Design a Better Future
A BIT ABOUT US

1,300 Multi-disciplinary Professionals

#7 Architecture & Engineering Firms, BD+C, 2021

7 Fast Company Innovation by Design Awards in 4 Years

$83B in construction costs for LEED projects
REDEFINING DESIGN EXCELLENCE
AWARD-WINNING DESIGN THAT GOES BEYOND AESTHETICS ALONE

HIGH PERFORMANCE BUILDING
POWERED BY WASTEWATER
DC Water & Sewer Authority Headquarters
Infrastructure Engineering

University of California San Francisco
University of Michigan
University of Wisconsin, Madison
University of Pittsburgh
Ohio State University
University of Georgia
College of DuPage
United States Air Force Academy
Loyola University
Lawrence Berkeley National Laboratory
University of California Riverside
North Carolina State University
Virginia Polytechnic Institute & State University
University of Illinois
University of Richmond

Breadth and Depth

Central Energy Plants
Energy Recovery
Thermal Energy Storage
Advanced Building Systems
Decarbonization
Electrification
Data Centers
Geothermal / Centralization
Renewable Integration
Energy Controls & Optimization
Microgrid Analysis & Concept Design
Fuel Cells
Waste-to-Energy Systems
Energy Conservation Measures
Energy Data Analysis & Management
SUSTAINABILITY

SUSTAINABILITY IS AT THE CORE OF WHAT WE DO

262 LEED Certified Projects

40 MIL Square Feet of LEED Certified Projects
MARKETS
Cultural
Government
Health
HIGHER EDUCATION
Hospitality
Mixed-Use
Parks & Open Spaces
SCIENCE & TECHNOLOGY
Waterfront
Workplace

UTPB D. KIRK EDWARDS FAMILY HUMAN PERFORMANCE CENTER
TEXAS A&M UNIVERSITY-COMMERCE NURSING & HEALTH SCIENCES
UT ARLINGTON SCHOOL OF SOCIAL WORK & SMART HOSPITAL BUILDING
ACC SAN GABRIEL CAMPUS MASTERPLAN & PHASE I BUILDING
CLIMATE’S IMPACT ON STUDENTS
97% of U.S. students ages 13 to 19 agree it is important to learn about global issues including Climate

70% said they would like to pursue a career where they can make a positive contribution to solving global issues

76% will consider what potential employers' attitudes are to key global issues when applying for jobs

Source: Cambridge International
- 60% of college students meet criteria for at least one mental health problem\(^1\)
- \(~3/4\) of all students report moderate or severe psychological distress\(^2\)
- Between 2009 and 2015, need for mental health services increased 40% on college and university campuses\(^3\)
- 45% of surveyed young people (ages 16-25) say their feelings about climate change impact their daily lives\(^4\)


2: ACHA & NCHA Fall 2021 Reference Group Executive Summary. NCHA-III_FALL_2021_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf

3: Penn State University Center for Collegiate Mental Health 2021 Annual Report.

FACILITY’S REALITY
CHALLENGES
EVALUATING DEFERRED MAINTENANCE & FACILITY COSTS

University of Missouri

- Eliminate 1M gsf
- $881M deferred maintenance backlog
- Generate $500,000 in annual operating efficiencies

SmithGroup

Demolish 230,000sf of existing buildings
- $195M deferred maintenance backlog

Eliminate $30M of deferred maintenance backlog
THECB data indicates Texas public institutions had $740M+ in deferred maintenance backlog in 2012 up 41% from 2009

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  - $195M deferred maintenance backlog
- Eliminate 1M gsf
  - $881M deferred maintenance backlog
- Eliminate $30M of deferred maintenance backlog
- Generate $500,000 in annual operating efficiencies
INTEGRATED PLANNING
INTEGRATED SOLUTIONS

HIGH PERFORMANCE CAMPUS

iCAP. NO NET NEW GROWTH

ENERGY RECOVERY

SEWAGE WASTE ENERGY / 100% ELECTRIC
INTEGRATING SPACE, CONDITION, ENERGY, AND COSTS

DATA DASHBOARDS
REGENERATIVE INFRASTRUCTURE
REGENERATIVE GROWTH
DEFINING THE FUTURE IN A CLIMATE CONSTRAINED WORLD

CLIMATE CHANGE AND RESILIENCE

STUDENT POPULATION GROWTH
FOOD CYCLE
ENERGY
WATER

REGENERATIVE SYSTEMS
BEYOND CARBON NEUTRALITY
COMMUNITY BENEFIT
"THERMAL CURRENCY" FOR A LOW-ENTROPY CAMPUS
CONNECTING ENERGY SILOS WITH WARM & COOL WATER LOOPS

PUMPED SEWAGE AS A COOLING SOURCE?
CANALS AS A HEATING SOURCE? (REDUCING EVAPORATION!)

FORD DEARBORN MASTER PLAN
MANAGING AIR—AND ITS EMBEDDED ENERGY

IN-BUILDING ENERGY REUSE

“SMART LAB” VENTILATION CONTROL
EHS staff assesses each lab for appropriate Air Changes per Hour for normal occupied mode, purge mode, and unoccupied mode.

EXHAUST AIR HEAT RECOVERY TO OUTSIDE AIR INTAKE
U of Texas–Southwestern lab exhaust employs the same set of AHU coils for both outside air preheat and run-around heat recovery.

CASCADING VENTILATION
Transferring air, either directly or through AHUs, saves imbedded energy of conditioning.
PHASED SYSTEMS
DECENTRALIZED CLUSTERS

1. Photovoltaics
2. Heat Recovery Chiller
3. Solar Thermal Use
4. High Efficiency Water Fixtures
5. Shower Drain Heat Recovery
6. Passive Energy Savings
7. Heat Pump Water Heaters
8. High Efficiency Water Fixtures
SCALED ENERGY SYSTEMS
THE CHALLENGE OF PHASING & GROWTH

MODULAR UTILITY PLANT - LAWRENCE BERKELEY NATIONAL LABORATORY
ENERGY STORAGE
ALIGNING WITH RENEWABLES & LOW CARBON GRID HOURS

LITHIUM-ION BATTERIES

THERMAL STORAGE

190°F WATER STORAGE

GREEN HYDROGEN & BIOMASS STORAGE
CRITICAL LOAD BACK UP

NATIVE SEEDS OF CALIFORNIA

REFRIGERATOR

LAB EQUIPMENT

HVAC FANS SERVING THE LABS
ALL ELECTRIC REALIZATION
24 HR. BACK UP POWER

Diesel Generator

BURNS FOSSIL FUELS

DECARBONIZATION

ELECTRIFICATION

NET-ZERO

Photovoltaic

Battery

MICROGRID
**MICROGRID**

**WHAT IS MICROGRID?**

- **PROVIDES RESILIENCE DURING UNRELIABLE GRID, FOREST FIRE, FLOODS**

- **DEMAND CHARGE REDUCTION**

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**Unreliable Grid—Once in 10 days?**

**Once in 10 years?**
HOW TO REDUCE DEMAND CHARGES
RIGHT MIX OF TECHNOLOGY TO HAVE BIGGER IMPACT

Demand Charge Savings

DEMAND CHARGES ARE DRIVEN WORST 15 MIN FOR THE ENTIRE YEAR

*DEMAND CHARGERS RANGE FROM 30-70% OF THE BILL
ENERGY – WATER NEXUS
INTERCONNECTING SYSTEMS
USING SANITARY SEWER AS ENERGY SOURCE/SINK
UC MERCED SMART GROWTH & ECOSYSTEMS

INTER-DEPENDENT WATER, ENERGY, WASTE SYSTEMS PLANNING
INSTITUTIONAL PARTNER

EXPERIENCED: INFRASTRUCTURE ACROSS SCALES

UNDERSTAND: DECARBONIZING GROWTH & PHASING

FOCUSED: TRIPLE BOTTOM LINE

INTEGRATED PLANNING  REGENERATIVE SYSTEMS  DESIGNING FOR 2060

SMITHGROUP
Design a Better Future