



# DM2120: Project Research Case Study

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How does Dubai plan on becoming one of the most sustainable and thriving cities in the world by 2050? Can other cities follow their example?

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# Introduction

Dubai is a city in the United Arab Emirates, but more famously known as the urban megacity of the modern world. A city that seemingly rose from the desert overnight, as in only 50 years it has achieved the unimaginable. Dubai is proof that with power, money and an unstoppable workforce, anything is possible. However, one question remains: at what cost? What did it cost the environment to have such a megalopolis emerge from the desert in such a short period of time? It turns out it makes it the most polluted city in the middle eastern region. So how does a city with 218,788,684 tons of CO<sub>2</sub> emissions plan on becoming the city with the smallest carbon footprint by 2050?

This case study aims to explore Dubai's 'Clean Energy Strategy 2050, and analysis whether or not Dubai is capable of solving its pollution problem within the next 28 years and if not, what factors will pose as barriers for them to achieve this ambitious goal. It will be looking in detail into the sustainability Strategy and analysing whether their goals are realistic in relation to what they achieved so far.

The second aim of this cases study is to explore whether other cities can implement and adapt Dubai's sustainability goal to fit their needs. It is important that what Dubai is doing can also be followed by other cities around the world. There is no solution to global warming if only a handful of cities around the world can act sustainably. Change needs to happen globally to see the results of our environment healing.

Global warming is not something we can ignore anymore, and hope for the next generation to fix it. We are the generation that needs to fix it or there might not be a next one. Therefore, we each individually need to assess our way of living, while also assessing the sustainability of the city that we live in and if we do not like what we are seeing, we need to act on it, before it is too

late. That is why living sustainability is the solution to this worldwide problem. we simply cannot keep living the way we are.

The first step to achieving change and living sustainably is by looking at our cities. What is their carbon footprint? What is their plan for sustainability? How do they plan to change to ensure a better and safer future for the generations to come?

## Aims and Objectives

**Aim 1:** Explore Dubai's Clean Energy Strategy 2050, and analysis how they plan to achieve their goal.

**Objective 1:** Research the history of Dubai and what allowed them to become such a thriving city in such a short period and if that will help them in becoming sustainable.

**Objective 2:** Discover if Dubai's sustainability plan matches with the United Nation's Sustainability Development Goals.

**Objective 3:** Analyse factors that can pose as barriers to Dubai achieving its sustainability goal.

**Aim 2:** Explore how other cities can adapt and implement Dubai's sustainable plan.

**Objective 1:** Analyse if other cities around the world can implement Dubai's ways of sustainability by looking at the factors that will allow Dubai to reach its goal and if those factors are realistic enough for other cities around the world as well.

# Methodology

To collect evidence for this case study, plans were made to use both primary and secondary research, where both qualitative and quantitative data would be collected. Qualitative data in the form of an interview and quantitative data in the form of statistics. This case study needed more than the primary and secondary research to back up the argument but also the quantitative data that proved if Dubai's plans were achievable or not. This would be relevant to the case study as it would provide further evidence, making the research more viable and reliable.

For the primary research, an email was sent to a professional in the field, living in Dubai, as this would give a good insight into Dubai's plans to become sustainable. The plan was to conduct an interview using a questionnaire that would be sent to them, where the professional could answer the questions by filling out a google form. The reason why an interview was chosen as the form of the primary research was to allow the interviewee to have time to think about the question to create a more coherent and thought-out response.

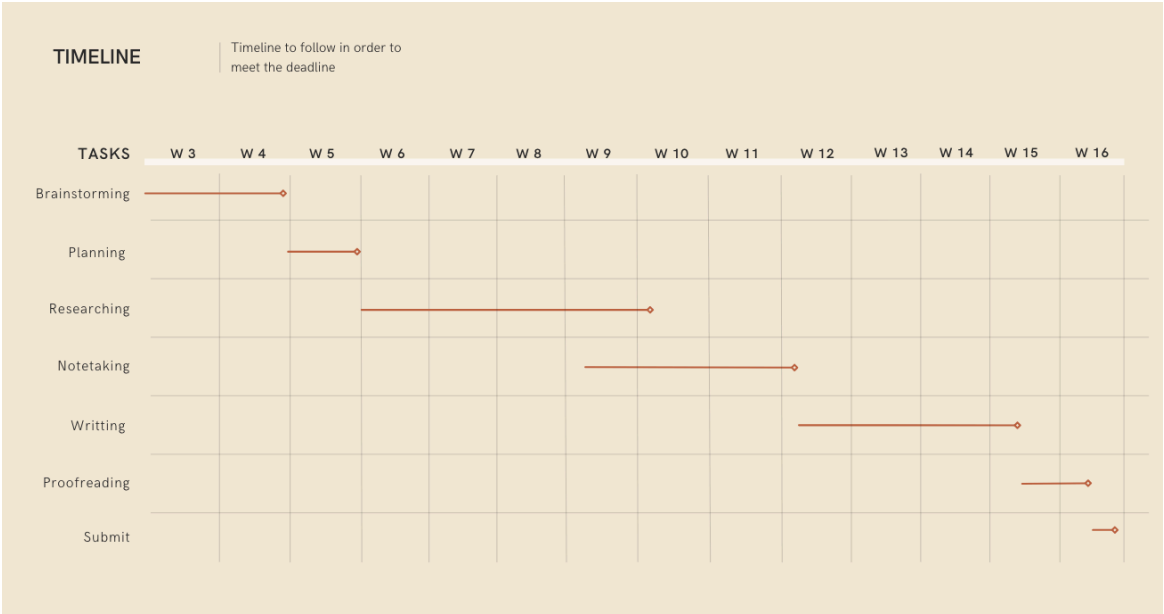
Some questions would be asked would be about Dubai's history and whether it showed signs that it can indeed become the city with the smallest carbon footprint by 2050. There were also questions about Dubai's Clean Energy Strategy 2050, and how realistic they believed it was. There were questions on the capabilities of the solar park as well as a question about potential barriers that could stop Dubai from reaching its goal.

Unfortunately, a response to the email was never received. The email sent can be found in appendix A, and the google form for the interview can be found in appendix B.

Secondary research would be a very important part of this case study as it would provide most of the information, facts and statistics needed to

create a well-balanced argument. Even though secondary data is seen as less reliable due to it being research conducted by someone else, for this case study, it would simply be too difficult and time-consuming to collect the type of data needed through primary research.

The forms of secondary research used is a mixture of academic articles found using one search, government articles found on their official website, and other case studies written by professionals in the field. Seeing as a response for the primary research was never received, looking into case studies written by others in the field could fill in that gap that the case study would be missing.



Above is the timeline created to help make sure that the case study would be completed on time.

# Findings

When investigating such a large-scale sustainability plan, such as Dubai's Clean Energy Strategy 2050, it is important to research some key elements to have the background knowledge needed to determine whether the plan is achievable.

## History of Dubai

The first key factor to consider is the history of the city itself. To analyze whether a city can achieve something in the future, it is key to look at its past to find what allowed them to achieve their past achievements.

Dubai started growing into the megalopolis that we know it as today, during the 1960s when Sheikh Rashid commenced his master plan of turning Dubai into an international city. This idea sparked in Sheikh Rashid mind after he visited London where he witnessed its urban design and travel system, convincing the Sheikh to turn Dubai into an international capital through its infrastructure. Understandably this was a costly endeavor, one that Dubai at the time did not have the financial capability for. Then came the discovery of oil in 1966. Contrary to what many people believe, Dubai was not always wealthy as it was not until the oil was discovered that Dubai thrived into the urban megacity that it is today.

Since the discovery of oil was a rather recent discovery, what lead Dubai to become the fastest growing city in the world is its infrastructure. It is the infrastructure that brings in 15 million tourists a year as they come to see the sky-high towers, shop in the largest and most entering malls in the world and experience the cosmopolitan and luxurious lifestyle that Dubai promises.

Knowing the significance that infrastructure has on the city success is very important as, infrastructure is one of Dubai's focus points for sustainability as will be discussed further in the case study.

## **What is Dubai's plan for 2050?**

The following key factor to consider is how do they plan to achieve their 2050 goal. Findings show that Dubai has create a thorough yearly specific plan of action that they seem positive they will achieve. In this plan, each milestone is scheduled by year such as the goal to have 25% of all energy production by 2030 be clean and renewable energy.

The plan mentioned is called the Clean Energy Strategy 2050. This strategy was announced in November 2015 by Sheikh Mohammed himself. The strategy aims to make Dubai the global centre of clean energy as its focus is making Dubai the city with the smallest carbon footprint in the world. It states that by 2050, 75% of the city's energy requirements will be supplied by clean sources.

They aim to increase portion of their clean and renewable energy from 7% by 2020, 25% by 2030 and by 75% by 2050. The way they plan to achieve this goal is by focusing on '5 pillars' of the strategy: infrastructure, legislation, funding, human resources and a sustainable energy mix.

## **Does this plan match with the UNSDG's?**

An important factor to consider when looking at Dubai Clean Energy Strategy, is does it match with the United Nations Sustainability goals? Indeed, it does, as Dubai's Strategy aligns itself with the visions of UN Sustainable Development Goal 11, as the strategy demands to adopt the latest technologies and innovations to tackle the effects of climate change due to global warming. In fact Dubai has allocated a budget of 600 billion AED to accomplish the project by 2050, proving that funding will not be an issue for them in achieving their goal.



## Discussion/Analysis

### How do they plan to achieve their plan?

Perhaps the most important part of the case study is analysing how Dubai plans on achieving its Clean Energy Strategy. As mentioned previously, they have broken it down to what they call the '5 Pillars of Dubai Clean Energy Strategy 2050.' This consists of infrastructure, legislation, funding, human resources, and a sustainable energy mix.

For infrastructure, their focus is the Mohammed bin Rashid Al Maktoum, Solar Park. This is currently the largest solar energy farm in the world, with investments in the park totaling AED 50 billion. It is planned that by 2050, it will produce 75% of Dubai's total energy and by completion, it will save 6.5 million tons of carbon emissions annually.

The first phase, back in 2013, saw the park producing a small capacity of 13MW of energy production, but that grew to 800MW in its second phase in 2017 and it by its completed third phase the solar farm produced 1013MW of energy production. This puts it right on the path to produce the projected 5000MW in its fourth phase by 2030, which will be about 25% of Dubai's total energy production.

This proves that Dubai's, although ambitious goal relating to solar power, is in fact achievable. The significance of the solar park reaching its estimated capacity in 2050 is immense. If just the solar park itself meets its predictions as it has done so far ever since its launch, Dubai's sustainability goal would be achieved in 2050, solely from solar power alone.

Even though the Mohammed bin Rashid Al Maktoum Solar Park is projected to achieve amazing amounts of energy production by its completion that is not Dubai's only plan when it comes to its infrastructure. Another major focus concerning their infrastructure is 3D printing. In fact, Dubai has an entirely separate goal called 'Dubai 3D Printing Strategy', which

states that 25% of buildings in Dubai will be based on 3D printing technology by 2030.

3D printing will undoubtedly be a significant factor in the sustainability of the city, as Dubai is known for its constantly growing skyline. At the beginning of 2020, there were 12,725 buildings under construction in Dubai, and they have not slowed down since. If they implemented 3D printing in the construction of even 25% of those buildings, the reduction of machinery, trucks and lorries and manual labor would have been vast. If they achieve their 3D printing strategy, this will undoubtedly allow Dubai to reach its sustainability goal by 2050, especially when combined with the solar park.

When it comes to a project of this magnitude, one that has not been attempted before, it is bound to fail without the right legislative structure. Through legislation, the city plans to encourage all building owners to install solar panels that will generate the electricity needed for each building. Once this is done, phase two will encourage the installation of PV panels to all the city's buildings by 2030.

This legislation is very important in the achievement of the sustainability plan, as without each household taking responsibility for its energy consumption, it could seriously damage the efforts Dubai is putting into the other pillars of the plan.

For funding, Dubai has established a fund named Dubai green fund, worth AED 100 billion. This funding is aimed to attract stakeholders interested in investing in clean energy from around the world, as it will be used for easy loans to aid all research and development programs relating to clean energy.

The fourth pillar of the strategy is all about human resources as it aims to provide skill-building and global training programs to the workforce in Dubai. Dubai is working alongside organisations such as the International renewable Energy Agency (IRENA) to create trained professionals in the field of clean

energy. This will undoubtedly increase the research on clean and renewable energy and by having the city provide it to the individuals.

The Dubai green fund and the human resources pillar of the strategy are Dubai's attempts to bring renewable energy innovations to the city. This will boost the probability that the research and testing are conducted in Dubai rather than in a different city or even country, therefore making Dubai a pioneer in clean energy. This is how the city plans on becoming the global center of clean energy, naturally leading it to become even more sustainable.

Lastly, the fifth pillar of the strategy is the sustainable energy mix. This energy mix comprises solar power, nuclear power, green coal power and lastly, gas. By 2030, the energy mix will be made up of 25% energy from solar power, 7% energy from nuclear power, 7% energy through green coal power and the remaining 61% through gas. The ultimate goal for Dubai is to have a total of 75% of energy derived purely from solar power, using the Mohammed bin Rashid Al Maktoum Solar Park. Seeing how the park has already been meeting its projected energy production levels, as well as the fact that Dubai is a desert, solar power is not something that they lack, which makes this an achievable goal for them if they manage to complete the park in a timely manner.

### **What can pose as barriers to achieving this goal?**

To make this a well-balanced case study, it simply cannot just look at all the facts that point to the success of the sustainability plan without assessing the barriers. If anything can prevent Dubai from becoming the city with the smallest carbon footprint in the world, it is its current unsustainable practices, which are currently causing pollution in the city. For true results to be seen with the implementation of the sustainability plan, the most important factor that needs to change is the cities current causes of

pollution. The three major ones are the city's heavy reliance on fossil fuel to provide the energy needed for the city to function, the desalinisation of water, and thirdly, the high usage of personal vehicles, heavy-duty trucks, and lorries.

As discussed in the previous section, the city's heavy reliance on fossil fuels will slowly but surely shift to relying on the sustainable energy mix that Dubai is currently working on. This means that even though the fossil fuel consumption in the city is damaging, the city has come up with a solution which it is currently trying to implement.

The next unsustainable practice for Dubai is the desalinisation of water. Since Dubai has very little natural water resources, it relies heavily on the desalinisation of water to generate electricity to power the city, as well as produce drinkable water. Unfortunately, desalination is extremely energy intensive. If Dubai wants to be truly sustainable, they will have to find an alternative way, perhaps one that incorporates solar power since it seems that they will have that in excess by 2050.

The last unsustainable practice for Dubai focuses more on its citizens' everyday practices. All the planning and forecasting Dubai is doing with the 5 Pillars of Dubai Clean Energy Strategy 2050 is fantastic but would not be as effective unless the citizens of Dubai start changing their habits as well.

There are a couple of practices the citizens need to adapt if they want to see results in the sustainability of the city. Solar power is a great solution unless the city requires more power than the solar farm can produce. The 3D building initiative is an innovative idea that has the potential to produce results, but not if the construction in Dubai passes its 3D capabilities. The same can be said for the legislation. Dubai can encourage citizens with their legislation to install solar panels in their homes, but unless the citizens comply, then it is a wasted effort. All these factors need to be considered not only by the government but by the citizens as well.

The habits the citizen will have to start changing are their water and electricity consumption. They will need to reduce their water consumption to about 150 litres per person per day as well as their AC consumption. Citizens also need to be wiser in their product consumption as recyclable products are only now being introduced in Dubai. Unfortunately, there is still a lot of single-use plastic packaging in the stores, whereas other cities around the world had already introduced recyclable plastic years ago.

Citizens can also help the city's sustainability by driving less and walk more. The use of public transport needs to be normalised in the city as there are simply too many vehicles on the roads of Dubai. Each home in Dubai has an average of two cars. Downsizing their cars, most of which are SUVs, or switching to electric vehicles can vastly help Dubai's sustainability.

Essentially, Dubai can provide the solutions, but if the citizens do not start utilizing them, then there is a significantly less probability that the sustainability plan will be achieved in time.

### **Can other countries follow Dubai's steps to sustainability?**

What is the point of Dubai going through all this effort to be sustainable, if their sustainability strategy cannot be adapted and used by other cities around the world? By having only, a handful of cities striving for sustainability, their efforts won't be worth it if other cities can't stop their own unsustainable practices. Therefore, it is extremely important, for the future of our planet to have as many if not all cities strive for sustainability, just as Dubai is doing.

Sheikh Mohammad himself said that "the strategy reflects our commitment to establish a sustainable model in energy conservation that can be exported to the whole world and support economic growth without damaging the environment and natural resources."

For the cities that want to follow Dubai's steps to sustainability, they will have to adapt the goals to accommodate their infrastructure, legislation, funding, human resources, and sustainable energy sources. Perhaps not all cities will be able to reach their individually set goals as quickly as Dubai. That is just one more factor they will need to adapt.

All in all, there is no reason why any other city around the world can't be inspired by Dubai's passion for sustainability and create a sustainability plan of their own.

## Conclusion & Recommendation

Will Dubai be able to meet its ambitious goals set by its Clean Energy Strategy 2050? What can be said with certainty is that it will not be easy. It will take an immense amount of funding, workforce, labour, and time for a city with 218,788,684 tons of CO<sub>2</sub> emissions to become the city with the smallest carbon footprint in the world.

Given all that was analysed in the case study, if Dubai's predictions come true, especially relating to the solar park, they are definitely on the right path to becoming a truthfully sustainable city.

However, it is important to not forget the impact the citizens of the city have on the sustainability plan. If their habits and behaviour towards the environment do not start changing soon, then Dubai's effort for sustainability will be exactly that. An effort.

Forecasts and predictions of clean and renewable energy cannot answer the question until the forecasts and predictions come true, which won't be for another 28 years. Hence, why citizens adapting their lifestyle is so important for the sustainability of any city around the world.

Behaviour change in citizens is not subject to future achievements. It is something that people can start taking action in as soon as today. All they need to do is make the decision to become sustainable in their own homes. This won't happen until people from cities all around the world realise their individual impact on nature. Therefore, the recommendation for this case study is to educate the population on how they themselves can be more environmentally friendly and how they can help their own city to be more sustainable.

Dubai's sustainability plan will have more impact on the health of the earth's environment if they can inspire other cities to follow in their footsteps.

To see real change regarding global warming, all cities around the world must prioritise their sustainability as we are simply running out of time.

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## Appendix

### Appendix A:

Below is the email sent for the primary research.

Hello sir,

I am a student at the University of Winchester and I am currently researching for a case study about Dubai's Clean Energy Strategy for 2050. The title of the case study is, "How does Dubai plan on becoming one of the most sustainable cities in the world by 2050? can other cities follow its example?"

I hope you don't mind me emailing you, but I was hoping that you could possibly answer some questions I have for my case study. Since you are a researcher in IRENA, you were suggested to be by one of your coworkers.

All I am asking is for a quick interview but since you are in Dubai and I am in England, I thought it would be simpler if I created a google form with my questions and you could just fill that out. It won't be too long, just 6-8 questions about Dubai's Clean Energy Strategy.

Please let me know if you are interested in helping out, if not I completely understand.

Kind regards,  
Rodothea Papachristoforou

## Appendix B:

Below is a screenshot of the google form for the planned interview.

The screenshot shows a Google Form titled "Case Study Interview: Sustainability in Dubai". The form is displayed on a light purple background. At the top, the title is in a white box with a purple border. Below the title, the user's email address "rodothea20@gmail.com" is shown, along with a "Switch account" link and a cloud icon. The form contains several questions:

- Are you familiar with Dubai's Clean Energy Strategy 2050?** with radio button options for "Yes" and "No".
- How realistic do you believe Dubai's Clean Energy Strategy 2050 is?** with a scale from 1 to 10. Below the scale are radio buttons for "Extremely Unrealistic" and "Extremely Realistic".
- Do you think that Dubai's history shows signs that they can indeed become the city with the smallest carbon footprint by 2050?** with a radio button for "Option 1".
- Can you give some insight on the Mohammed bin Rashid Al Maktoum Solar Park? Has it meet its 2020 prediction of 7% energy consumption?** with a text input field labeled "Your answer".
- Do you believe that the solar park will reach the projected 75% energy production by 2050?** with a text input field labeled "Your answer".
- In your opinion, what factors could become possible barriers for Dubai reaching their goal by 2050?** with a text input field labeled "Your answer".
- What do you believe will be the component that will really help Dubai achieve their sustainability goal?** with a text input field labeled "Your answer".
- Do you believe that Dubai's sustainability plan can be easily adapted to be implement in other cities around the world?** with a text input field labeled "Your answer".

At the bottom of the form, there is a purple "Submit" button and a "Clear form" link. Below the form, there is a warning: "Never submit passwords through Google Forms." and a footer: "This content is neither created nor endorsed by Google. Report Abuse - Terms of Service - Privacy Policy". The Google Forms logo is at the bottom center, and a small icon is in the bottom right corner.

