




## DESIGNING A BIM ENERGY-CONSUMPTION TEMPLATE TO CALCULATE AND ACHIEVE A NET-ZERO-ENERGY HOUSE

### 1. Workshop Instructor Information

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<b>Short Biography</b> <i>(150 words max.)</i>	<p>Samer El Sayary is an Assistant Professor of Architecture, researcher, and award-winning architect with a special passion for Outer space architecture. He is also an Autodesk certified instructor in Revit since 2012. Graduated in 2001 with honors, top of his class, and through the years he received many national and international awards (40 awards and prizes till the year 2021) from 4 different continents, such as the 1st Prize Mars City design foundation (Los Angeles, 2017), Jacques Rougerie Foundation (Paris 2016, 2018 &amp; 2020), Kuala Lumpur International Architectural Festival (Malaysia 2019), 1st Prize Mediterranean scientific forum "MEDIBAT", (Tunisia 2011), Hassan Fathy award for sustainable architecture (Egypt - Twice 2011&amp; 2013), Honored by the Society of Egyptian Architects (S.E.A 2017) as one of the best 100 architects in the last 100 years in Egypt, to name a few. His work is exhibited in several countries including NASA Johnson Space Center in Houston (USA) 2019, Medcop 21 France 2015, United Nations Office for Outer Space Affairs (UNOOSA) 2021 &amp; Paris 2016, Greece 2015, Tunisia 2011, Egypt 2011 &amp; 2013, Malaysia 2019 among other countries. His work has also been featured in the Discovery channel UK documentary, Dutch TV, California Dreamers channel, Wired magazine 2017, Up-magazine and L'arca magazine, Architecture d'aujourd'hui special edition 2021, Fiabci 2020, universetoday.com, designboom.com, archdaily.com, spacearchitect.org among many others.</p>
<b>Head Shot</b>	

# HYBRID SPACES OF THE METAVERSE

Architecture in the Age of the Metaverse  
Opportunities and Potentials

Debbieh, Lebanon  
October 12-14, 2022  
Hybrid Conference

جامعة بيروت العربية  
BEIRUT ARAB UNIVERSITY



## ASCAAD 2022

10<sup>th</sup> International Conference of the Arab Society  
for Computation in Architecture, Art and Design

## 2. Workshop Information

<b>Length</b>	One day workshop, 4 hours duration. Date: October 12, 2022
<b>Short Abstract (250 words max.)</b>	BIM is not simply a drafting tool or advanced CAD. BIM is a collaboratively generated and maintained data-rich information source, especially when it comes to the energy-calculation process and beyond. Due to growing awareness around energy conservation, numerous projects and initiatives have occurred to promote the development of low- and net-zero-energy homes. The widespread adoption of photovoltaic rooftop systems has shown that solar homes can be a effective solution to that energy demand; nowadays, the idea that BIM is not just software has been decided upon. In this paper, a new approach was used to calculate energy consumption using a BIM template designed for this purpose. The greatest value derived from BIM was in the template designed to neutralize energy consumption by calculating the number of photovoltaic panels needed to achieve a net-zero-energy house. The BIM prototype developed is considered a useful tool, intended to be used by everyday, non-specialist users to aid and disseminate energy knowledge in order to achieve a zero-energy home, as well as to be used as a decision-support tool, incorporating energy simulation into the early design process of zero-energy buildings in architectural practice. Finally, the tool was tested on a group of users in order to fine-tune and develop the design parameters of the template.
<b>Handouts and Materials</b>	Each participant is expected to bring his own laptop with Autodesk Revit 2018 minimum installed.
<b>Learning Objectives</b>	Participants are expected to gain the following learning objectives: <ol style="list-style-type: none"><li>1. Training the participant on using Revit software to anticipate and calculate the energy consumption of their residential spaces/buildings precisely.</li><li>2. To enable the participants to integrate the usage of required number of solar panels precisely into the design process in its early stages.</li><li>3. To achieve zero energy consumption by balancing the expected consumption with the required number of solar panels.</li><li>4. To familiarize participant with renewable energy resources and its applications</li><li>5. To provide all participant with the knowhow of the template design as an open source to be developed later.</li></ol>

### Sample Outcome

The image displays three screenshots of the Autodesk Revit software interface, demonstrating the generation of electrical schedules for a building project. Each screenshot shows the software's ribbon, a project browser on the left, a central schedule table, and a properties panel on the right.

#### Top Screenshot: <Total Balance sheet>

Code	Family and Type	Power (Watts)	Operative Hours	Watt-Hours
1	Ceiling & Plenary Air Conditioner 1000 watt	1000	0	0
2	Control & Transfer Valve: water-400 watt	400	0	0
1	Electrical equipment Control: Fluorescent 3 watt	3	0	0.00
2	Electrical equipment Control: Fluorescent 100 watt	100	0.00	0.00
3	Electrical equipment Control: Fluorescent 150 watt	150	0	0
1	Electrical equipment Control: Fluorescent 200 watt	200	0	0
2	Electrical equipment Control: Fluorescent 200 watt	200	0	0
3	Electrical equipment Control: Fluorescent 200 watt	200	0	0
1	Electrical equipment Fluor Type: Vial coated 80 watt	80	0.000	0.000
2	Electrical equipment Fluor Type: Vial coated 80 watt	80	0.00	0.00
1	Electrical equipment Microtune 100 watt	100	0.0	0.00
2	Electrical equipment Microtune 100 watt	100	0.0	0.00
1	Electrical equipment Power 40 Watt	40	0.0	0.00
2	Electrical equipment Power 40 Watt	40	0.0	0.00
1	Electrical equipment Transformer 20 watt	20	0	0.00
2	Electrical equipment Transformer 20 watt	20	0	0.00
1	Electrical equipment Transformer: 3 watt	3	0	0.00
2	Electrical equipment Transformer: 3 watt	3	0	0.00
1	Electrical equipment TV LED 30 watt	30	0	0.00
2	Electrical equipment TV LED 30 watt	30	0	0.00
1	Electrical equipment VHSR 40 watt	40	0.00	0.00
2	Electrical equipment VHSR 40 watt	40	0.00	0.00
<b>Lighting</b>				
1	Lighting Downlight - Recessed Cir 120w	12	4	50.00
1	Lighting Downlight - Recessed Cir 200w	20	4	4.00
1	Lighting Floor Lamp 2 (P, 100 watt, 240v)	100	0	0.00
1	Lighting Floor Lamp 2 (P, 100 watt, 240v)	100	0	0.00
<b>Panel Schedules</b>				
1	New Panel: New Panel 300 watt	300	0	0.000

#### Middle Screenshot: <Lighting Power Consumption>

Code	Family and Type	Power (Watts)	Operative Hours	Total Power Consumption (Watt-Hours)
1	Downlight - Recessed Cir 120w	12	4	50.00
1	Downlight - Recessed Cir 200w	20	4	4.00
1	Floor Lamp 2 (P, 100 watt, 240v)	100	0	0.00
1	Floor Lamp 2 (P, 100 watt, 240v)	100	0	0.00
<b>Total</b>				
		142	8	54.00

#### Bottom Screenshot: <Electrical Equipment Schedule>

Code	Family and Type	Power (Watts)	Operative Hours	Total Power Consumption (Watt-Hours)
1	Air Conditioner 1000	1000	0	0
1	Water Heating Unit 1000 Watt 300	600	0.00	0.00
1	Control & Transfer Valve: water-400 watt	400	0	0
1	Room Free Standing Cooler: Fluorescent 2000	2000	0	0
1	Room Free Standing Cooler: Fluorescent 2000	2000	0	0
1	Electrical equipment Fluor Type: Vial coated 80 watt	80	0.000	0.000
1	Electrical equipment Fluor Type: Vial coated 80 watt	80	0.00	0.00
1	Microtune 1000 watt	1000	0.0	0.00
1	Microtune 1000 watt	1000	0.0	0.00
1	Power 40 Watt	40	0.0	0.00
1	Power 40 Watt	40	0.0	0.00
1	Transformer 20 watt	20	0	0.00
1	Transformer 20 watt	20	0	0.00
1	Transformer: 3 watt	3	0	0.00
1	Transformer: 3 watt	3	0	0.00
1	TV LED 30 watt	30	0	0.00
1	TV LED 30 watt	30	0	0.00
1	VHSR 40 watt	40	0.00	0.00
1	VHSR 40 watt	40	0.00	0.00
1	New Panel 300	300	0	0

**Corresponding Conference Theme**

**(B) Information Management.**

### 3. Attendees Information

<b>Who should attend this workshop?</b>	The workshop is open to students of architecture and interior design, architects, interior designers and any enthusiast of integrating BIM into zero energy calculations.
<b>Prerequisites</b>	Prior knowledge of Revit is a must.