**Request for Proposal for**

**Building Energy Modeling Services[[1]](#footnote-1)**

*This document serves as a template and comprehensive example of a request for proposal for securing building simulation performance modeling services for a fictional building. It is designed to help a building owner articulate the services they desire. It also directs the response format to facilitate proposal comparison to reveal distinguishing features. The template content can also be added to more broadly focused RFPs to address modeling service considerations.*

# General Information

*Denver Energy Center (DEC)* is requesting proposals from qualified firms to provide building energy modeling services for the *Center’s new headquarters office building*. The modeling services requested will begin during the early design stages and continue through post-construction into occupancy and operations. Please do not provide detailed pricing. *DEC* will negotiate price with the selected consultant.

*Include a description and details about the project here. Outline basic project details in the table below.*

|  |  |
| --- | --- |
| ***Building Details*** |  |
| *Building Purpose* | *Office* |
| *Size* | *21,400 s.f* |
| *Location* | *Denver, Colorado* |
| *Schedule* | *12 months for design*  *8 months for construction* |
| *Sustainability goals* | *Listed below* |
| *Budget* | *$4.1 million* |

The performance goals established for the project, include:

|  |  |  |  |
| --- | --- | --- | --- |
| **Overall Targets** | **Comparative** | **Certifications** | **End-Use Specific** |
| * An Energy Use Intensity (EUI) < 35 kBtu/sf/yr * Complies with the Energy and Security Act of 2007 | * 65% reduction in GHG emissions compared to existing offices * 50% energy cost reduction from ASHRAE 90.1-2010 | * LEED BDC Platinum * EnergyStar score > 95 | * 80% reduction in electric light energy due to active daylight controls * 100% of heating from waste heat and solar thermal |

# Requested Services

## Purpose

*DEC* seeks energy modeling services to support the design, commissioning, performance verification, and on-going operation of their new headquarters building. The specific objectives to be met through modeling include:

* Assist the integrated design process to effectively direct efforts to meet project performance goals
* Evaluate the impact of individual energy efficiency measures affecting the building design, construction materials, space layout, passive strategies, equipment, or mechanical systems
* Develop an energy model to determine and report the ASHRAE Building Energy Quotient for the “As Designed” building under standard conditions as defined by the program requirements
* Adhere to LEED BD+C requirements for Energy & Atmosphere, Credit 1 -Optimize Energy Performance to determine and document points achieved
* Use building energy modeling to demonstrate compliance with the commercial building energy code
* Support the testing and integration of installed components and systems during building commissioning
* Develop a calibrated model representing the existing building to identify operational issues and savings opportunities
* Develop a calibrated model representing the existing building to establish baseline conditions to support an Option D M&V approach
* Update the design model to develop a calibrated energy model to determine and report the ASHRAE Building Energy Quotient for the “In Operation” building under standard conditions as defined by the program requirements
* Update the design model to develop a calibrated model to check and reconcile outcome-based targets with actual energy use
* Update the design model to develop a calibrated energy model of the in operation building to establish performance targets are met per the integrated project delivery contract agreements

## Requested Studies

In support of meeting the objectives above, DEC desires the following elements be included as part of the analysis:

* Conduct studies for three daylight design options and assess their ability to provide daylight autonomy, visual comfort, and lighting energy savings. Support integrated project design and delivery, using modeling to inform the design process
* Incorporate passive solar heating strategies into the building design, evaluate their net benefit, and identify potential visual and thermal comfort issues
* Evaluate state-of-the-art technologies and controls for drastically reducing electric lighting and plug loads
* Identify the cost point ($/kWh saved) that balances the cost of efficiency against renewable energy systems
* Assess the benefits of using solar thermal versus solar electric to satisfy space heating loads
* Propose three mechanical system design options for their first costs and performance impacts, and integrate with other systems
* Complete life-cycle cost assessment for top three building designs. Use the economic model to compare return on investment and impact on carbon reduction
* Identify key monitoring points for monitoring and tracking performance, as well as supporting the M&V Plan
* Post-construction, develop the as-built, calibrated model and compare predicted performance results against the design model. Assess differences and share findings with DEC and the design team

## Best-Practice Process

Appendix Table 1 lists modeling tasks and deliverables that contribute to a best-practice modeling process. The proposed modeling services provided should be rooted in the process while aiming to balance the level of effort with the value it provides to the project.

Table 1. Modeling Process

|  |  |
| --- | --- |
| **Project Timeline** | **BEM Activities** |
| Pre-design | * Evaluate siting, massing, and geometry * Develop a “technical potential” model\* * Hold a Technical Potential/Goal Setting Workshop * Document and submit pre-design analysis, findings, and recommendations |
| Early Design | * Evaluate efficiency measures contributing to an integrated design solution following the “right steps in the right order” by: examining service requirements, reducing space loads, considering passive strategies, selecting systems, planning layout, fine-tuning controls, and sizing renewables * Develop the “implemental minimum” and compare against other options * Update model based on current design documents and refinements * Document and submit performance assessment, model assumptions, approach and details, and design recommendations |
| Design Development | * Assist in system selection and right-sizing equipment * Refine control strategies and sequence of operation * Inform value engineering decisions * Update model based on current design documents and refinements * Document and submit project attributes, performance assessment, model assumptions, approach and details, and design recommendations   ----------------------------------------------------------------------------------------------------------------------   * Develop minimally-compliant/reference baseline model * Update baseline model as design progresses; initiate completion of compliance documentation; assess and report compliance status * Identify and resolve compliance issues |
| Construction Documents | * Check that energy efficiency features are included and properly characterized in construction documents * Finalize model, check performance against targets, share results, reconcile shortcomings * Document and submit project attributes, performance assessment, model assumptions, approach, and details   ------------------------------------------------------------------------------------------------------------------   * Finalize minimally-compliant/reference baseline model * Complete and submit compliance documentation   ------------------------------------------------------------------------------------------------------------------   * Develop and submit a “Calibration Plan” * Support the development of the M&V Plan * Assist in establishing points for data collection post-construction based on model calibration and M&V needs |
| Construction | * Use modeling to support commissioning efforts; provide data as needed describing anticipated performance of equipment and systems   --------------------------------------------------------------------------------------------------------------------   * Respond to issues regarding design-based compliance submittals |
| Operations | * Create the as-built model by updating the proposed design model to reflect installed components and actual operation * Calibrate the updated model to measured data * As required, compare modeled total, end-use, system and equipment performance against actual performance to investigate discrepancies * Reconcile differences to inform the model and/or identify underperformance * Develop plan to resolve remaining discrepancies * Share findings with project team, building operators, managers, and owner |

# Nominal Requirements

## Reference Guidelines and Standards

Refer to the following guidelines and standards to inform model assumptions and methods:

* DOE/NREL/RMI Building Energy Modeling for Practitioners (available summer 2014)
* ASHRAE Standard 209: Energy Simulation Aided Design for Buildings Except Low-Rise Residential Buildings (expected release summer 2014)
* Environmental Defense Fund Investor Confidence Project, Energy Efficiency Protocol – Large Commercial v.1.1 (EPP-LC); retrieved at <http://www.eeperformance.org/large-commercial1.html>
* ASHRAE Standard 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings (compliance reference version)
* COMNET Commercial Buildings Energy Modeling Guidelines and Procedures Manual; retrieved at <http://www.comnet.org/>
* ASHRAE Standard 62.1: Ventilation for Acceptable Air Quality (most current version)
* ASHRAE Standard 55: [Thermal Environmental Conditions for Human Occupancy](http://www.techstreet.com/ashrae/standards/ashrae/55_2004?product_id=1160905&utm_source=certification&utm_medium=BEMP&utm_campaign=std55_2004&ashrae_auth_token=) (most current version)
* International Performance Measurement & Verification Protocol (IPMVP) Volume 1 (most current version); retrieved at: <http://www.evo-world.org/>

## Software Tools

The whole-building modeling shall be completed using simulation software that meets the requirements specified in ASHRAE 90.1 (current version) Appendix G, Section G2 - Simulation General Requirements. Exceptional calculations shall be conducted for strategies that: a) cannot be directly modeled in the simulation software, b) are based on schedule changes, or c) are based on plug load reductions. Additional specialized software programs can be used to perform supporting studies.

## Qualifications

*DEC* seeks firms that have the following qualifications.

* ASHRAE Building Energy Modeling Professional (BEMP) or AEE Certified Building Energy Simulation Analyst (BESA).
* LEED AP
* A minimum of five model reviews by GBCI for LEED BD+C projects.
* Engineering, architecture or other technical degree for the modeling, project management, and QA staff.
* At least three years of modeling experience on a variety of building types and sizes

The following qualifications are not required but are preferred:

* ASHRAE High Performance Design Professional (HPDP) Certification
* Certified Energy Manager (CEM)
* Licensed Professional Engineer (P.E.)

# Proposal Format[[2]](#footnote-2)

In responding to the RFP, please provide the following:

1. Cover Letter
2. Overview of Firm and financial stability
3. Experience

* Number and types of buildings modeled over what time period
* Simulation programs and supporting tools used
* Mechanical systems and process loads modeled
* Case studies of projects that involve: informing design, LEED certification EAc1 modeling, existing building calibration, operational modeling. As part of the project descriptions, please include: baseline/actual/modeled energy use intensity, peak load reduction, and percent cost savings.
* Description of modeling quality control and internal review procedures

1. Proposed Modeling Tasks and Deliverables

Using Appendix Table 1 for reference, provide a description of the tasks and process that you propose to follow in delivering services. The proposed work should reflect a balance between modeling level-of-effort, accuracy, and ability to meet project objectives. Discuss the value proposition for the tasks proposed. Mention the software tools that will be used for the whole-building and any specialized analyses proposed.

# Proposal Evaluation[[3]](#footnote-3)

Proposals will be evaluated on the following criteria. The rating scale shall be from 1 to 5; from poor to outstanding, respectively. At the discretion of *DEC*, the firms submitting top-rated proposals will be invited for an interview session.

|  |  |  |
| --- | --- | --- |
| **Weighting Factor** | **Category** | **Criteria** |
| 25% | Scope of Proposal | Do the proposed scope and methods show an understanding of project objectives, best-practice process, and value proposition? |
| 25% | Assigned Personnel | Does the assigned modeling team have the required skills and experience? Is the project sufficiently staffed? |
| 20% | Availability | Will the team be available to meet regularly during design and be available to resolve issues on short notice? Can the work deliverables be submitted in accordance with the needs of the project timeline? Are other qualified staff available to assist in meeting the project schedule if required? |
| 10% | Motivation | Is the firm interested and capable of doing the work within the required time frame? |
| 20% | Firm Capability | Does the firm have the necessary buildings-related experience to meet the requirements of the RFP? |

1. Acknowledgement and thanks to Fort Collins Utility and the Poudre School District for sharing their procurement materials with us to inform this template. [↑](#footnote-ref-1)
2. Adapted from the City of Fort Collins, Financial Services Purchasing Division, Request for Proposal 7497 Building Energy Modeling Services released March 2013 [↑](#footnote-ref-2)
3. Adapted from the City of Fort Collins, Financial Services Purchasing Division, Request for Proposal 7497 Building Energy Modeling Services released March 2013 [↑](#footnote-ref-3)