Sustainable High-Rise Buildings Webinar this is the word that I want to start with, is to thrive about, to elaborate about the word sustainability, that most of our talk today will be around.Yeah, so there is the email of Ms. Safa and engineer Ibrahim.So like in materials, we use timber crete, recycled steel, the energy we used mirrored ducts, regenerative drive, and for the water, low flow fixtures and ozone and recycling chutes.Actually, also, Engineer Ibrahim, the visit for Dubai Expo, we did in January, the beginning of this year, we visited the site of Dubai Expo, and masha'Allah, they have implemented a lot, a lot of sustainability approaches in the construction.You may join the internships offered generously by Green Innova engineer Ibrahim Radhi, of course, and insha'Allah, we will always keep this collaboration between us and always learn from you what's the up-to-date methods in the field.So the residential building consists of 24 floors and we've got parking levels, the showroom and lobby, as well as the gym and outdoor pool and like terrace area.They have used a mixture between the rubber from the tires, recycled, mixed it with other aggregates to produce it. It gives a very nice look, maybe the architecture people would know it. It looks so nice, the texture wise, and they did it with heels, like they requested the ladies to wear the heels and check the adequacy of it. Is it going to serve their needs?So, the old electrical and a very, you know, unsafe, you know, electrical water heater is replaced with renewable solar water heater and harvesting the power of the sun.Now, actually, is another pivot point that all the building, all the houses, ministry of housing houses will be built by the exterior installation finishing system, which is a sustainable product.Before, the grid connection for the electricity was done by them, you know, the government, in order to achieve economic scales and make it cheaper.So, now, all of these are now economically viable to install and go to them, you know, their renewable, sustainable, you know, approach in building and constructing building.And for the sake of, you know, promoting that this is work, and we have in Babco, we have a big plant for solar system that I'm thinking also with Dr. Noha and Doha, one day we can arrange a visit for Bahrain students to go there and see.But now, we have rating system which is going to be like certified, silver, old, and so on. And this will be a game changer tool that the valuation, how much this building is valued, will be based on how sustainable is this building.It shades it. And by using this device, we actually reduce the HVAC consumption because we have one more layer in the window, which would reduce the heat transmittance within the window.In order to convey these messages, okay, selling is actually fulfilling a genuine requirement for the end user.Creativity needs somebody bold to do it and go for it. And that's happening, actually, in our region, insha'Allah, and Bahrain as well.So, allow me first before the presentation starts with the engineers, that will focus on a very particular case study, how we have implemented the sustainability work from all direction about, you know, engineers, civil engineers, architects, and to show you about our company and what we does, and what it is doing, and how is that helping also environment.But later on, we end up knowing about projects that was retrofit, okay, to be more, you know, sustainable, and reduce its energy by 70%.One of them is called Certified Energy Practitioner and Certified Solar PV. And we have a program that is really open for internship.You can email Mohsen, Dr. Ramounah, Dr. Abrar, whoever you know from us, and inshallah we will forward the details.You could like adjust it. So we'd be saving about 2,000 bd by using it during daytime in the more dark areas in the apartments.So we're going to be composting and recycling by using a dual duct system, shaft system.But why we want this kind of

awareness that I really congratulate Dr. Rohan Doha for making such, you know, a presentation for you to drive.And what end up the engineers in some of these, not all of the engineering offices, but in some of these engineering offices just follow where the money is. And they start compromising on, you know, the standards of sustainability.Like now what engineer Bashair and engineer Doha did, they presented very well showing that, you know, it's not a trade off between sustainability and, you know, saving money.Because before you say, okay, you go to the developers and I'm talking now very much, you know, from industrial point of view, not academia or theoretical point of view.Previously, the word sustainability, you know, was cornered to, you know, when we talk about energy, when we talk about, you know, waste, or, you know, climate waste, and resources a little bit.More on that, you can see the United Nations itself, putting 17, you know, sustainable goals for all the world to look at it and to build on it. So, it's actually a very, very, very important subject for you as a young engineer.But knowing that the world population will be doubled, okay, within only 80 years from now, okay, that's a shocking number.And this is the application that now, and the solar panels that you can see it here, okay, it used to cost four times what it's costing now, okay, just three years back.And we have just installed, you know, 211 villas in Danat Al Baraka project.Now, you have to add how sustainable is this building, how we could reduce, how it can reduce its energy by itself, how it can recycle the water by itself, and so on. So, this is what will be in that building rating system.Maybe Engineer Safa can type her email in the chat, and the student could get in touch with her via email.So Baha and I were actually given a challenging project because it was productivity in the sense of engineering.And to design a sustainable high-rise building could be really challenging because we don't have much roof area and much of the space is occupied by residential space.I don't know if any of you heard about EDEC, but it's the slab in between, you have polystyrene panels.And you also reduce the PV light, UV light, which is actually harmful for humans as well as not very good for furniture.So next we're going to see how we applied it within our building by using water faucets, shower heads, water closets, and washing machine.So we saw an ozone generator, which would kill germs, use up to 90% less chemicals and it's cost effective.So you have sliding pool decks or just a sheet cover or a hydro lift that would actually make you utilize that area.They actually applied it. It's actually applicable in Palestine and in Jeddah.We don't use common spaces very much in a high-rise building, because it's like the corridors, the lights, the elevator halls, the staircases, they're not used all the time.And an annual cost would be about 5,000 bd. So to reduce it, there's a simple, simple solution, which is the regenerative drive.So what it does is that it generates electricity when the elevator shaft is going down, and then it reuses it when it comes out.And I guess that's it. Then to conclude, this is a diagram that shows you how we solve the sustainability problem, how we made our building through these four pillars.The ones highlighted are the ones that the building contributed in. Okay, so you would be doing a lot, not just for the energy, actually for life on water, climate change, many things.So just to give you an example, we are offering an exterior installation and finishing system, which is called EIFS.So the question is, or the question that you will see it may be a little bit odd, how many of you want to engage in selling incubation or selling a transaction, okay?A homeowner will not buy these sustainable ideas, which is the innovative, which is the new, okay?Zoha also, masha'Allah, this is the way that the graduate should act after graduation, to directly engage,

engage in the university.Okay, and not speaking much on it, but it's just for you to know me. So, what we do in Green Innova, we actually have two divisions.The first one is first, how we could, you know, reduce the energy requirements in a building or an establishment.And the shocking number that we are wasting 92% of energy consumption, 92% based on the study of LEED, which is then the Green Building Council in America, that 92% are waste of the energy and water.Why we don't establish sustainable building or sustainable establishment at the very first?Okay, so we don't waste in order to rectify So, actually, your mission, once you go to the world, you young engineers is really to go and fight for this.So, this is a brief about us. We are an ISO certified company, and we work with all the governmental approval.We are electrical company approved, and also solar approved company.We are one of the very few company which is approved by United Nations to do energy efficiency, and we will come back to this later.And solar street, solar water heater is now a great popularity.Also, street lighting, we are renovating parks.Thermal insulation is also a very important subject that I'm sure that you have studied.So, we did thermal insulation system for the building in order to reduce the required energy.Also, they put LED light and other items as well in order to reduce the required energy and then power the rest with renewables.Previously, building are being evaluated based on the income of the building.So, I don't know whether how we will be able to connect with you, but maybe in the chat, you put your contact details for Safa, our engineer, and maybe we'll be in touch with you once this program is there.The internship opportunity you gave to our students, the jewels of Bahrain, this is very generous from you.So Mr. Ibrahim actually was our mentor, our supervisor for this project.So Bashar, now we'll continue with you with the materials section.It was actually really hard because we're all used to the conventional materials that are used in conventional buildings.And all these percentages that you see on the screen are a report from Bahrain Supreme Council of Environment.Steel is 100% recyclable in all stages of its life cycle.This logo is where the company provides it in Bahrain.So let's go back to what it's 100% recyclable in all stages of its life cycle.To purchase brand new steel, you would need 220 BD per tonne.But when you use recycled steel, you would need 85 BD per tonne.So by using recycled steel, we would contribute in all these goals.So you understand when you reduce the HVAC costs, you reduce the amount of electricity.But it's made out of timber and recycled concrete.It provides thermal insulation up to six times.It's lightweight, so 2.5 times lighter than conventional blocks.Fire resistance, it means that it doesn't burn as fast as other materials would.Again, the sustainable development goals that it serves.So wherever there is concrete outside in the external walls, wherever there is blocks, we would use instead timbercrete.Okay, so the air pollution in Bahrain, that's another thing.So you can see these are examples where they used this to reduce the pollution around.Okay, and the cost is 250 BD additional.And you can see from the bottom, we were unhealthy on the air quality index, and this would move it to moderate.But we have found a device or a way to eliminate these parts, which would need maintenance and just have the one part, which is the glazing itself.And we're lucky because the southern side of the building is the main facade, which has most of the glazing.So Bahrain is actually one of the water-stressed countries, which means we don't have like a backup plan if we run out of water.So we've proposed a simple yet magnificent solution, which is using low-flow fixtures.So by using this low-flow fixtures, we are reducing the water consumption.And next we're going to see how much the water consumption is reduced within

like one household.We're looking and looking for things in Bahrain that we can actually use instead of the chemicals that we would use to disinfect a pool.Isn't ozone harmful to humans?Actually, yes, it's harmful when it's in the O3 form, but when it evaporates, all the O particles, they break down.Otherwise there wouldn't be an ozone generator.So after one year of buying this generator, you would get your money back and we would reduce chemicals by 87%.Additional suggestions for the pool is to make it more sustainable and to make it to have more space when you're using that area, we can use pool covers.We cannot live without energy, but to produce energy, we usually use fossil fuel, which is harmful for the environment because it emits CO2.So the first thing we decided to tackle is the HVAC system, which consumes 50 to 60% of energy in a building, which is huge.And that reduces very much of the HVAC consumption.Lighting is an essential part of a building as well, because we use light all the time, even during daytime, sometimes when we feel that there's not enough light.And we wouldn't need very much structural changes, because the mirror ducts is really thin.And they're going to be applied, as I said, in the halls, the elevator halls, and the staircases.We cannot use any other thing but elevators in the high-rise building, because like staircases isn't very practical.So we have a recycling chute that could have different places to go. Three is the maximum that we have found.So you can see that some things were very small, like the water fixtures, some of us actually have them at home, we all use water fixtures for the faucets or for the sinks.So the total annual saving for that building will be 126,000 BDs annually.Not only that, but you saw all the sustainable development goals icons.And remember at the beginning in Ibrahim's presentation, he mentioned LEED.So this is why we pulled out the LEED checklist for new constructions.Before I conclude and we go to the questions part, I just want to say that I hope this presentation inspired you.You can reduce your own footprint and it would make a magnificent difference.Well, thank you very much, Meshayir and Jaduha for this amazing presentation.You are always inspiring us with our up-to-date and sustainable construction technologies.The magnificent speakers are, of course, welcoming your questions.So about, this is the building that you haven't seen here yet, but about the ministries that you are working with, are they benefiting from these things that you talked about?Actually, the awareness of sustainability in terms of governments and as well as the companies are growing day by day.So since we have been in the market for the last seven years, we can see an accelerated attention or accelerated interest within the government as well as the private sector in terms of sustainability.So you go to the developers and you tell them, you know, okay, we have this very sustainable, very good.Now, if you make what is exactly what Bashair and Doha said, okay, this is the money.A genuine requirement for the end user.Thank you very much, Walla Engineer Ibrahim.Why not going for a sustainable perspective using recycled material instead of just buying extra new materials?Actually, we are consuming double than the earth is being able to regenerate or reproduce.Ah, Raghib says that he thanks you, of course, and then he says if he can get the PDF copy of the slides, if possible.Okay, and Ibrahim was my supervisor.Right now, I work at NSH, Nasr al-Hajri, in the training center.Zoha also is a graduate from our university, from architecture program, bachelors.Masha'Allah, Zoha.And with your help, actually, giving a hand to them is a great, great, great thing for life now and after our life, insha'Allah, in Jannah.Between the theory, you know, the write up, and between implementation, there is always gaps.So, now, the question is, is how we would not be

required to retrofit, to redo things?So, actually, the whole world now in terms of energy, and it's moving to more of decentralization rather than centralization.And for that, government now saying, and all the world now, we need everybody to generate his own electricity.So, we provide A to Z product and services for solar.We have done this installation for solar system.We have in there, we are doing retrofitting and also a new solar street light.But we provide what we call it continuous insulation.So, this is one of our project, Bahrain Airport, US Navy.Bahrain Science Center is a very good example that I want to share with you is that we did a retrofitting.So, in Bahrain, there will be a changeover.So, it is no longer now how much we just pay to build that building, but also how much we will pay on continual basis as operation and maintenance for this building.So, for you as engineer, it is not only enough now to build very fancy, very beautiful, functional building.And we also provide the training specialized in sustainability.You are one of the rare engineers in Bahrain who is always up to date.And inshallah, this will return back to good in you and in your company and in Bahrain, inshallah.And please, anyone, any of our students interested in joining Engineer Ibrahim, and please type your details.You may also, they may also send it via email, maybe.Thank you very much, Engineer Ibrahim.So first, I'll start with an introduction.It was a productivity improvement program.Check Iqtidar's Instagram.So make the building generate electricity for itself.So Ms. Baha is going to start now with the presentation.So we were given this sustainability project and we were specifically assigned a high-rise building.And this is a real estate project where the seller wants to sell more space for the client and he doesn't want to waste space here and there.Bashar is a civil engineer.So we were able to combine both our expertise into one project.So our project was located in the safe area, which is a highly dense area.There are a lot of cars, a lot of buildings and lots of pollution.So sustainability in architecture.Ibrahim was very generous and explained sustainability.So I would just add a little point and that sustainability in architecture is basically having the building have less negative impact on the environment.We actually looked for sources to follow on because sustainability is a very deep topic.And we actually followed this exact same pillars like we've got material, then the site.The site, we couldn't do much with it because it was already selected and the design was already made, but we were able to do other things.So what are the materials that you're going to use in a building to make it sustainable?So we thought very creatively and I will share now the approaches.So whenever a building is being torn down or whenever some materials are not used in building a specific building, all these waste go to landfills.And I'm sure you can see on top of the screen Crown Industrials.So we made sure that we would put as many products you can get them from Bahrain.Sustainable development goals.Again, on top of every implementation, you will see the goals that we're doing again.We'll use it in the place that needs your reinforcements.So if you have any question, any clarification, ask me, please ask me. Okay.Thank you very much, Bashair and Mahmoud for the question.As Ms. Neha said, to just write a note and we'll address them all later.The sound transfers from where, from wall to wall and between the slabs.I'm sure people who live in residential areas know that.So for the slabs, we can use EDEC.It's 40% lighter than regular slabs.And it's very, it reduces the HVAC costs.So we'd use that where an internal, an internal slabs in the slab, all the slabs in the building.It's actually volcanic fibers.To reduce the sound transmission between the walls.So this would reduce the amount of sound transmitted.The carbon footprint.We can use timber crate.Timber

crate actually was a very amazing thing when we discovered it. But it looks like blocks.So it's very sustainable and environmentally friendly.When you use recycled things, it's very environmentally friendly.We try to find materials at the same time problems that are happening in Bahrain.So as you can see, Bahrain is the number one most polluted country in the Middle East.So this puts us in the unhealthy air quality index.So whenever the sun hits it, the sun hits the surface of the building, it will make all the pollutants into small debris, and these would just fall off.Okay, and you might ask that, okay, what about the debris?We're going to cover the timbercrete with this self-cleaning cement.So one of the most essential parts of the building, especially in high-rise building, is the glazing.And when we have glazing, we need sunlight.So to solve it, we need to put either internal shading device or external shading device, which means more parts.And also reduces the outside noise, which is important, as Beshire said, because it's in like a commercial area.And it doesn't need much energy to run, so it wouldn't be much of a problem.The only thing that differs is the glare.And we're going to be applying it in the southern side of the building.We use much water in residential buildings.And we consume two times the average water consumption around the world, which is huge.And you can see overall, it's reduced very much.Next would be the pools, which Bashar will explain to you.So Bahar and I were thinking, can we actually make a pool sustainable?So we had this idea that can we at least reduce the amount of chemicals that we use in a pool?Because the chemicals are very harmful to us, to our skin, to our lungs, and even to our clothes.So you might think, oh, ozone generator.So that was a really good idea where we could actually use something that's very environmentally unfriendly and make it better.In high-rise buildings, they normally use the split ducted unit system.But in our project, we have found an incredible solution, which is the geothermal HVAC system.Geothermal HVAC uses the energy within the earth instead of the normal way it runs.It uses renewable energy, which is the geothermal energy.It is not weather dependent because below the earth as well, and we wouldn't need very much maintenance only for the parts that are in the building.Below the earth, we don't need maintenance because the earth protects the system.But we will need a bit of electricity to run it, but not as much as when we use the HVAC system.And like typical geothermal systems, they use the water as part of the equation.And so we thought about how we could reduce it. One of the ways is to use natural sunlight.By channeling it within the building, by using mirror ducts.Sunny, cloudy, it's all great.And it wouldn't change very much in the facade, because it's like the same.We're not even certified, we'll get the silver.Masha'Allah.