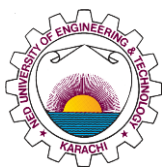
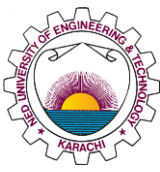


**Final Year Project Showcase Batch 2020
Year 2024**

Department: Civil Engineering Programme: <u>Civil Engineering</u>	
1	Project Title Energy Efficient Design of Housing Community using City Information Modeling
2	Project Idea Energy consumption has emerged as one of the biggest challenges faced by housing communities today. To address this issue, Energy-efficient technologies and sustainable practices are vital to ensure the long-term well-being of modern housing communities. City Information Modeling (CIM), derived from Building Information Modeling (BIM), can be used as a tool for the energy efficiency assessment of a housing society. The purpose of this project was to create a CIM of a housing community and use that model as a tool to conduct an energy efficiency assessment of the selected area.
3	Process The first stage of the project was to perform a literature review. The next stage was data collection in which necessary data was gathered with the help of industrial partner for the design community, including drawings, material specifications and geographical coordinates etc. Two building cluster surveys of selected benchmark communities were conducted. In the next stage, the CIM model was developed. The next phase was energy efficiency analysis. This phase included the use of CIM and previously collected data to evaluate wind path, thermal performance, and sun path analysis. The next stage was to propose energy efficient design modifications for the design community, for this stage a lane wise energy analysis was conducted using energy simulation engine (Insight 360). Thereafter, all modifications based on available options in Insight 360 engine were compiled in a spreadsheet. Logically design interventions, having maximum applicability were shortlisted.
4	Outcome Design modifications and guidelines proposed for energy efficient housing society.
5	Evidence (Theoretical Basis) To address this issue, Energy-efficient technologies and sustainable practices are vital to ensure the long-term well-being of modern housing communities. City Information Modeling (CIM), derived from Building Information Modeling (BIM), can be used as a tool for the energy efficiency assessment of a housing society. The purpose of this project was to create a CIM of a housing community and use that model as a tool to conduct an energy efficiency assessment of the selected area. The first stage of the project was to perform a literature review. The next stage was data collection in which necessary data was gathered with the help of industrial partner for the design community, including drawings, material specifications and geographical coordinates etc. Two building cluster surveys of selected benchmark communities were conducted to serve as a benchmark for the design



	<p>community. The first stage of the project was to perform a literature review. The next stage was data collection in which necessary data was gathered with the help of industrial partner for the design community, including drawings, material specifications and geographical coordinates etc. Two building cluster surveys of selected benchmark communities were conducted. In the next stage, the CIM model was developed. The next phase was energy efficiency analysis. This phase included the use of CIM and previously collected data to evaluate wind path, thermal performance, and sun path analysis. The next stage was to propose energy efficient design modifications for the design community, for this stage a lane wise energy analysis was conducted using energy simulation engine (Insight 360). Thereafter, all modifications based on available options in Insight 360 engine were compiled in a spreadsheet. Logically design interventions, having maximum applicability were shortlisted. Therefore, all possible Energy-efficient modifications decreased the base EUI value by 16.41%. Further, incorporation of renewable energy solutions decreased it to 34.62%.</p>
6	<p>Impact on Sustainability of Urban Regions or SDG-11 “Sustainable Cities and Communities”</p> <p>The project was aligned with the Sustainable Development Goal (SDG) 11, for “Sustainable Cities and Communities”. It focused on inclusive, safe, resilient, and sustainable human settlements as cities represent the future of global living. It intends to renew and design cities and other settlements in a way that provides opportunities for everyone, including access to basic services, energy, housing, and green public spaces. Additionally, the project aimed to reduce environmental impact to promote sustainability in the housing society and reduce energy consumption through the introduction of design modifications. It strategically fosters a community that meets present needs while also ensuring a resilient, eco-friendly urban environment for the future.</p>
7	<p>Competitive Advantage or Unique Selling Proposition</p> <p>Energy costs in Pakistan are on the rise hence the energy efficient design of buildings has become crucial. While there are many studies that cover energy efficiency in buildings, there are very few that cover energy efficiency on a larger scale such as on a city or community scale. This study is intended to help set a basis for the energy efficient design of communities and cities. This study is the first of its kind in Pakistan and sets a benchmark for energy efficient community design in the Pakistani market which is dire need for energy reforms.</p>
a	<p>Attainment of any SDG (e.g. How it is achieved and why it is necessary for the region)</p> <p>By implementing thoughtful and strategic design interventions, the project aimed to set a benchmark for environmentally conscious urban development, aligning with global commitments to creating sustainable and livable cities i.e. SDG-11.</p>
b	<p>Environmental Aspect (e.g. carbon reduction, energy-efficient, etc.)</p> <p>This study has explored various dimensions and provides various methods by which energy efficiency can be achieved in community design.</p>
c	<p>Cost Reduction of Existing Product</p> <p>By developing energy efficient communities there will be no immediate cost reduction but definitely it will lead to long term energy savings which will be translated into cost savings after payback period.</p>



d	<p>Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process (e.g. What is the issue in current process and what improvement you suggest)</p> <p>This study proposes guidelines for energy efficient design of communities, therefore, the communities designed following the provided guidelines will be more energy efficient as compared to the existing communities. It also sets a benchmark for energy efficient community design in the Pakistani market which is dire need for energy reforms.</p>
f	<p>Capture New Market (e.g. Niche market or unaddressed segment)</p> <p>There are few energy efficient buildings in Pakistan but energy efficient communities are not developed in Pakistan yet and it's an untapped area. This study provides detailed guidelines to develop an energy efficient community specifically in sukkur and generally anywhere in similar climate. Hence, it is creating a conducive environment for designing energy efficient communities.</p>
8	<p>Target Market (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service</p> <p>The targeted end users are builders, developers, designers and consultants, and construction industry.</p>
9	<p>Team Members (Names along with email address)</p> <ol style="list-style-type: none"> 1- Areej Asif asif4300505@cloud.neduet.edu.pk 2- Saim Khan Khan4300350@cloud.neduet.edu.pk 3- Sardar M. Hassaan Tariq tariq4306130@cloud.neduet.edu.pk 4- Muhammad Hamdan Latif latif4301573@cloud.neduet.edu.pk
10	<p>Supervisor Name (along with email address)</p> <p>Supervisor: Dr. Farrukh Arif Email: farrukh@cloud.neduet.edu.pk Co-supervisor: Engr. Faiza Saeed Email: faizasaeed@cloud.neduet.edu.pk</p>

