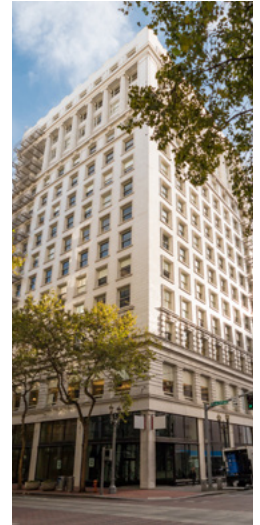


# SUSTAINABILITY: ENERGY AND WATER MODELING



Prototyping design trade-offs for energy and water systems to optimize project cost and performance

Choices about energy and water are central to designing for sustainability. However, because so many factors and interactions are involved, the trade-offs are complex. Predicting performance and costs can start to resemble a guessing game.



## Our service

We take the guesswork out of designing energy and water systems by showing you how energy and water performance targets affect your project's bottom line. First, we model your building's energy or water "economy" in detail. Then we look at how that economy could be affected by climate, technology choices, occupant use and behavior, and other performance drivers.

With the model, we can rapidly prototype concepts or test performance within a certification framework. Such studies give you essential context and confidence for key decisions. They can also form part of a broader review of sustainable options.

Our goal is to help all parties—owners, designers, and operators—discover how to achieve outstanding real-world performance while finding the best balance between first costs and operating costs.

Redefining possible.



We understand that achieving this goal requires relationships and collaboration. We devote ourselves to you and your project, whatever its scale, taking ample time to interact, explain and listen.

As an independent consultant, we deliver high-powered analysis without the bias of a preferred design. All aspects of our work are grounded in expert understanding of the fundamental science and engineering behind a building's demands for energy and water. And our solutions are built from the unique circumstances of your project.

When a project targets the highest levels of performance, the local climate is absolutely the boss. As a world leader in climate-based solutions, we understand how to make the climate work for you. By applying our broad understanding of climate and predictive algorithms, we find solutions others might miss.

## RWDI is a valuable partner to clients seeking to...

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### Explore Innovations

- Propose advanced, highly integrated sustainability strategies with confidence in constructed performance
- Use passive technologies for resource efficiency without sacrificing other performance measures
- Rapidly prototype concepts to achieve standout certifications

### Create Opportunities

- Obtain incentive funding
- Increase asset value by achieving market-recognized sustainability qualifications (benchmarking, labeling, certification)
- Easily and quickly integrate renewable energy and energy storage technologies
- Find unexpected solutions and cost savings through independent, experienced judgment and detailed modeling

### Meet Challenges

- Understand and manage tradeoffs among sustainability strategies, indoor comfort, and indoor air and water quality
- Address a challenging local climate creatively and cost-efficiently

### Fulfill Expectations

- Develop verifiable performance claims (e.g., for LEED, WELL, Passivhaus, and ENERGY STAR)
- Demonstrate compliance with advanced building codes

## How we work

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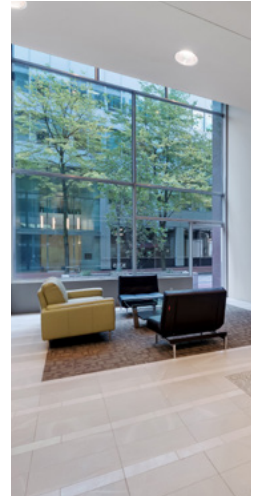
Our models draw on company-wide expertise in climate, weather, practical design and construction solutions, and state-of-the-art computational methods. We work with projects at all scales, from single systems to iconic, signature buildings.

Our goal is to minimize energy and water consumption; deliver tangible, measurable outcomes; and maximize occupant comfort, health and well-being.

We look at how energy/water and comfort targets will affect the project's success and bottom line. For example, we can help you answer specific questions such the following:

- Will we need more air conditioning if we make all of the windows 10% larger?
- What's the most cost-effective way to provide a comfortable space to tenants?
- How many LEED points do we achieve by adding heat recovery ventilators?
- What size cistern is needed to reuse rainwater for toilet flushing?
- Will this design meet the energy and water portions of the building code?

# SUSTAINABILITY: ENERGY AND WATER MODELING



Depending on your concerns, we can also review larger outcomes, such as

- Performance — annual use, peak demand, throughput
- Risk management — downtime, underperformance, failures or flaws, wasted money, insurance
- Asset value — performance costs, visibility/differentiation (market-recognized “labeling” of an asset).

Our evaluation of these outcomes is informed by our deep understanding of the interrelationship among many contributing factors, such as the following:

- Comfort factors — thermal, acoustic and visual (glare/light) properties; daylighting
- Indoor air and water quality factors — CO, CO<sub>2</sub>, odor, VOCs, and others

Redefining possible.

To build a model, we first develop and apply custom climate data (from Weather Research Forecast [WRF] models) for your site. Then we overlay these data against a thorough assessment of occupant needs, behaviors and client performance objectives. Using a combination of market-available and custom software and predictive algorithms, we develop targets, opportunities and constraints and then use these to rapidly prototype designs. Finally, we present quantified solutions to reduce energy or water use. Our proposals include a clear summary of trade-offs and opportunities, along with quantified assessments of risks, reliability and strategies for resiliency.

In proposing and quantitatively evaluating these solutions, we draw on an exceptionally broad range of in-house experience. Approaches we are especially well-qualified to address include

- Design for passive response to climate/microclimate to minimize use of mechanical and energy systems
- Implications of interrelated thermal, acoustic and visual comfort requirements
- Design strategies to meet critical loads for resiliency planning
- Renewable energy and energy storage systems
- Strengths of multiple suitable designs and construction technologies
- Efficient strategies to commission a building and monitor its performance after construction.