo.

Software Screens



LEO - Landscape Efficiency Optimizer

BACK HOME IRRIGATION SYSTEM AUDIT

PROGRAM INFO

PROGRAM A	PROGRAM B
Cycles per Day: <input type="text" value="1"/>	Cycles per Day: <input type="text" value="2"/>
Days per Week: <ul style="list-style-type: none">SundayMondayTuesdayWednesdayThursdayFridaySaturday	Days per Week: <ul style="list-style-type: none">SundayMondayTuesdayWednesdayThursdayFridaySaturday
or	or
odd/even	odd/even
<input type="button" value="Delete Program"/>	<input type="button" value="Delete Program"/>

ZONE INFO

ZONE 1	ZONE 2
<input type="button" value="Quick View"/> <input type="button" value="Edit"/>	<input type="button" value="Quick View"/> <input type="button" value="Edit"/>
Program: A Run Time per Cycle: 30 min Area: 5,050 ft ² Landscape Type: turf Microclimate: full sun	Program: B Run Time per Cycle: 45 min Area: 4,000 ft ² Landscape Type: turf Microclimate: partial sun
<input type="button" value="Delete Zone"/>	<input type="button" value="Delete Zone"/>

LEO - Landscape Efficiency Optimizer

BACK HOME AUDIT SUMMARY

GENERAL INFO

Water Rate: \$4.74 per 100 ft³

ZONES

ZONE 1	ZONE 2
Current Schedule Depth per week: 1.47 in Run time: 30 minutes Cycles per day: 1 Days per week: odd/even Annual volume applied: 138,812 gal Annual cost: \$880	Optimized Schedule Depth per week: 0.65 in Run time: 13 minutes Cycles per day: 1 Days per week: odd/even Annual volume applied: 61,379 gal Annual cost: \$389
	Adjustment Factor: <input type="text" value="1.00"/>
Savings Annual water savings: 77,433 gal Annual savings: \$491	
Current Schedule Depth per week: 3.00 in Run time: 45 minutes Cycles per day: 2 Days per week: Tu, F Annual volume applied: 224,388 gal Annual cost: \$1,422	Optimized Schedule Depth per week: 0.55 in Run time: 8 minutes Cycles per day: 2 Days per week: Tu, F Annual volume applied: 41,325 gal Annual cost: \$262
	Adjustment Factor: <input type="text" value="1.00"/>
Savings Annual water savings: 183,063 gal Annual savings: \$1,160	

AUDIT TOTALS

Current Schedule	Optimized Schedule
Total annual volume applied: 363,200 gal Total annual cost: \$2,302	Total annual volume applied: 102,704 gal Total annual cost: \$651
Savings Total annual water savings: 260,496 gal Total annual savings: \$1,651	

Automatic Customer Reports:



LANDSCAPE EFFICIENCY OPTIMIZATION AUDIT

Bill's Lawn Care
987 Water Cres, Smalltown, CA, 2354657, (123) 876-5432



June 25, 2018

Customer: Joe Biggs
123 Main Street
Oakland California, 92886-5337
joe@email.com
(123) 456-9876

Auditor(s): Mike Jones and Mary Smith

As a result of completing a *Landscape Efficiency Optimizer* (LEO) water audit at the property identified above, we were able to optimize the runtimes of each of your irrigation zones to maintain a healthy landscape while eliminating water wastage.

- Water Savings: 34,056 gallons per year
- Cost Savings: \$129 per year

Water Demand and Savings Summary

Zone #	Existing Schedule		Optimized Schedule		Savings	
	Thousand gallons/year	Annual Cost	Thousand gallons/year	Annual Cost	Thousand gallons/year	Annual Cost
1	23	\$87	13	\$49	10	\$38
2	31	\$116	7	\$25	24	\$91
Total	54	\$204	20	\$75	34	\$129

Existing Schedule

Zone #	Area, ft ²	Program	Runtime	Cycles/day	Days/week	Inches/week
1	1,234	A	45	1	3.5	1.50
2	538	B	35	2	3.5	4.59

Optimized Schedule

Zone #	Area, ft ²	Program	Runtime	Cycles/day	Days/week	Inches/week
1	1,234	A	26	1		0.85
2	538	B	8	2	3.5	1.00

Notes: Two broken heads were replaced in Zone 1.

- Data stored in secure database
- Variety of reports can be produced
- Identify program costs:
 - cost per contractor, cost per zone, cost per ft² of landscape, cost per depth of savings, cost per gallon saved, etc.
- Identify program savings:
 - inches/week/zone, gallons/day, average savings per customer, average savings per zone, etc.

Summary Reports:



Monthly Summary Report – Landscape Efficiency Optimization
East Bay Municipal Utility District
Sept 2018

Audits Completed

Company	# of Audits	# of Zones	Total Area, ft ²	Avg. ft ² / zone	Avg. PRE inches/wk	Avg. POST inches/wk	Avg. Savings, inches/wk	Total Savings, gal/day
Jones Irrigation	4	28	12,580	450	1.85	1.05	0.80	6,273
Irrigation Kings	12	15	25,750	1,717	1.45	1.20	0.20	8,945
Diamond Sprinklers	1	3	2,800	933	2.24	1.00	1.24	950

Cumulative

Company	# of Audits	# of Zones	Total Area, ft ²	Avg. ft ² / zone	Avg. PRE inches/wk	Avg. POST inches/wk	Avg. Savings, inches/wk	Total Savings, gal/day
Jones Irrigation	36	182	186,400	522	1.80	1.25	0.55	52,500
Irrigation Kings	23	41	65,123	1,958	1.65	1.00	0.65	22,422
Water Watcher	6	25	5,800	750	2.12	1.50	0.62	5,675
Diamond Sprinklers	55	224	295,854	220	1.12	0.95	0.17	72,125
Tony's Rain Maker	4	28	4,600	685	1.75	1.15	0.60	1,280

Key Objective Toward Win-Win-Win Scenario



- Customer wins by:
 - Improved understanding of outdoor water use
 - Appreciation for contractor-provided audit/maintenance
 - reducing water waste and saving on their bill
- Contractor wins through:
 - enhanced site management (i.e. may find additional maintenance items that need repairing (paid by customer))
 - Increased customer satisfaction
- EBMUD wins by maximizing water savings for minimum cost (e.g. program is more cost-effective than toilet rebate programs)

Questions

