ROOS INSTRUMENTS, INC.

Corporate Social Responsibility (CSR)

2017 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.
This report is available online - roos.com/green.

2017 Energy Facts

Natural Gas: 1,574 Therms
*Electricity: 212,113 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

In 2017, 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. The kilowatt hours target was changed from an unsustainable 2% reduction per year to a constant target of 80% of peak demand. An audit revealed misalignment of reported use in some months, so it has been corrected and normalized for future reporting.

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 platforms 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

12 Years of 100% Renewable Electricity 100% CA Solar[1]

Over 3.5 million "green" kilowatt hours have purchased since 2005 from Silicon Valley Power, our Green Power supplier.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	**2017**
KwH	202,634	210,240	230,975	218,975	208,594	209,113	201,336	199,806	184782	202,079	203,589	**212,113**
% 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%

"Green Team" Awards for RI Employees after energy audit and training. ***Skipped 2017***

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***

[1]2017 Product Content Label, Green Power Facilities
http://www.siliconvalleypower.com/solar-and-green-power/santa-clara-green-power/green-power-facilities

Goals for 2017

Reach 20% Reduction of Peak Electricity.[2]
185,868 kWh Target (20% reduction)
212,113 kWh Actual (Target Missed by 17%)

Maintain Natural Gas at 2008 Levels[3]
2,179 Therms Target
1,854 Therms Actual (Target Achieved)

Encourage corporate environmental responsibility with focused programs to increase awareness and building efficiency. Reduce electricity usage to 80% of “peak demand." After successfully targeting 10% reduction in 2011, after 6 years of 2% reduction, the target is now 80% of peak demand, representing a 20% reduction overall.

Planned Goals for 2017 and Beyond

- 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.
- 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.

[2] 80% or less of 2008 levels (Peak demand) or 185,868 kWhs/yr (2008 Annual Usage = 232,335 kWh)

[3] 100% or less of 2008 levels or 2179 Therms/yr

Green Power Partners

Silicon Valley Power

100% renewable energy from Silicon Valley Power. Verifiable RECs available upon request.[4]

EPA

Roos Instruments participates with the EPA Green Power partnership.

RI has purchased 100% renewable energy for every year since 2005.[5]

The following suppliers and customers have implemented a similar Corporate Responsibility and Environmental Management System. Thank you for helping Roos Instruments promote good environmental stewardship in the semiconductor industry.

[4]Send an email to "admin@roos.com" to request RECs from Silicon Valley Power

[5]EPA: https://www.epa.gov/greenpower/green-power-partner-list#RoosInstrumentsInc

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 working towards the 2017 targets.

Total Expected Annual Impact for All Projects in 2017: **500 kWh**
0.027% of 2017 Target kWh

Name of Project *Potential Impact*[6]

Continue Power conservation: **250 kWh**
Turn off lights when not in use. Use motion sensors for lights frequently left on.

Audit Sleep profiles on workstations: **250 kWh**
More than 95% of the workstations did have an acceptable sleep profile enabled.

Continue HVAC maintenance: **100 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.

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.

[6]Potential 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

Name of Project — *Potential Impact*

"Leave Off" Stickers: **500 kWh**
Light switch plates to clearly identify where lighting can be reduced.

Virtualize Server Infrastructure: **500 kWh**
Dedicated hardware vs increased server utilization due to virtualization.

Clean Living **Waste Reclaim**
Replacing all non-biodegradable products used in the break rooms like foam cups and plates to more biodegradable ones.

Sweater & Shorts Days: **500 Therms**
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.

Lighting Upgrades: **1,000 kWh**
Bypass ballasts and replace T12 fluorescent with LED.

Land Care: **Hazardous Material Reduction**
Mulching and using non-toxic chemicals for lawn maintenance.

Purchase RECs to offset 100% GHG Emissions: **100% GHG Offsets**

Employee Activities

Recycle Program: 100% of recyclable material is collected in dedicated bins.

Green Waste: recycle all electronics that are not in use. (GreenMouse)

Annual Employee Training and Audits (Carpool, how to reduce paper, proper tire inflation, etc...)

Support mobile workforce: **1,000 kWh**
Provide smart phones, laptops and other materials for mobile and remote offices.

Web conference **Saving 2.91 Tons of CO2**
Instead of face to face meetings, use remote presence (video chat) for sales/support.

Cascading CSR Notice **Reduce Scope 3 GHG**
Top 10 vendor CSR Questionnaire - Cascading requirement letter and questionnaire.

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 kWh 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)

Audit
An internal audit was conducted that identified some formula that has affected kwH consumption since 2001. The peak demand was adjusted +1,360 kWh from 230,975. All historical data has been updated in this report. Data de-duplication resulted in a reduction of 18,520 kWh total since records have been maintained in 2001.

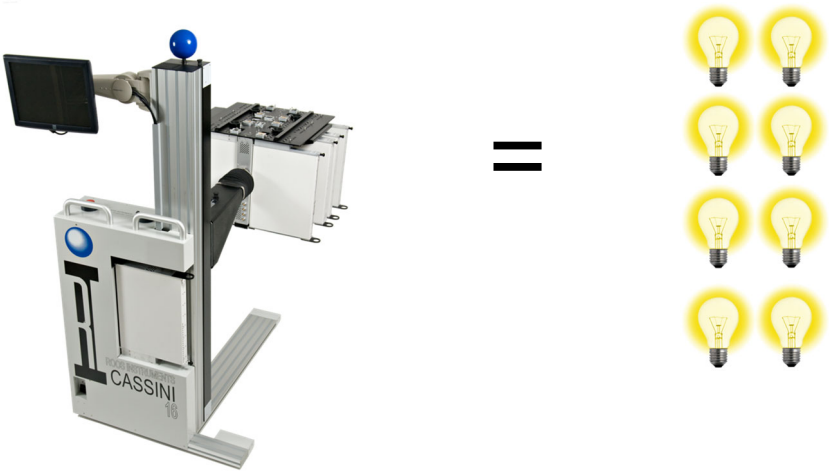
Employee Training Resources

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 CO_2. 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 standard[7]. 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 **13,381 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): 1,574 Therms[12]	**8,345kg CO2 -e**
Scope 1 Total:	**13,381 kg CO2 -e**

Scope2: Generated by electricity producers (Silicon Valley Power)

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

Electricity: 212,113 kwH **15,514 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**
16,328	15,461	15,238	14,220	14,018	13,482	15,009	15,514
-	-5.61%	-1.46%	-7.16%	-1.44%	-3.98%	11.32%	3.25%

[7]Scope1 GHG emissions calculation. http://www.ghgprotocol.org/calculation-tools/faq

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

[9]KitchenAid 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

[10]GHG 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

[11]According 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

[12]0.005 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 Year and Percent of Target[13]

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	**2017**
210,017	232,335	218,618	208,384	208,240	205,462	200,039	195,526	208,068	213,741	**212,113**
-0.59%	0.24%	-2.41%	0.01%	1.92%	0.00%	-5.32%	6.48%	9.53%	16.69%	6.23%

Target varies. 2017 and beyond is 185,868 kWh

2017 kWh By Month and Percent of Previous Year

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
14,741	14,121	12,995	14,064	16,431	18,866	21,158	20,292	21,537	22,329	17,800	16,216
-11%	-14%	2%	-2%	5%	18%	8%	6%	1%	-1%	2%	-5%

Basis for monthly over/under percent is 10 Yr average (2015)

Natural Gas provided by PG&E
Conservation efforts are monitored with vendor supplied meters.

Therms By Year and Percent of Target

2008	2009	2010	2011	2012	2013	2014[14]	2015	2016	**2017**
2,179	2,135	2,092	1,966	1,924	1,732	1,694	1,593	1,881	**1574**
N/A	86%	91%	106%	-89%	119%	78%	73%	86%	**72%**

Target is 2,179 Therms (2008)

2017 Therms By Month and Percent of Previous Year

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
360	360	181	87	17	6	1	0	4	23	81	454
-53%	3%	-15%	0%	-87%	-82%	-94%	0%	-76%	-75%	-76%	-32%

Basis for monthly over/under percent is 2008 usage.

[13] Started purchasing Renewable Energy Credits in 2005
[14]