**Text from the online application segment**

**Time schedule and work plan**

Task 1: Establish a digital workflow to evaluate the holistic urban-scale environmental performance.

Task 2: Identify and evaluate solar-driven metrics to serve as environmental performance indicators for optimization.

Task 3: Evaluate the efficiency of optimization workflows and algorithms to determine the best solutions from a large range of design variants.

Task 4: Explore the robustness of the approach by accounting for diverse constraints and compare with traditional SE methods.

Explanatory notes

Task 1: This task will focus on establishing the computational foundation of the project, including the geometrical solar block generator, the analytical module, and the visualization module. These three modules will be combined into a seamless, iterative workflow.

Task 2: This task will establish suitable metrics for evaluating environmental performance. It will start with a preliminary study of several solar-based metrics in a sensitivity analysis followed by a parametric study of a generic run (on a theoretical model). It will finish with a principal component analysis to highlight overlaps between metrics to help reduce the number of metrics for the multi-objective optimization.

Task 3: This task will be dedicated to the exploration of optimization methods for solar driven design. It will add an optimization module to the workflow assembled in tasks 1 and 2, which will be explored through a district case study in Tel Aviv. Objectives for the MOO will be selected based on outputs of Task 2, and a series of sensitivity optimization will be studied to test different algorithms and explore their performance in the context of our optimization problem. Full energy performance (supply and demand) in addition to daylight and outdoor comfort simulations will be conducted to test the optimization results.

Task 4: This last task will be dedicated to experimentation with the workflow in different climatic conditions (regional climates and future climates) and scales. It should finalize the project by providing observations on solar urban design, the integration of digital tools and optimization methods in the solar-driven design process, and the robustness of solar urban design in different urban and climatic settings.

**Justification for requested personnel**

This research will be carried out with the help of three students: a Ph.D. student with a strong environmental/sustainable design and computational background who will explore the whole spectrum of the solar block approach from setting up the computational workflow to exploring the metrics and to running the optimization studies; a master's student with a strong computational design background who will help to establish the digital workflow, collect the relevant inputs, and help characterize the case study; and a post-doctoral student with strong computational skills who will be in charge of the optimization module and the different robustness studies. Professor Wortmann will support the optimization module, Dr. De Luca will support the generative computational segment, and Professor Capeluto will reinforce the selection and evaluation process of the solar-performance metrics based on the relevant environmental standards.

**Justification for requested computers**

The project will be powered by two laptop computers: one for the PI and one for the research team. Additionally, a high-performance desktop will be acquired and dedicated to running the simulations throughout the project.

The software Rhino (for 3D modeling) and Meteonorm (for weather data analysis and prediction) will be acquired through an annual subscription.

Pollination cloud computing for high performance environmental analysis (using Ladybug tools) will escort the computational tasks of project throughout its stages.

**Justification for requested miscellaneous items**

Publishing research results in conference proceedings and peer-reviewed journals requires professional editing services and incurs the associated open-access fees.