INTEGRAL
Revolutionary Engineering
trust | nurture | inspire

JOHN McDonald, PE, LEED AP
Principal: Mechanical Engineer
MECHANICAL + ELECTRICAL ENGINEERS

ENERGY + WATER EFFICIENCY CONSULTANTS

SUSTAINABILITY + LEED CONSULTANTS

350+ STAFF IN SIXTEEN OFFICES

35+ LEED PLATINUM CERTIFIED

8+ LIVING BUILDING PROJECTS

15+ AIA COTE TOP TEN BUILDINGS

60+ NET ZERO ENERGY PROJECTS...1M SF OCCUPIED
NET ZERO ENERGY EXPERTS

ILFI CERTIFIED
945 Front Street, DPR Construction Office, San Francisco, CA
Peckard Foundation Headquarters LEED Platinum Certified Los Altos, CA
IDEAs “Z Squared” Integral Group Office San Jose, CA

COMPLETED PROJECTS NZE Verified
J. Craig Verite Institute LEED Platinum Certified La Jolla, CA
Tah Mah Lab. Residence LEED Platinum Certified Northern CA
University Childcare facility LEED Platinum Certified Scale Jumping, Living Building Challenge Burnaby, BC
Watsonville Water Resources Center | LEED Platinum Certified Watsonville, CA
415 Mathilda Sunnyvale, CA
435 India Sunnyvale, CA

NZE Designed
117 Easy Street Sunnyvale, CA
Aquarium of the Pacific LEED Platinum Certified Long Beach, CA
Bishop O’Dowd High School LEED Platinum Certified Oakland, CA
Blackford Elementary School Campbell, CA
California Lottery Office Santa Fe Springs, CA
California State Polytechnic University Pomona, Student Center Pomona, CA
Castlemont Elementary School Campbell, CA
Del Mar High School Science Education Facility CHPS Certified, Campbell, CA
Explorerum LEED Platinum Certified San Francisco, CA
Hawaii Portland Oahu, HI
Kaneda Residence LEED Platinum Certified Cuperino, CA
Loyola Middle School Administration San Jose, CA
Lynnhaven Elementary School Multi-Purpose Campbell, CA
McClellan Ranch Cuperino, CA
Millennium Water (Southeast False Creek) LEED Platinum Certified Vancouver, BC
Monterey Office Building LEED Platinum Certified Burnaby, BC
OUSD, Downtown Educational Complex CHPS Certified Pendergast Oakland, CA
Regent College Library Vancouver, BC
San Jose Environmental Innovation Center San Jose, CA
Sherman Oaks Elementary School Multi-Use Facility Campbell, CA
Van Ossen Visitor Centre Living Building Challenge Vanouver, BC
Water Main LEED Platinum Certified San Francisco, CA
Watsonville Water Resources Center | LEED Platinum Certified Watsonville, CA
Westmont High School Science Education Facility Campbell, CA

DESIGN COMPLETED
NZE Designed
CIF Bar Headquarters LEED Platinum Certified Emeryville, CA
NZE Ready
2 Bryant, Perkins + Will Office San Francisco, CA
Samsung Research Center Mountain View, CA
UNDER CONSTRUCTION
Confidential Medical Lab Inland Empire, CA
LinkedIn Office Innovation Sunnyvale, CA
Metallica Research Building Mexico
Xilinx Headquarters Renovation San Jose, CA
Yosemite Institute Yosemite National Park, CA
IN DESIGN
360 Post Oak Office Building Renovation Sanylee, CA
360 Post Oak Office Building Renovation Sunnyvale, CA
895 Emerson Schmidt Family Foundation Offices Palo Alto, CA
Boulder Commons Boulder, CO
City Place Development Santa Clara, CA
Confidential Urban Campus Los Angeles, CA
Denver Water Denver, CO
Hanover Page Mill Palo Alto, CA
Hayward Library Hayward, CA
Kaiser Baldwin Hill Medical Office Building Baldwin Hills, CA
Kaiser Santa Rosa Medical Office Building Santa Rosa, CA
Mark Day School Administration Building San Raphael, CA
OUSD Madison High School Oakland, CA
Rowland Hall St. Mark’s School Salt Lake City, UT
Sacramento Market Co-Op Sacramento, CA
San Francisco International Airport Consolidated Administration Campus San Francisco, CA
Stanford University Living Lab Palo Alto, CA
UC Davis California Avenue Lecture Hall Davis, CA
UC Merced Downtown Campus Merced, CA
UC Santa Cruz, Big Creek Santa Cruz, CA
MASTERPLAN
Fort Collins Net Zero Energy Eco-District Ft. Collins, CA
OUSD Fremont High School Master Plan Oakland, CA
Station Pointe Sustainable Master Plan Edmonton, AB
UC Berkeley Global Campus Richmond, CA

Accelerating the adoption of sustainable building design that mitigates global environmental impacts and reduces ecological degradation.
OUR APPROACH :: MEASURED. METERED. VERIFIED. REAL.

NET ZERO
ENERGY BUILDING CERTIFICATION SM

INTERNATIONAL LIVING FUTURE INSTITUTE SM
ZERO NET ENERGY RENOVATIONS
• 30,000 SF square one-story office warehouse circa 1970
• Uninsulated concrete walls, wood roof and single pane windows
• DARK, DINGY, DERELICT and UNRENTABLE!
REDUCED HVAC SIZE

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Indio Building – November 2015

Max OSA Temp

Max Space Temp

Max Mass Temp
BUSINESS CASE FOR ZERO NET ENERGY

- ADDITIONAL COST TO RENOVATE SUSTAINABLY VS. LESS EXPENSIVE STANDARD METHOD OF RENOVATING => ($49.84 / SF)

- ADDITIONAL VALUE CREATED DUE TO A REDUCTION IN OPERATING EXPENSES AND RESERVE REQUIREMENTS => $52.94 / SF

- ADDITIONAL VALUE DUE TO ACCELERATED LEASE-UP TIME VS. AVERAGE MARKET DOWNTIME => $22.81 / SF

- ADDITIONAL VALUE DUE TO RECEIVING A PREMIUM IN RENT OVER THE TOP OF THE MARKET RENTS => $34.47 / SF
ACCELERATE
Taking Net Zero Energy from Replication to *Production*

**INDIO**
SILICON VALLEY BUSINESS JOURNAL BEST REUSE PROJECT AWARD 2014 • ACTERRA SUSTAINABLE BUILT ENVIRONMENT AWARD 2015
ASHRAE NATIONAL FIRST PLACE TECHNOLOGY AWARD 2016

**MATHILDA**
SILICON VALLEY BUSINESS JOURNAL GREEN PROJECT OF THE YEAR 2015 • ACTERRA SUSTAINABLE BUILT ENVIRONMENT AWARD 2016
CORENET GLOBAL SUSTAINABLE LEADERSHIP AWARD 2016 • ENR BEST REGIONAL PROJECT MERIT AWARD 2016

**AP + I**
SILICON VALLEY BUSINESS JOURNAL GREEN PROJECT OF THE YEAR RUNNER UP 2015 • AIA SILICON VALLEY CITATION AWARD 2016

**PASTORIA**
SILICON VALLEY BUSINESS JOURNAL BEST REUSE PROJECT AWARD 2017
Wellness

Human-centric Electric Light

Cool white light for concentration work. Warm white light for relaxation.
Front End Building Dashboard
Actual Monthly Energy

Actual Monthly Total Elec. Consumption

- Plug + IT
- Lighting
- Mech
- Extrapolated

May: 10,000 kWh
June: 9,000 kWh
July: 12,000 kWh
August: 10,000 kWh
September: 11,000 kWh
October: 10,000 kWh
November: 15,000 kWh
December: 14,000 kWh
January: 20,000 kWh
February: 16,000 kWh
March: 13,000 kWh
April: 12,000 kWh
Lessons Learned

1. Don’t Install an ICE MACHINE!
2. Smart plug strips can be a little complicated.
3. Getting data out of a BMS is a pain – cloud based is ideal
4. Right Size the PV
5. The earlier you complete Cx - the better
6. Popularity Curse of Net Positive
7. Submeters for subtenants too.
THANK YOU

Check out our book.

INTEGRAL

Revolutionary Engineering

MOLLY MILLER