

## Criterion A: Inquiring and Analysing

Imagine that you are an Architectural engineer. You have been approached by a client regarding a building project.

### Task 1: Explain and justify the need for a solution to a problem. (Write a paragraph of 3-6 lines)

Identify the problem that you can solve using an architectural design. In your explanation make sure to answer the following questions.

What problem will your architectural design solve?

Where is the problem happening?

Who is your target audience and why?

What will you design and make to solve the problem?

The problem I am going to solve is electricity efficiency in houses, many people with larger families have to pay a huge electricity bill at the end of the month and many people complain that the average house isn't sustainable enough.

There is no specific target audience as it could be any house owner, it's more of a target place. This problem is happening in Dubai, United Arab Emirates, and is recognized as one of the fastest growing cities in the world. This rapid urbanization has led to many environmental issues because of the harsh environment, paucity of local resources such as building materials, and the unplanned manner of expansion. Which means that the majority of housing in the UAE is unsustainable as the main goal was to build the housing as quick as possible to support the large amount of people immigrating to the UAE.

Sustainable houses are cheaper in the long run because they are much more energy efficient, a sustainable house will have fewer and lower utility bills. Sustainable houses are easier to maintain. It has been proven that sustainable houses are cheaper to maintain than non- sustainable homes.

The building practices minimize waste and recycle materials, which helps achieve efficient use. Best of all, as they're built with the intention of reducing energy consumption, sustainable homes reduce emissions that impact climate change.

### Task 2: State and prioritize the main points of research needed to develop a solution to the problem.

Complete the table below.

What information or resources do you need to know to design your product. Think of all the ideas and designs you will need to build a house/city.

<p>What did I research for?</p>	<p>I have researched characteristics of sustainable housing.</p>
<p>Explain your findings. (Write 3-5 lines. Add images if possible).</p>	<p><b>Solar panels</b> Solar panels are a key characteristic of sustainable housing. Further reduce your energy bills by generating electricity from the sun through the use of solar panels. If you happen to generate more energy that you can consume, you can even sell that excess back to the main grid.</p> <p><b>Sustainably Sourced Furniture</b> Sustainable furniture is made from materials that have certain characteristics. These materials may be recycled or re-purposed. Anything that is made from materials that had previously been used for something else and are then reused in the making of new furniture.</p> <p><b>Organic Garden</b> Planting a selection of native plants can improve the aesthetic qualities of your home and supply you with supplementary organic goods. You can even cultivate spider plants if you're located near the highway to neutralize the pollution coming from the passing automobiles.</p> <p><b>LED bulbs</b> The benefits are many and include increased energy efficiency, lower electric bills, a longer bulb life, and a better and safer light source overall. LED bulbs were designed as a more energy-efficient light source, using a semiconductor to convert electricity into light.</p>
<p>Link/reference</p>	<p><a href="http://www.gf.uns.ac.rs/~wus/wus09/Sustainable%20House%20web%20page.doc%202.htm">http://www.gf.uns.ac.rs/~wus/wus09/Sustainable%20House%20web%20page.doc%202.htm</a></p>
<p>What did I research for?</p>	<p>I have done Secondary research on different house designs.</p>
<p>Explain your findings. (Write 3-5 lines. Add images if possible).</p>	<p><b>Modern Home Design</b> They designed homes that featured a strong horizontal composition with large open floor plans, intentional asymmetry, and large expanses of glass windows or glass walls. Modern home designs are the most popular right now.</p>



### Cape Cod Homes

With roots dating back to 1675, Cape Cod was a popular style for homes built in the 1930s. Typically one story (sometimes 1-1/2 stories) the Cape Cod-style features a steep roofline, wood siding, multi-pane windows, and hardwood floors.



### Mediterranean homes

The exterior of Mediterranean homes typically feature a red-tiled roof (usually terra cotta), as well as brick or stucco that's often painted white. Stone details, carved doors, and raw iron and metalwork on windows, over balconies, and front doors are other common features.



Link/reference

<https://www.bhg.com/home-improvement/exterior/curb-appeal/house-styles/>

What did I research for?

Secondary Research on suitable house size for average family in UAE.

Explain your findings

In Dubai, the average household size is 4.2 members. Determining size and number of rooms and bathrooms to include in your house highly depends on the size of your family. Your house size should fit in your budget and meet your space needs. Well you can

(Write 3-5 lines. Add images if possible).	Imagine the average home size for a family is roughly between 1500 and 1700 square feet. I believe the ideal square feet per person is about 600 – 700. For a family of four, the ideal house size is between 2,400 – 2,800 square feet.
Link/reference	<a href="https://www.financialsamurai.com/the-ideal-house-size-and-layout-to-raise-a-family/">https://www.financialsamurai.com/the-ideal-house-size-and-layout-to-raise-a-family/</a>

Conduct an interview with the target audience or client and Include your findings (Interview and surveys). Ask questions that will help you create the product.

### Primary Research- Interview

Me: Hello, I will be designing your house for you, I understand that you have had some issues with electricity bills. Therefore, I will ask you a few questions in order to create the perfect sustainable house for you.

Client: Hi, yes, I have faced many issues with this which is why I chose to have a sustainable house.

Me: Since you are a parent of 4, how much do you think is the ideal size for your villa?

Client: I believe 3000 square feet is a minimum requirement to raise children in.

Me: Agreed, how many floors and how many rooms would you and your family need?

Client: We will need 2 floors and 4 bedrooms as I have 2 kids and each of them will have their own bedroom and bathrooms. Me and my wife will need a master bedroom with a bathroom. We will need an extra guest room as well which makes it 4 bedrooms.

Me: Alright. What house design would you like and what characteristics of sustainable housing would you like?

Client: I would like a modern house style as this is very suitable for my family. For sustainable characteristics I would like Solar panels, an Organic Garden, LED bulbs in every room, as well as Sustainably sourced furniture.

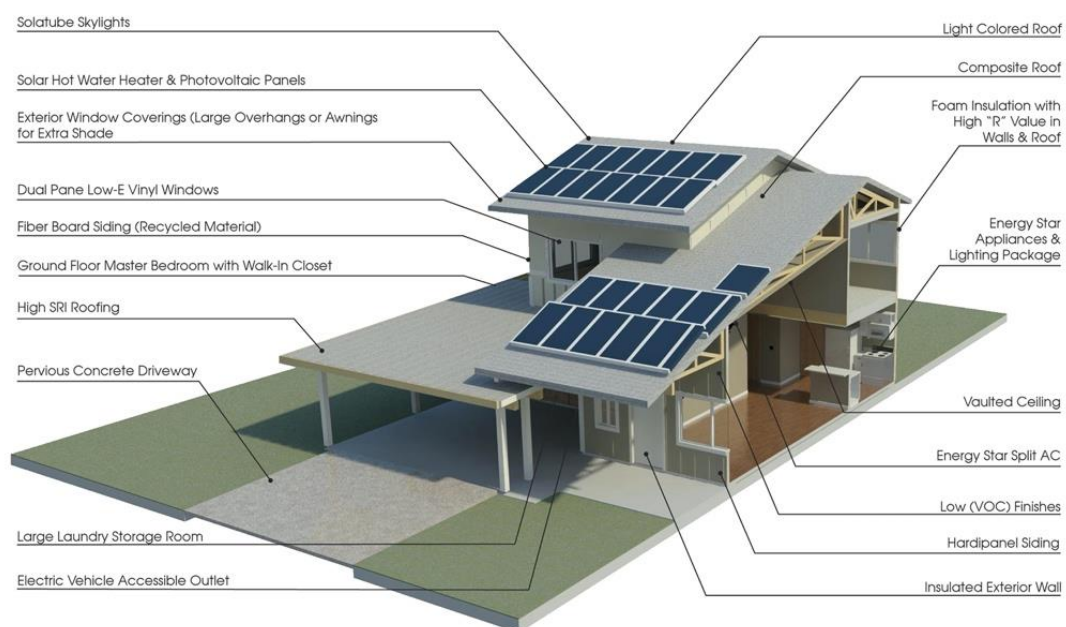
Me: Thank you for your advice, this is very helpful and will make the designing process a lot easier for me, is there any other notes you would like to give me before I begin?

Client: I would like our house to be facing the lake to have the main view of it.

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**Task 3: Describe the main features of an existing product that inspires a solution to the problem.**

Take a Snip or screenshot of the product on the internet that is related to your ideas of solving a problem and analyze its features, strength, weakness, opportunity, and threat (SWOT)



What is the architectural design?

This sustainable home design is designed to be highly environmentally friendly and consists of a lot of useful/ sustainable features, such as Solatube skylights, solar hot water and photovoltaic panels, electric vehicle accessible outlet, composite roof, Energy star split AC and more.

What is the purpose or function?

This sustainable house is well-considered in terms of sustainability, and it has several useful features that can be used to reduce household energy bills while still avoiding environmental damage. The main objectives of sustainable design are to reduce, or completely avoid, depletion of critical resources like energy, water, land, and raw materials; prevent environmental degradation.

Who is the targeted audience or client?

There is no specific target audience as it could be any house owner, it's more of a target place. The problem of electricity efficiency in houses, is happening in Dubai, United Arab Emirates. This rapid urbanization has led to many environmental issues because of the harsh environment.

Link: <https://jhmrad.com/take-a-tour-of-the-22-sustainable-house-design-plans-inspiration/>

## SWOT Analysis

### Strengths:

The house is designed to be highly environmentally friendly and includes features such as Solatube skylights, solar hot water and photovoltaic panels, an electric vehicle accessible outlet, a composite roof, Energy Star split AC, and more. This house design was well-considered in terms of sustainability, and it has a number of useful features that can be used to reduce household energy bills while still avoiding environmental damage. Homeowners who build photovoltaic power systems reap a slew of advantages, including lower energy bills, reduced carbon emissions, and possibly higher home prices. Sustainable homes are built in a way that is meant to improve their insulation, helping them to maintain a stable temperature inside even during the most extreme temperature variations. High-quality windows, doors, insulation, and building materials mean that you will not be subjected to pesky drafts and temperature fluctuations throughout the day.

### Opportunities:

This sustainable house design offers many opportunities such as the environment's health and biocapacity are maintained by sustainability. As well as people and community well-being are aided by sustainability. Sustainability encourages a more sustainable economy with less waste and pollution, less emissions, more employment, and a more equitable distribution of income. One of the primary benefits homeowners receive when they purchase a sustainable home is improved year-round comfort. This also has the added benefit of reducing your energy bills, as your HVAC system will not have to run as frequently to keep your home comfortable. Superior insulation means that your home will be able to maintain a stable temperature longer, extending the intervals where your heater or air conditioner is not running.

### Weaknesses:

The house design is really sustainable although the design itself isn't perfect for living as it has a low roof meaning very little open space, the house only has two bedrooms and doesn't have an upper level meaning very little space. The house Design isn't the most appealing from the outside, it is very basic and is very common. That is what I want to change in my design. Some other weaknesses of sustainability include: Location, availability, no air cooling features, and a long time to construct.

### Threats:

The threats of this are that if they went through with the design and made the house then larger families wouldn't look at the design because of the lack of space meaning low occupancy and no profit made from the construction of the house. The consequence of this product is that no one will buy it and it won't have a high market value if someone does buy it.

## Task 4: Present the main findings of relevant research.

What will you design and make?

The problem I am going to solve is electricity efficiency in houses, Many people with larger families have to pay a huge electricity bill at the end of the month and many people complain that the average house isn't sustainable. Therefore, I am going to design a sustainable house for a client which includes many features.

Explain the main features you will include in your design?

The main features I will add are the following:

### Solar panels

Solar panels are a key characteristic of sustainable housing.

Further reduce your energy bills by generating electricity from the sun through the use of solar panels. If you happen to generate more energy that you can consume, you can even sell that excess back to the main grid.

### Sustainably Sourced Furniture

Sustainable furniture is made from materials that have certain characteristics. These materials may be recycled or re-purposed. Anything that is made from materials that had previously been used for something else and are then reused in the making of new furniture.



## Organic Garden

Planting a selection of native plants can improve the aesthetic qualities of your home and supply you with supplementary organic goods. You can even cultivate spider plants if you're located near the highway to neutralize the pollution coming from the passing automobiles.

## LED bulbs

The benefits are many and include increased energy efficiency, lower electric bills, a longer bulb life, and a better and safer light source overall. LED bulbs were designed as a more energy-efficient light source, using a semiconductor to convert electricity into light.

According to the SWOT Analysis, What are the strengths and weaknesses that you will put into consideration when designing your product?

I learnt many things about sustainable houses from the SWOT analysis. The strengths I will take into consideration are the features that the house had to reduce greenhouse gas emissions, save water and energy as well as reduce waste during construction. I will also take the placement and structure of the house, and the safety features that they included into consideration as well. The weaknesses that I will make sure I do not include is lack of design in the house and using the wrong sizes for families as I would like to offer this solution to large families and small families. The existing products are cramped as well as they have an unoriginal design which you can see everywhere.

## Sources that I have used (Harvard referncing):

1. *Take A Tour Of The 22 Sustainable House Design Plans Inspiration - House Plans* (2019). Available at: <https://jhmrad.com/take-a-tour-of-the-22-sustainable-house-design-plans-inspiration/> (Accessed: 23 April 2021).
2. *7 Features of a Sustainable Eco House - Infinity Energy Organisation* (2021). Available at: <https://infinityenergyorganisation.co.uk/life-style/7-features-of-a-sustainable-eco-house/> (Accessed: 23 April 2021).
3. *Sustainable house* (2021). Available at: <http://www.gf.uns.ac.rs/~wus/wus09/Sustainable%20House%20web%20page.doc%20202.htm> (Accessed: 23 April 2021).
4. Calautit, J. and Hughes, B. (2016) "Sustainable Buildings: opportunities, challenges, aims and vision", *Sustainable Buildings*, 1, p. E1. doi: 10.1051/sbuild/2016001.
5. Zastrow, P. (2021) *7 Benefits of Purchasing Sustainable Housing*, *Golendsmart.com*. Available at: <https://www.golendsmart.com/blog/7-benefits-of-purchasing-sustainable-housing> (Accessed: 23 April 2021).