



TEXAS A&M
UNIVERSITY *at* QATAR

Monitoring System for Carbon Footprint in TAMUQ

Team Members:

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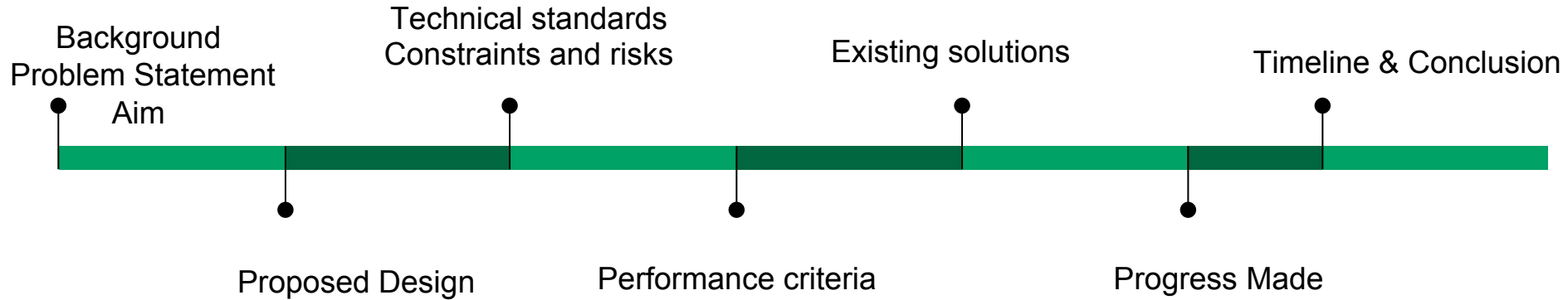
Team Mentor:

Dr. Ali Ghrayeb

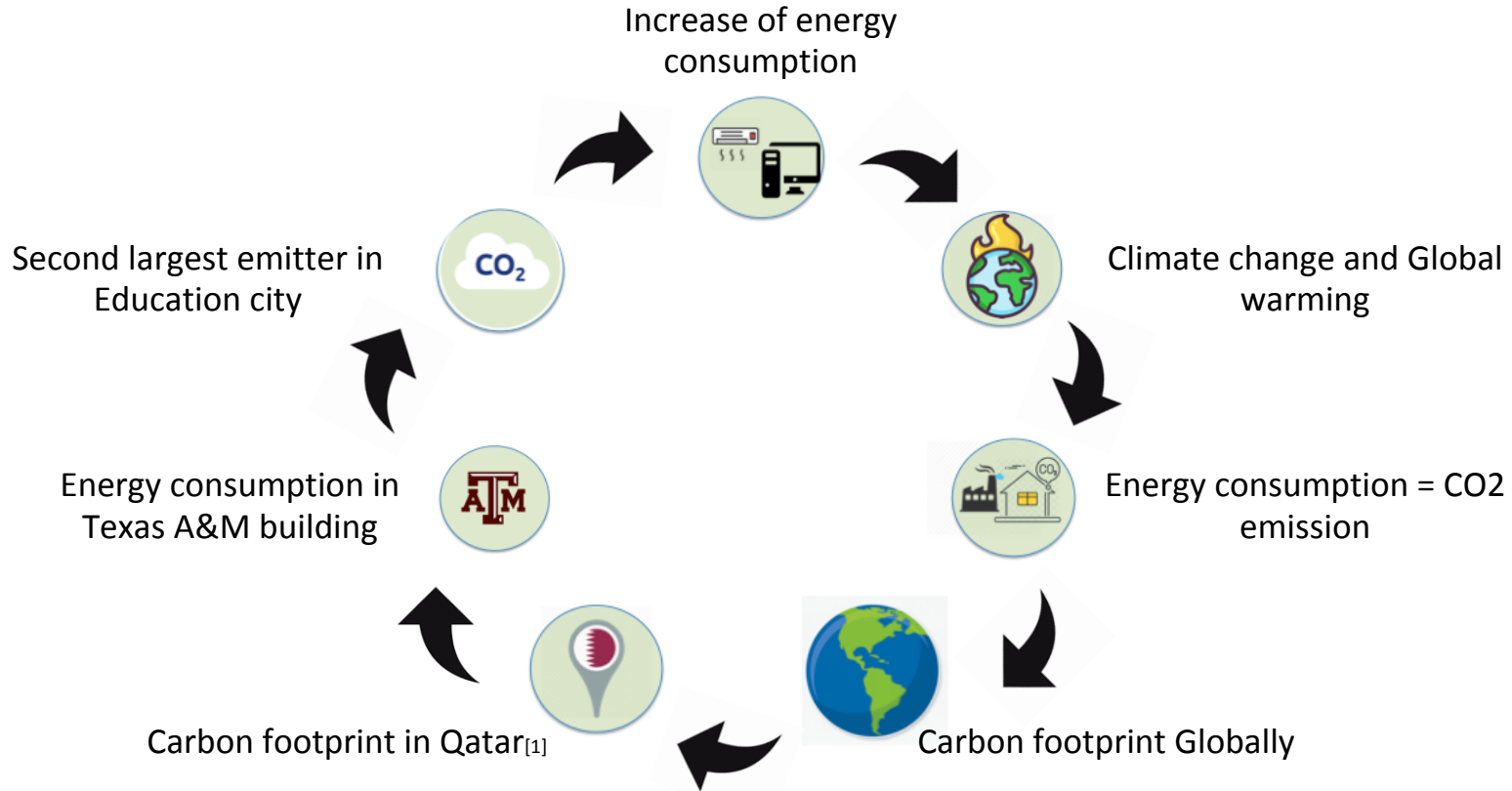
Course Instructor:

Dr. Ali Ghrayeb

Presentation Outline



Background and Problem statement



Aim of the project



Monitoring system for carbon footprint

Proposed solutions to reduce carbon footprint

QEERI

Qatar Environment and Energy Research Institute



OBO

The Office of Building Operations in Texas A&M
Qatar



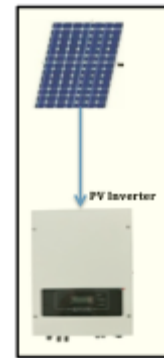
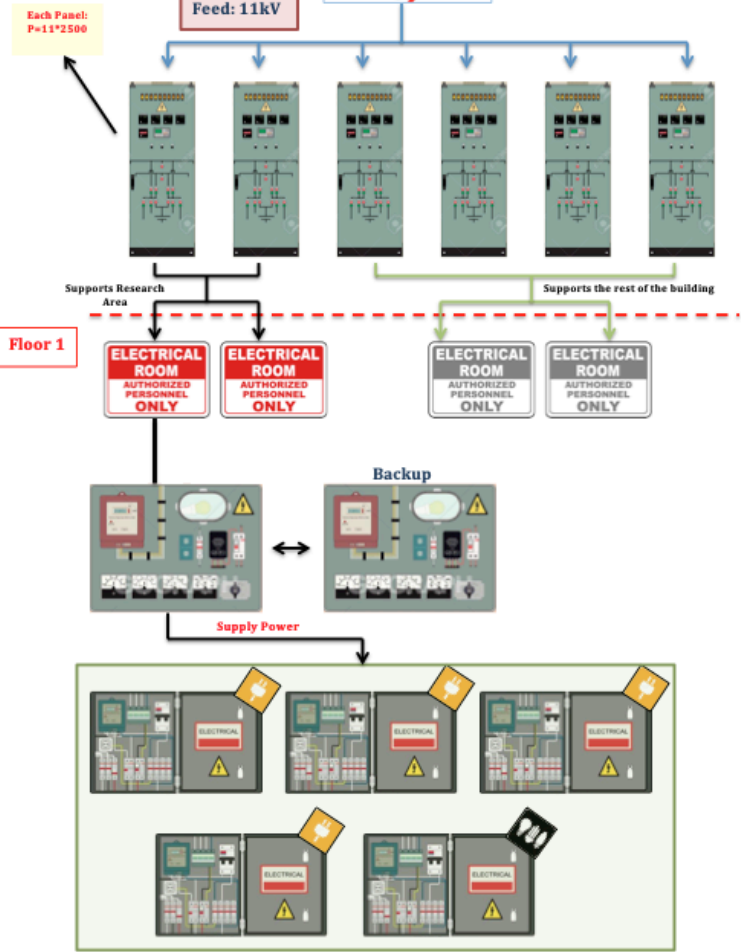
Siemens

In progress



The image features a background of a complex network diagram. It consists of numerous nodes, represented by small dark dots, interconnected by a dense web of thin, light-colored lines. The nodes are arranged in a somewhat circular pattern, with a higher density of connections in the center. The overall appearance is that of a large-scale network or data structure. In the center of the image, there is a dark green rectangular box with a slight gradient. Inside this box, the text "Proposed Design" is written in a clean, white, sans-serif font. The text is centered both horizontally and vertically within the box.

Proposed Design



Plug Load

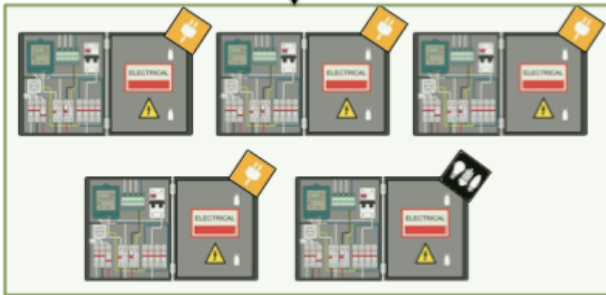
Lighting Load

Monitoring System

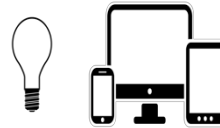
Energy consumption

Carbon footprint calculator

Monitoring system



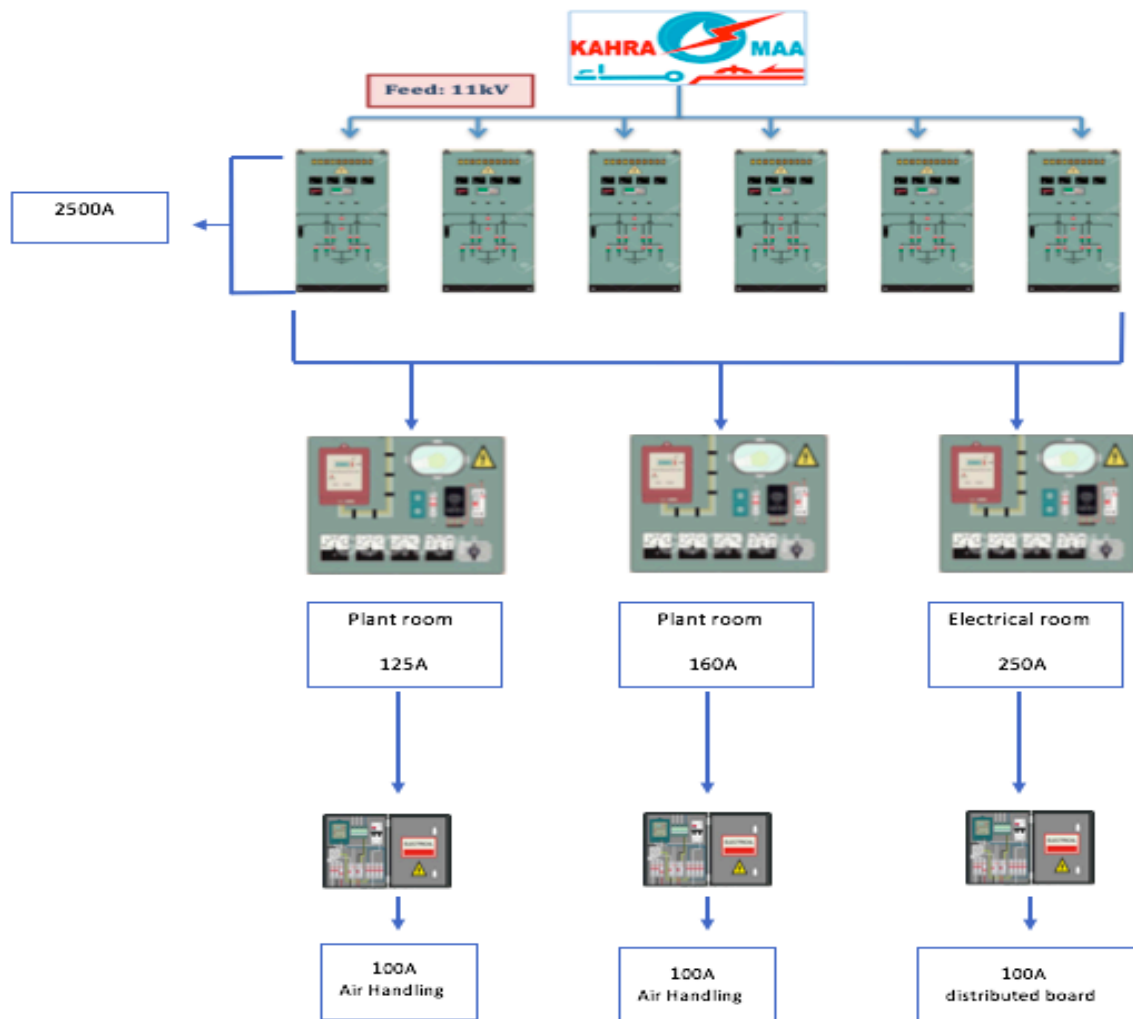
- Lighting
- Plug loads



- Energy conversion
- Carbon footprint for TAMUQ building



- Real time monitoring system
- Highest energy consumption component
- Propose solutions to reduce carbon footprint



Reduce carbon footprint in TAMUQ

Lighting

Solar Bulb lights
LEDs lights



HVAC Control

Increase temperature
Pump & blower speed
Air handling unit



Minimize Plug Load

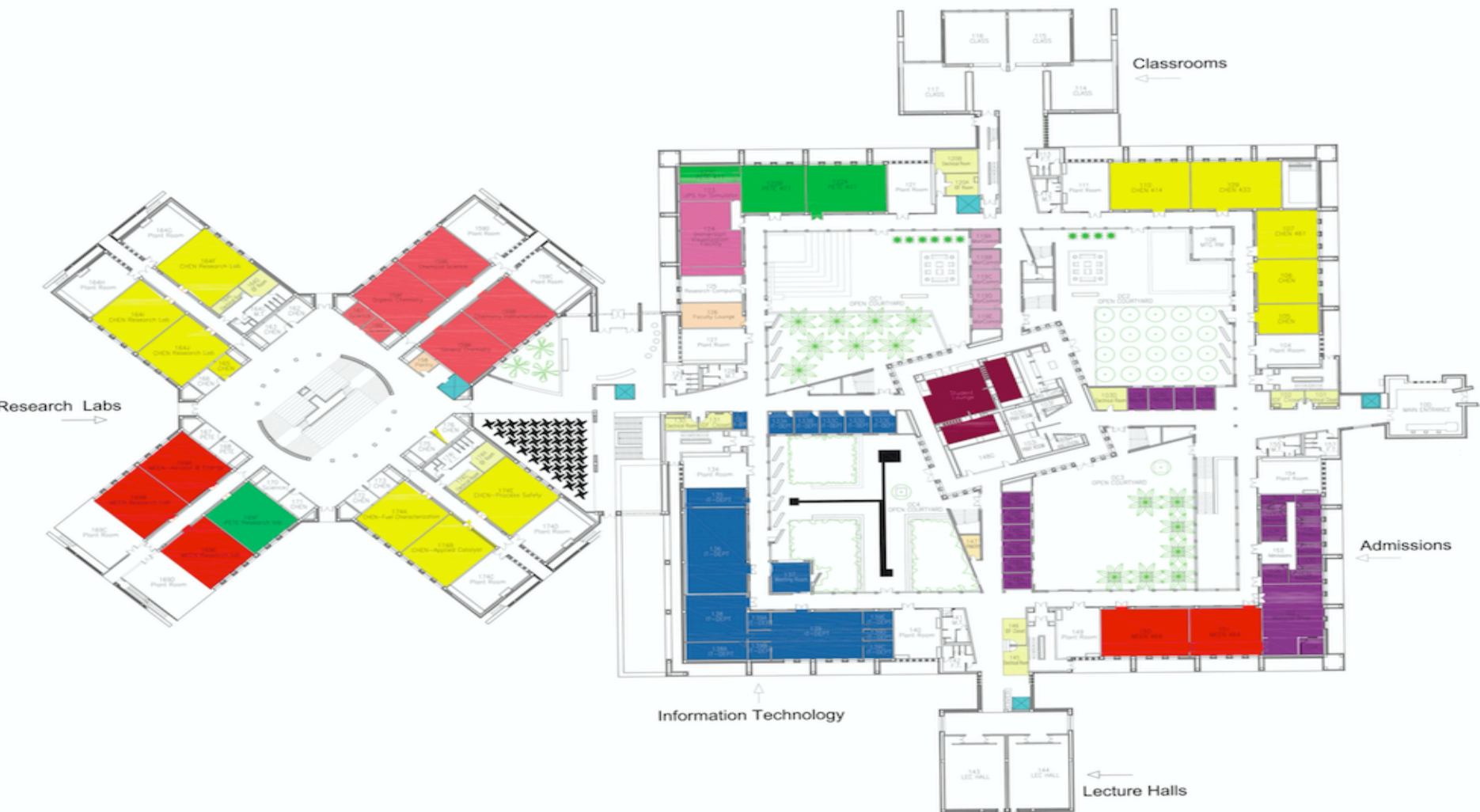
Turning off devices when **not** used
Use low-power mode
Avoid using screen savers

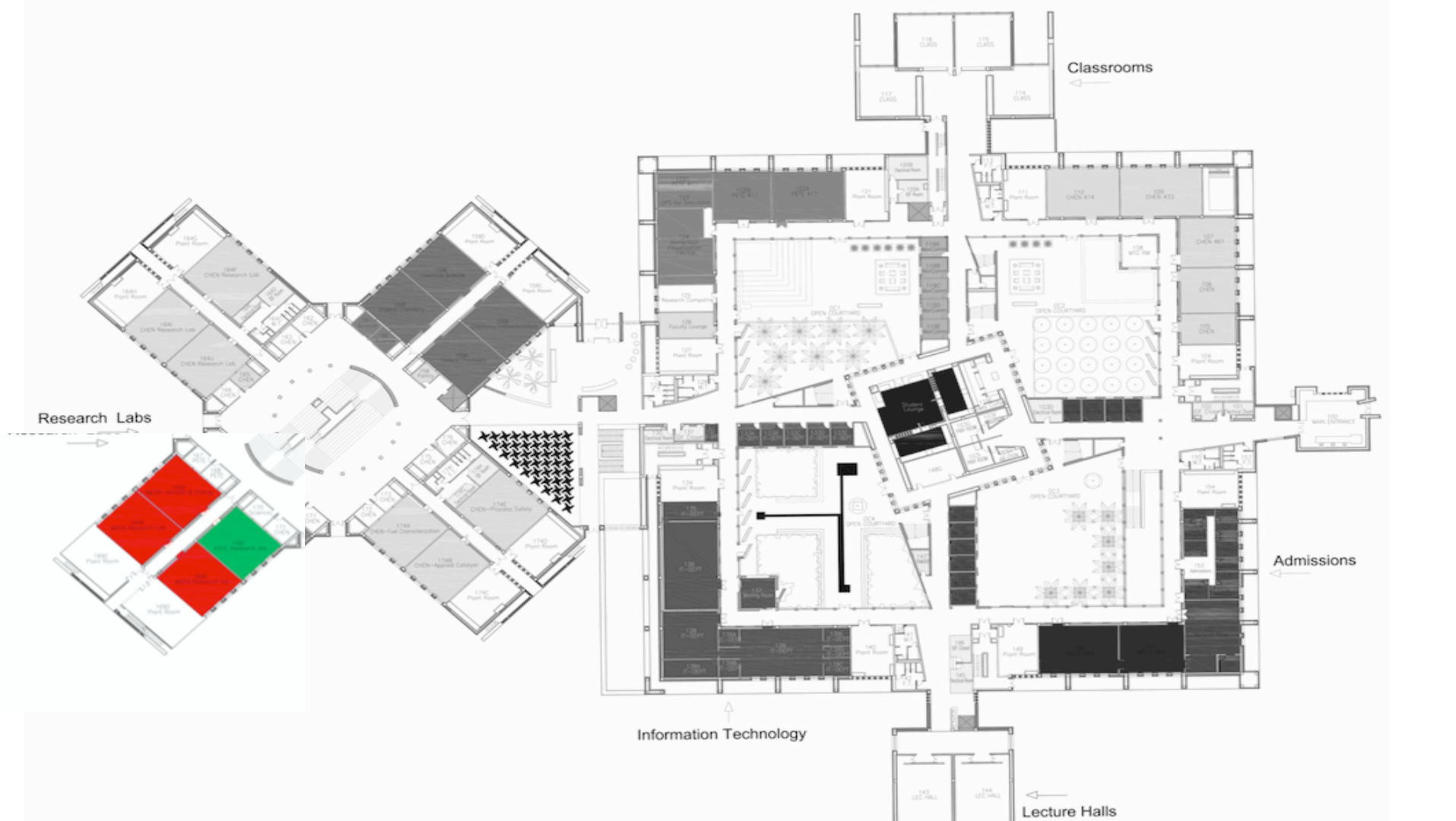


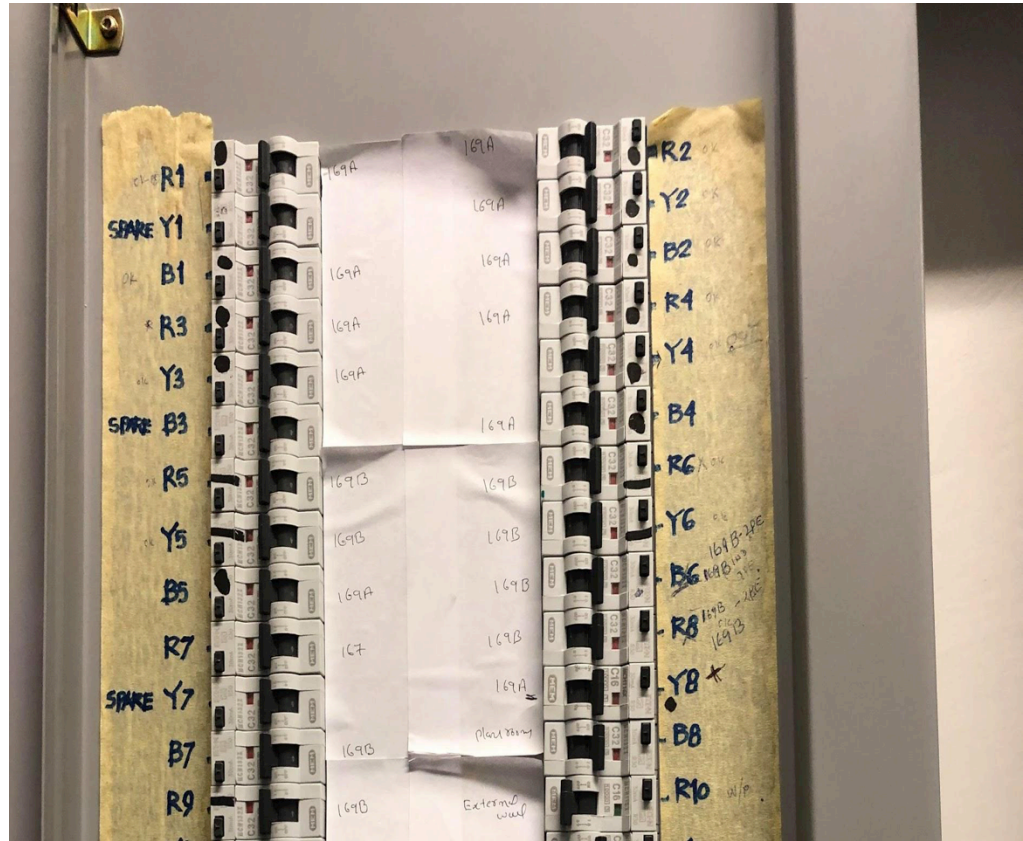
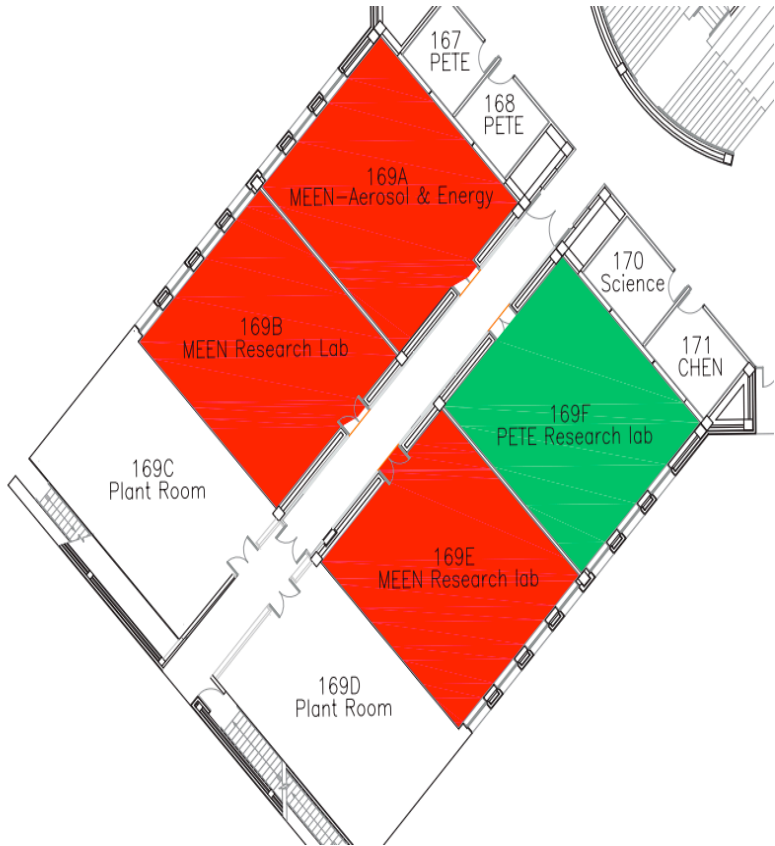
Raise Awareness

Involving TAMUQ community
help reduce carbon footprint











Design Constraints

- Data Collection
 - Previous Data collected
- Monthly
- Authorization



Design Risks

- Accuracy
-
- Affect the main line

Technical Standards

GHG Protocol

Identify



Data Collection



Calculate



Energy efficiency measures



Visualize



GREENHOUSE
GAS PROTOCOL

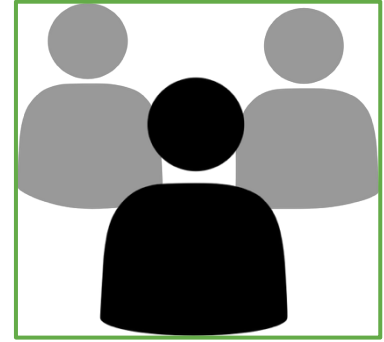
Performance Criteria



Environmental



Safety



Cultural & Social



Global



Public Health



Economical

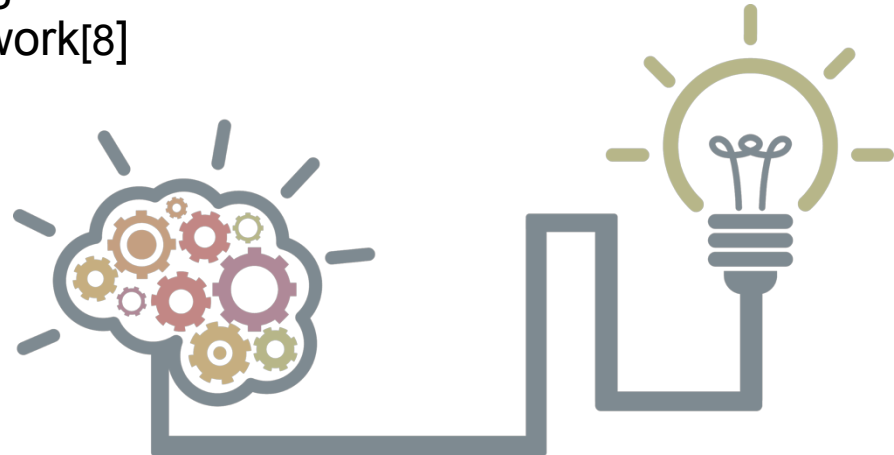
Existing solutions vs our proposed design

D1: AirVantage carbon Footprint Monitoring system[6]

D2: QU carbon calculator[7]

D3: Real-Time Carbon Emissions Monitoring Tool for Prefabricated Construction: An IoT-Based System Framework[8]

D4: TAMUQ carbon calculator[9]





D1: Real-Time

D2: Not real-Time

D3: Real-Time

D4: Real-Time



D1: A car & house

D2: University Building

D3: Production line

D4: University Building



D1: Accurate

D2: Not accurate (data missing)

D3: Not accurate (data missing)

D4: depending on Data



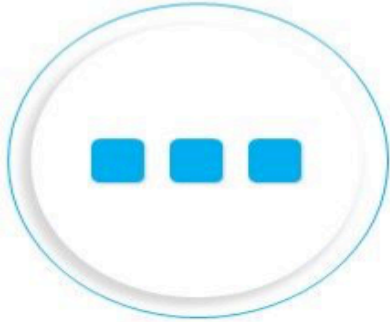
D1: GHG protocol

D2: GHG protocol

D3: Product Life-Cycle standards

D4: GHG protocol

EXISTING Solutions Vs. Our Solution



Pending

Smart meters

Coding & implementation of the project

Applying real-time monitoring system

Analyse and propose solutions



In Progress

Data collection

Siemens collaboration

Framework for the project



Complete

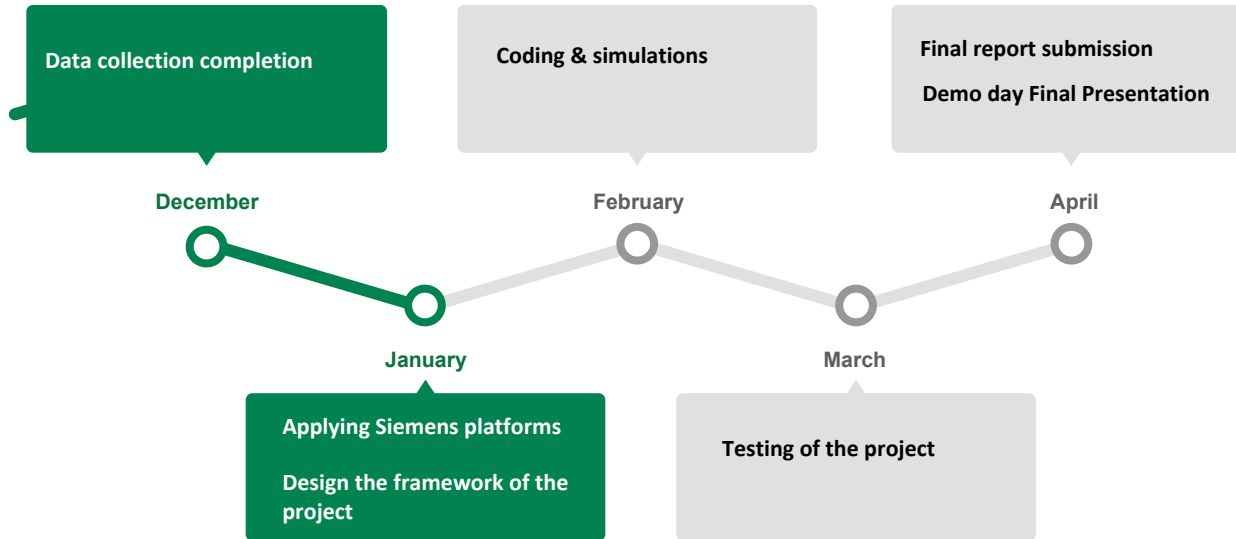
Building electricity distribution network

Public & experts feedback

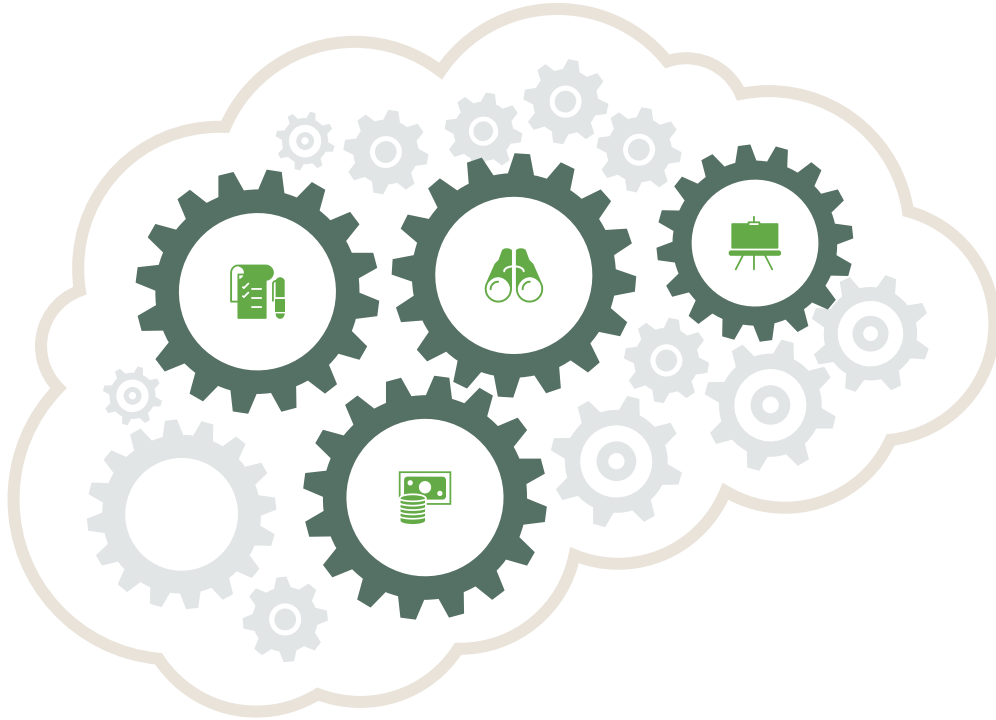
Air handling units in the building



Project Timeline



Conclusion



Global warming & climate change
Qatar carbon footprint rate



Carbon footprint monitoring system
Proposed solutions



Performance criteria
Constraints
standards

References

- [1] Al-Asmakh, M., & Al-Awainati, N. (2018, March 12). Counting the Carbon: Assessing Qatar's Carbon Dioxide Emissions. Retrieved from https://www.qscience.com/content/papers/10.5339/qfarc.2018.EEPD592#abstract_content
- [2] Qatar Environment and Energy Research Institute. (n.d.). Retrieved from <https://www.qf.org.qa/research/qatar-environment-and-energy-research-institute>
- [3] Carbon Footprinting Guide: Resources & Guides: Carbon Trust. (n.d.). Retrieved from <https://www.carbontrust.com/resources/guides/carbon-footprinting-and-reporting/carbon-footprinting/>
- [4] AL-ASMAKH, M. AND AL-AWAINATI, N. Counting the Carbon: Assessing Qatar's Carbon Dioxide Emissions <https://davidsuzuki.org/what-you-can-do/greenhouse-gases/>
- [5] October 1, 2014 by L. W. L. E. P. S. H. A. R. E. S. F. T. W. (2014, October 8). Qatar holds world's second largest ecological footprint per person. Retrieved from <https://dohanews.co/global-report-warns-qatars-consumption-resources-unsustainable/>
- [6] Results of Campus Carbon Footprint 2013-2015 revealed. (n.d.). Retrieved from <http://www.qu.edu.qa/ar/newsroom/esc/Results-of-Campus-Carbon-Calculator-2013-2015-revealed>
- [7] Sierrawireless.com. (2019). *IoT Design Challenge Winner: A Carbon Footprint Monitoring System*. <https://www.sierrawireless.com/iot-blog/developer/2015/04/iot-design-challenge-winner-a-carbon-footprint-monitoring-system/> [Accessed 10 Nov. 2019].
- [8] C. Mao, X. Tao, H. Yang, R. Chen, and G. Liu, "Real-Time Carbon Emissions Monitoring Tool for Prefabricated Construction: An IoT-Based System Framework," *Iccrem 2018*, Aug. 2018.

The background features a complex network diagram with numerous nodes and connecting lines. A prominent horizontal green band is centered across the image, containing the text 'THANK YOU'. There are also two dark grey rectangular shapes, one at the top center and one at the bottom center, partially overlapping the network lines.

THANK YOU