

RIVERSIDE'S CLEAN ENERGY FUTURE: UC RIVERSIDE'S ROLE

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Carbon Neutrality Initiative

Mission:

*The University of California's operations goal: **carbon neutral by 2025**.*

Vision:

*The University of California is developing **scalable solutions** to build the low-carbon future our research has proven to be imperative.*

Values:

Our actions will:

- *Reflect UC's **core mission** of research, teaching, and public service*
- *Be **financially responsible***
- *Provide **tangible** environmental, health and social benefits*
- ***Optimize** existing and future campus infrastructure*
- *Demonstrate the value of coordinated **systemwide action***



UCR Office of Sustainability

- **Carbon Neutrality Initiative (CNI) Fellows Program**
 - Students receive fellowship to work on sustainability
 - Fellows represent UCR at larger UC-wide meeting
 - Similar Global Food Initiative Fellows program
- **GCLC Applied Research Working Group Research Projects**
 - Funding from UC Office of the President to apply research locally
 - UC Riverside has conducted several projects: central plant efficiencies, etc.
- **UCR GreenLabs Program**
 - Deep Energy Efficiency
 - Student and Faculty activities in various research labs and offices
- **Numerous Other Projects and Opportunities**
 - Sustainability Faculty Retreat
 - Sustainability Seminar Series



Fortino Morales III
(UCR Sustainability Officer)



Brian Siana
(Assoc. Faculty Director of Sustainability)

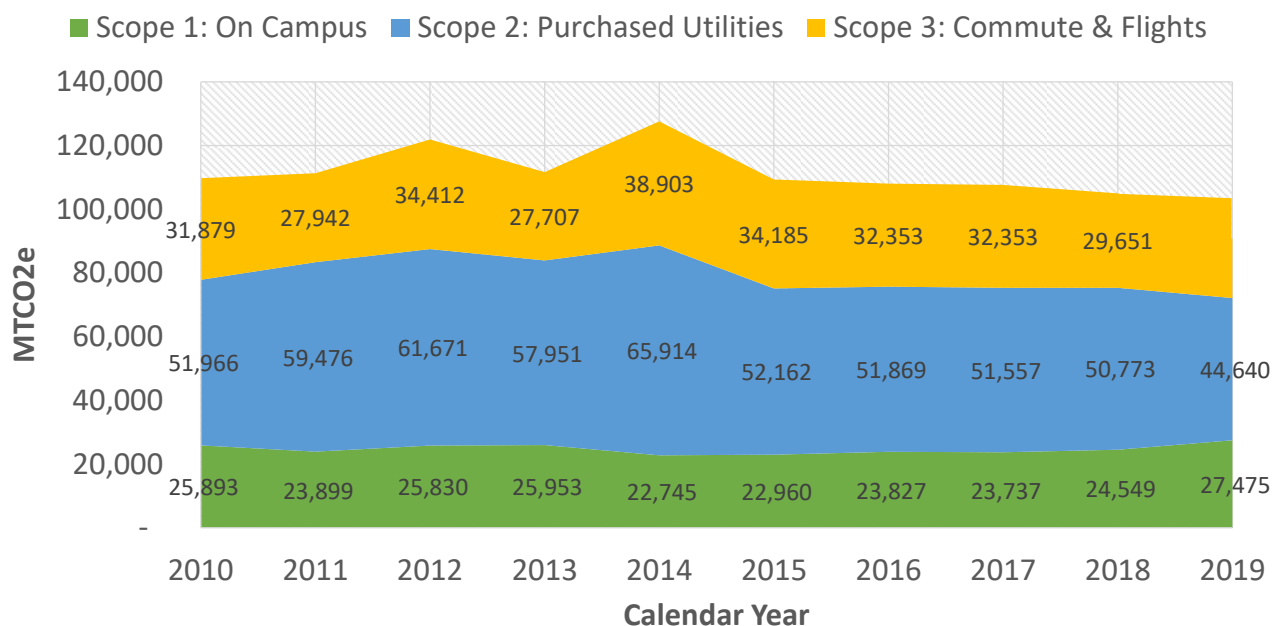


Francis Mitalo
(Sustainability Program Coordinator)



David Palacios
(UCR Energy Manager)

Total Campus Emissions by Scope from 2010-2019



UCR GHG Initiatives

Solar Generation

- 8MW of solar PV installed on campus
- Solar supplies ~9% of the campus energy needs
- Additional rooftop solar installation set for 2021

Energy Efficiency Programs

- LED lighting retrofits for existing buildings
- Central Plant efficiency upgrades planned

Commute Emissions

- 32 PEV chargers installed on campus



CE-CERT RESEARCH FOCUS: AIR QUALITY, TRANSPORTATION AND ENERGY



Clean Air

Quantifying and Measuring Emissions
Toxic, Ozone and PM formation



Renewable Fuels

Aqueous Processing of Biomass to Fuels
Thermochemical Processing of Biomass to Fuels

Climate Change Impacts

Impacts of our fuels
Cloud formation & impacts

Sustainable Transportation

Intelligent Transportation Systems
Connected and Automated Vehicles
Electric and Hybrid vehicle integration
Ecodriving, Shared Vehicle Systems



Renewable Electricity & Smart Grids

Advanced Solar Energy Production
Energy Storage Devices
Energy Management Systems



CE-CERT's Sustainable Integrated Grid Research

Microgrids

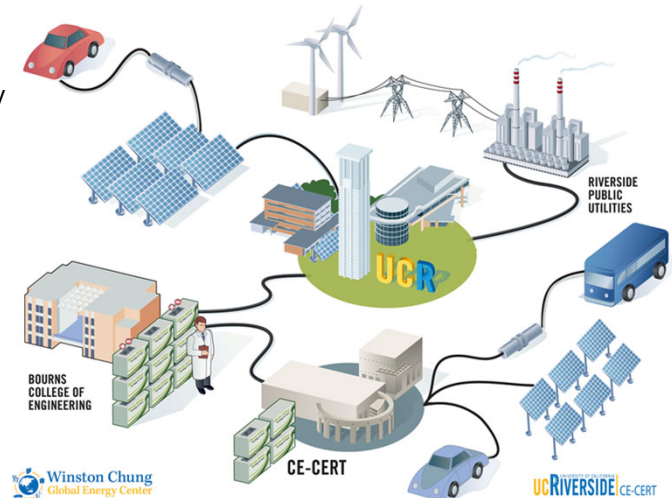
- Islanding studies and demonstration: increased grid stability, robustness, and reliability
- Advanced data and energy management algorithms
- Optimized utilization of renewable and stored energy
- Implementation of use cases and scenarios

Vehicle-to-Grid (V2G) Integration

- Load management utilizing V2G algorithms
- Smart charging based on distributed generation
- Aggregation algorithm development
- Vehicle activity monitoring
- Carbon based pricing for EV charging

Mobile Renewable Energy Power Systems

- Modular and deployable solar-plus-battery system demonstration and testing
- Portable battery performance cycling and testing
- Solar energy generation, inverter, and load data monitoring, reporting, and analysis
- Versatile and adaptable testbed system



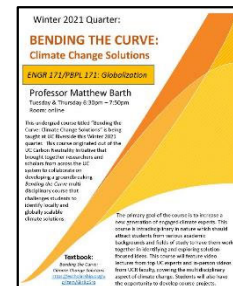
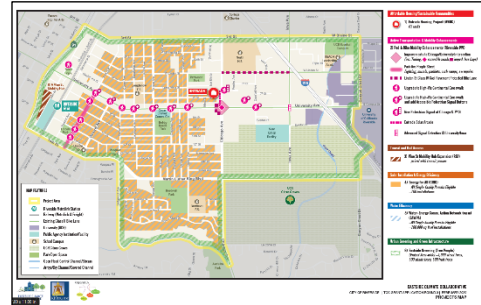
CITY OF RIVERSIDE INNOVATION CORRIDOR: RESEARCH TESTBED



- Six mile section of University Avenue between UC Riverside and downtown Riverside
- All traffic signal controllers are being updated to be compatible with SAE connectivity standards
- UCR/City have installed Dedicated Short Range Communication modems at several traffic signals
- UCR is also equipping corridor with new generation air quality sensors
- Corridor is being used for connected and automated vehicle experiments (light-duty vehicles, ARPA-E hybrid bus, etc.)

UCR & City of Riverside: Sustainability Collaboration

- Riverside Green Summit
- Innovation District and Innovation Corridor
- City of Riverside TCC Grant funded by Strategic Growth Council
- Shared Mobility Systems Planning and Modeling
- Sustainable Freight Planning and Modeling (*Transportation Electrification*)
- Joint efforts with the California Air Resources Board
- RPU Educational Grant Program
- Sustainability Curriculum



UCR & City of Riverside: Future Opportunities

- Implementation of innovative pilot programs in energy, including transportation systems
- Unified methods for energy systems monitoring and management
- Proliferation of microgrids (renewable energy and storage)
- Electrification of Buildings: technical and policy analysis (retrofit program, air quality benefit analysis, etc.)
- Sustainability outreach, education, and training opportunities

