



ROOS INSTRUMENTS, INC.

Corporate Social Responsibility (CSR)

2018 Annual Report

Roos Instruments produces Automated Test Equipment for the world's most innovative semiconductor technology. RI continues to lead the ATE industry with a Corporate Social Responsibility (CSR) management system focused on reaching aggressive goals that reduce our impact on the environment.

Visit roos.com/green for access to this and other annual reports.

2018 Energy Facts

Natural Gas: 1,648 Therms

Electricity*: 211,603 Kilowatt Hours

GHG (Scope 1&2): 13,381 kg CO₂-e

*100% of electricity offset by Renewable Energy Credits

81% CA Solar, 19% WA, OR, and ID Wind



Table of Contents

	Page
1. Accomplishments	3
2. Goals	4
3. Green Partners	5
4. Projects	6
5. Compliance Enforcement	8
6. Employee Training Resources	9
7. Disclosing Results	9
8. Greenhouse Gas Emissions	10
9. Energy and Natural Gas Annual Usage	11

In 2018, as in previous years, Roos Instruments continued to make minor changes to our energy reduction and material reuse plans and began slowly upgrading our lighting systems to exceed recently updated standards. We enjoyed the reduced environmental footprint from changes made in previous years.

Purchasing 100% green energy since 2005 has helped us reach a higher standard of environmental responsibility and encouraged us to take this concept one step further. We are proud to offer our flagship product, Cassini, as one of the most energy efficient automated test equipment available, helping our customers set higher standards in responsible semiconductor manufacturing.

“We see this initiative as a wise investment in our future. Meeting energy needs with clean power and reducing the energy footprint of any investment, be it our company or the products we make, is very rewarding.” -- Cathy Rossi-Roos, Roos Instruments COO.

Accomplishments

14 Years of 100% Renewable Electricity

81% CA Solar, 19% WA, OR, and ID Wind¹

Almost 3 million kWh purchased since 2005 from Silicon Valley Power, Green Power Supporter.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Kwh	202,634	210,240	230,975	218,975	208,594	209,113	201,336	199,806	184,782	202,079	203,589	212,113	211,603
% diff	1.24%	3.62%	8.98%	-5.51%	-4.95%	0.25%	-3.72%	-0.01%	-8.13%	8.56%	0.36%	6.13%	-2.24%

"Green Team" Awards for RI Employees after energy audit and training. *Skipped 2018*

Employee's trained via one on one "green survey" completion and award nominations for improvements to RI's Green Team programs including preferred vendor, using less light by half-full florescent fixtures, and for regularly riding a bicycle to work.

Awarded Environmental Innovator 2010 *Awarded 2011*

Silicon Valley Power issues the Environmental Innovation Award to organizations for "all around efforts to support energy efficiency and renewable energy."

At Desk Recycling - quarterly recycling, reduce waste, reuse components *Since 2009*

Each desk has a dedicated recycling container, facilities empties weekly and reports "good to great" compliance and notifies individuals of incorrectly discarding recyclable material in a waste bin. Our vendor, Waste Management, switched from taking only paper and cardboard (separated) to accepting all forms of plastic, glass, aluminum, and paper in one container, increasing individual compliance.

Reduce Travel - Telecommuting and Virtual/Web Conferencing *Since 2006*

Green Projects - Ideas to improve energy conservation collected from staff *Since 2012*

¹2018 Green Power Facilities – Sources for Renewable Energy Credits

<https://www.siliconvalleypower.com/sustainability/santa-clara-green-power/green-power-facilities>

Goals for 2018

Reach 80% Reduction of "Peak" Electricity² Maintain Natural Gas at 2008 Levels³

185,686 kWh Target (20% reduction)

2,179 Therms Target

211,603 kWh Actual (Target Missed by 13.82%) 1,648 Therms Actual (Target Achieved)

Encourage corporate environmental responsibility with focused programs to increase awareness and building efficiency and increase individual employee participation with "Green Team" awards and incentives. Reduce all electricity usage by 2% year after year of "peak demand." After successfully targeting 10% reduction in 2010, after 6 more years, the target is now 80% of peak demand, representing a 20% reduction overall.

Planned Projects

- Maintain Energy reduction programs to meet future goals
- Cascading requirements - Vendor incentives (monetary and preference) to voluntarily participate in creating a CSR of their own.
- Strive for 100% recycling with facility reviews where all recyclable material is recovered from waste bins prior to dumping.
- Increase energy efficiency of RI systems with software and hardware engineering related to supporting sleep and low power modes.
- Replace existing fluorescent lighting fixtures based on Silicon Valley Power's sponsored energy audit to update to modern lighting standards for brightness, install motion sensors, and replace some fixtures with LEDs, to save hazardous waste disposal fees (\$0.80 per tube), and reduce energy use over the fixtures' lifetime.

²For 2018, Goal for electrical consumption is 185,686 kWhs/yr or less (80% of Peak Demand, 2008 Annual Usage = 232,335 kWh)

³100% or less of 2008 levels or 2,179 Therms/yr

Green Projects

RI Santa Clara, CA

Building Area: ~19,600 feet², Constructed 1978

5,000 feet² redeveloped 2007 with modern HVAC, high efficiency motion sensing lights

The projects listed below contributed to achieving the 2018 targets.

Total Expected Annual Impact for All Projects in 2018: **250 kWh**

Name of Project

Potential Impact⁶

Continue Power conservation:

250 kWh

Turn off lights when not in use. Use motion sensors for lights frequently left on.

HVAC Efficiency Tuning and Maintenance:

80 Therms

Assure optimum performance, managed by Environmental Systems.

Other CSR Goals:

- Reclaim Used Equipment: Any RI equipment can be returned to Santa Clara factory for recycling. Incentives like free shipping may be available. Publicized online roos.com/contact, and on printed material like docs & service/training manuals.
- Maintain high recycling compliance with "unified" recycling bins located throughout the building that is used for plastic, aluminum and paper instead of separate bins.
- Supply "Green certified" office cleaner and post-consumer recycled paper products in restrooms and kitchens and environmentally friendly cleaning chemicals.
- Divert waste with composting collection bins.

Vendor Letter and qualification:

- Promote vendors who have their own Green programs on our roos.com/green page. Prefer "green" vendors by clearly marking them in our vendor contact databases to enable increased purchasing of equipment and services from preferred sources.

⁶Potential Impacts were computed with the following calculators:

EPA's www.epa.gov/cleanenergy/energy-resources/calculator.html

CO2 Footprint Calculator: www.carbonify.com/carbon-calculator.htm

Future Green Projects

<i>Name of Project</i>	<i>Potential Impact</i>
"Leave Off" Stickers: Light switch plates to clearly identify where lighting can be reduced.	500 kWh
Clean Living Replacing all non-biodegradable products used in the break rooms like foam cups and plates to more biodegradable ones.	Waste Reclaim
Sweater & Shorts Days: Wear warm clothing and leave temp down to 68 two days a week in Winter. Wear cool clothing and leave temp up to 76 two days a week in Summer.	400 Therms
Lighting Upgrades: Bypass ballasts and replace T12 fluorescent with LED.	1,000 kWh
Land Care: Mulching and using non-toxic chemicals for lawn maintenance.	Hazardous Material Reduction
Purchase RECs to offset 100% GHG Emissions:	100% GHG Offsets

Employee Activities

Recycle Program: 100% of recyclable material is collected in dedicated bins.	
Composting: Divert waste that is not recyclable but will compost to dedicated bins.	
Green Waste: Recycle all electronics that are not in use,	
Annual Employee Training and Audits: Carpool, how to reduce paper, proper tire inflation, etc...	
Support mobile workforce: Provide smart phones, laptops and other materials for mobile and remote offices.	1,000 kWh
Web conference Instead of face to face meetings, use remote presence (video chat) for sales/support.	Saving Estimated 2.91 Tons of CO₂
Cascading CSR Notice Top 10 vendor CSR Questionnaire - Cascading requirement letter and questionnaire.	Reduce Scope 3 GHG

Compliance Enforcement

All local and national environmental laws, regulations and contractual requirements are followed by ensuring that appropriate signs and labels are posted. Employees are notified of changes to requirements via email and are required to attend annual safety training programs appropriate to their tasks. All vendors are certified and approved legal operations, only verified if suspected of violations.

Projects are reviewed by assigned personnel and milestones used to show progress.
OSHA - Computer Workstations & Material Safety Data Sheets (MSDS)

Employees are asked to complete the [Green Audit & Survey](#)
RI Headquarters in Santa Clara is included in this program.

Safety Program

All Employees should complete formal training including: workstation ergonomics, lifting, emergency plans, and distracted driving. Employees working on the production of RI systems should complete electronics safety, soldering iron, lighting, ventilation, and lead exposure training courses. Employees who regularly ship equipment must learn about back safety, maintaining a safe working environment (i.e. no cluttered floors) and proper lighting.

"Green Team" awards are given to RI employees annually to encourage innovation and participation.

Innovator - finds new and effective ways to meet or define goals

Grind - the person recognized for doing the most to lower consumption, increase reuse, or do the most recycling @ RI Santa Clara

Guru - the person who proves the most aware of RI's current programs (answers most questions right, random drawing if tie)

Example "Green Team" Guru survey questions:

How many kWhs did Roos Instruments consume last year?

How many Watts does a fully loaded Cassini (16 TIMs) use in an hour?

What is the closest Thermostat set at right now?

How many Therms (Natural Gas) did RI use last year?

How many average total miles do RI employees collectively commute per day?
(excluding visits from employees normally staffed outside of Santa Clara county)

What is RI's CO₂ Equivalent impact? (mostly due to Natural Gas consumption)

Employee Training Resources

The Roos Instruments' training presentation includes an introduction: "What is our CSR?", an Employee Survey/Audit, and mandatory minimum training. There will be a prize incentive to come up with a project that saves the most kWh or CO₂. Employees are instructed to "turn off" all lights (except where indicated) when you leave the room, including bathrooms, office, and when locking up for the day. Carpooling is highly encouraged. The thermostat is not 72°F all year round; 74°F in warm months and 68°F in cold months. Employees sent newsletter including links to "[More Energy Saving Tips](#)" online. Posters from "[Recyclestuff.org](#)" remind employees where to recycle various items. Occasionally "Bike to Work" incentives like free lunch is used to get hooked on cycling as normal transportation. [Local Government Programs](#) are used to educate and engage. Email newsletter includes topics like "[How to Reduce paper at work](#)" and "Dangers of distracted driving" OSHA's distracted driving brochure explains to employers and supervisors the importance of preventing texting by their workers while driving. Texting while driving dramatically increases the risk of motor vehicle crashes, the leading cause of worker fatalities.

Disclosing Results

The Green Annual Report (this document) published online at roos.com/green includes Roos Instruments' annual usage, goals, projects, analysis, and refinements needed to the Corporate Social Responsibility program.

Fully Loaded Cassini 16



800 Watts



=

Greenhouse Gas (GHG) Emissions

Greenhouse Gas Emissions and Carbon Dioxide Equivalent (CO₂ -e) are calculated using the GHG Corporate Protocol standard⁷. Zero percent (0%) of Scope 1 and one hundred percent (100%) of Scope 2 GHG Emissions are offset by Renewable Energy Credits.

Total Scope 1 & 2 **13,774 kg CO₂-e**

Scope1: Generated by Roos Instruments

Includes RI vehicles, appliances (refrigerators), HVAC systems, facilities, and landscaping.

2000 Tundra 4WD, 6 cyl, 3.4 L (Petroleum - Transportation) ⁸	4,738 kg CO₂-e
3 Office Refrigerators (Leaking Refrigerant) ⁹	56 kg CO₂-e
12 Air Conditioning Units (Leaking Refrigerant) ¹⁰	100 kg CO₂-e
Facilities (Gas Lawn Care, Blower, etc.) ¹¹	142 kg CO₂-e
Natural Gas (Heating with Natural Gas): 1,648 Therms ¹²	8,738kg CO₂-e
Scope 1 Total:	13,774 kg CO₂-e

Scope2: Generated by electricity producers (Silicon Valley Power)

100% renewable sources. Natural Gas usage is included in Scope 1.

Electricity: 211,603 kWh **15,738 kg CO₂-e**

100% Offset by Renewable Energy Credits

Scope 2 Total: **0 kg CO₂-e**

Total GHG CO₂-e By Year (excluding Scope 2, 100% offset by RECs)

2010	2011	2012	2013	2014	2015	2016	2017	2018
16,328	15,461	15,238	14,220	14,018	13,482	15,009	15,514	13,774
-	-5.61%	-1.46%	-7.16%	-1.44%	-3.98%	11.32%	3.25%	

⁷Scope1 GHG emissions calculation. <http://www.ghgprotocol.org/calculation-tools/faq>

⁸Annual mileage is 7,500 miles/year @ 15 mpg = 0.0667 gallons per mile = 500 gallons of gasoline per year

⁹KitchenAid Model: KSF5200EWHO, 5.125 oz of R134b, 0.145291306 kg

Kenmore Model: 106.9618412, 1992, 6.25 oz R12 0.17718452 kg

Electrolux Home Products: 4.25oz, R134a = 0.1566305 kg

Total from Refrigerant = 0.479 kg

Global Warming Potential Table HFC 134a, 1300 R404a, 3260 R407b, 2285 R407c, 1526 R410A, 1725 source:

<http://www.ghgprotocol.org/calculation-tools/all-tools>

¹⁰GHG emissions from refrigerants (kg CO₂-e) = Recharge capacity (kg) X Annual leakage rate x Global Warming Potential - 37.72 kg

CO₂ -e = 0.322 kg x 0.09 x 1300; Air conditioners/chillers Annual leakage rate = 0.09 (9%) - www.fueleconomy.gov

¹¹According to the EPA, and one gas-powered [lawn mower emits](#) as many pollutants as 8 new vehicles driving 55mph for the same period of time. 30 min per week, for 12 months, equals 16 hours, approx 16 gallons of gas.

<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

¹²0.005 metric tons CO₂/therm - <http://www.epa.gov/cleanenergy/energy-resources/refs.html>

Energy Usage Details

Electricity generated by Silicon Valley Power

Conservation efforts are monitored with vendor supplied meters.

kWH By Year¹³

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
210,240	230,975	218,975	208,594	209,113	201,336	199,806	182,716	202,079	203,589	212,113	211,603
3.62%	8.98%	-5.51%	-4.95%	0.25%	-3.72%	-0.01%	-9.35%	8.56%	0.36%	1.04%	0.00%

Percentage is Year to Year Difference

2018 kWH By Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
14,358	17,343	20,634	19,357	20,031	18,909	15,168	14,815	15,284	15,417	16,270	16,002
-11%	-14%	2%	-2%	5%	18%	8%	6%	1%	-1%	2%	-5%

Basis for monthly over/under percent is previous year (2017)

Natural Gas provided by PG&E

Conservation efforts are monitored with vendor supplied meters.

Therms By Year

2008	2009	2010	2011	2012	2013	2014 ¹⁴	2015	2016	2017	2018
2,179	2,135	2,092	1,966	1,924	1,732	1,694	1,593	1,881	1,574	1,648
N/A	86%	91%	106%	89%	119%	78%	73%	86%	72%	76%

Target is 2008 is 2,179 Therms

2018 Therms By Month

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
364	364	297	112	34	7	1	0	2	8	107	352
-0.52	0.12	0.31	0.13	0.1	-0.79	-0.93	-	-0.8	0.14	-0.25	-0.36

Basis for monthly over/under percent is 2008 usage

¹³Started purchasing Renewable Energy Credits in 2005

¹⁴2014 amount revised after audited data