Hot Air Power Mega City Building

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Contents

Abstract

Nowadays there are many cities that are very crowded. In order to create more living space, we need to build taller and taller buildings. But there are many problems with tall buildings. This paper proposed the Hot Air Power Mega City Building which does not have the problems of traditional tall buildings. With hot air it can create electric power and fresh water. And it does not require an elevator to make it work. It has efficient transportation systems which are more reliable than elevators. The transportation systems can be completely powered by electricity and with zero automobile exhaust. In order to make a Living Building work efficiently and suitable for living, this paper proposed a Standard Module. With many Standard Modules, we can make up a mega Living Building. It allows humans to develop high space at a lower cost. And Hot Air Power is sustainable green power. Hot Air Power Station is not just clean, it can even clean the air and eliminate haze. Hot Air Power Station can also recycle part of the energy which has been used in the building. Hot Air Power Station uses the heat exchange reaction between hot air and cold water to generate power. To make the hot air cool down quickly and efficiently, this paper proposed the Drooping Cold Water Infiltrated Cotton Strip Array. The fresh water is a by-product of Hot Air Power Station. Hot Air Power Mega City Building has Gradient Transparent Roof which height is gradient to collect hot air and transfer them to Hot Air Power Station. Because the city can generate hot air in twenty-four hours without stop, so Hot Air Power Station will be able to generate electric power in twenty-four hours without stop also. Hot Air Power Station consumes hot air in the city, make the city cool down, and solve the problem of Heat Island Effect.

Key words: hot air power, hot air, mega city building, green power, energy recycle

1. Hot Air Power Mega City Building

The west part of Hot Air Power Mega City Building is Hot Air Power Station. The green buildings are Living Buildings, the purple buildings are Commercial Buildings. On the top of Living Buildings and Commercial Buildings there are transparent roofs which height are gradient to collect hot air and transfer them to Hot Air Power Station. All the transparent roofs connect together and make up Gradient Transparent Roof.

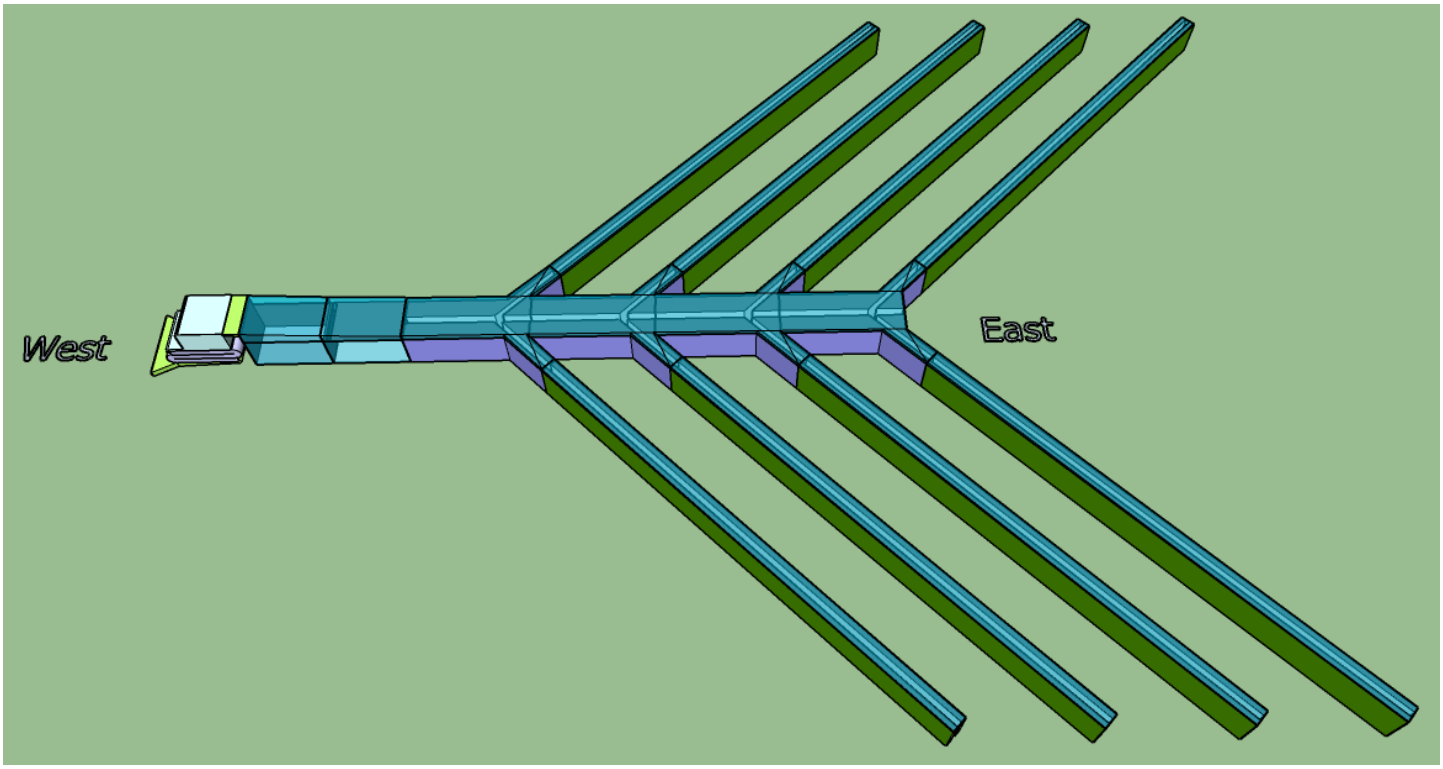

Figure 1-1: Hot Air Power Mega City Building

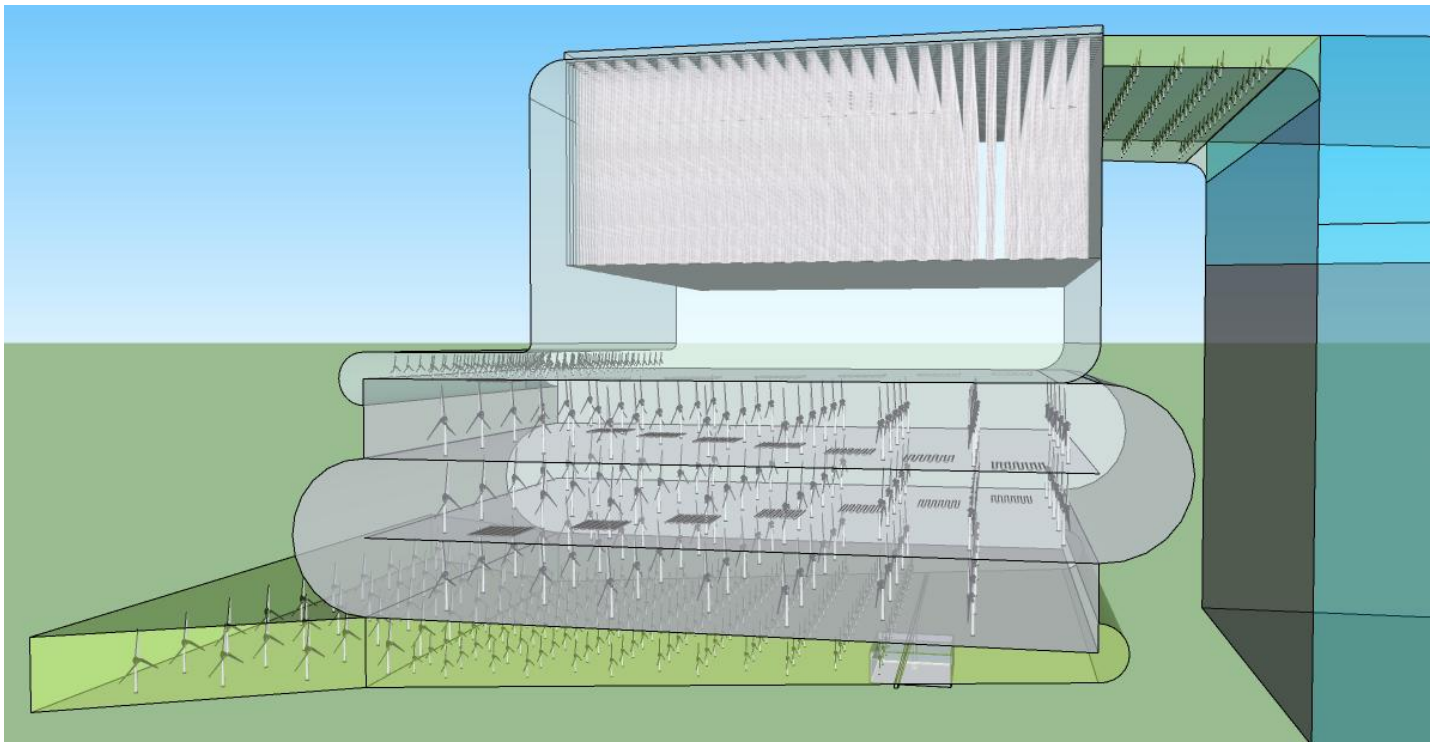

Figure 1-2: Hot Air Power Station

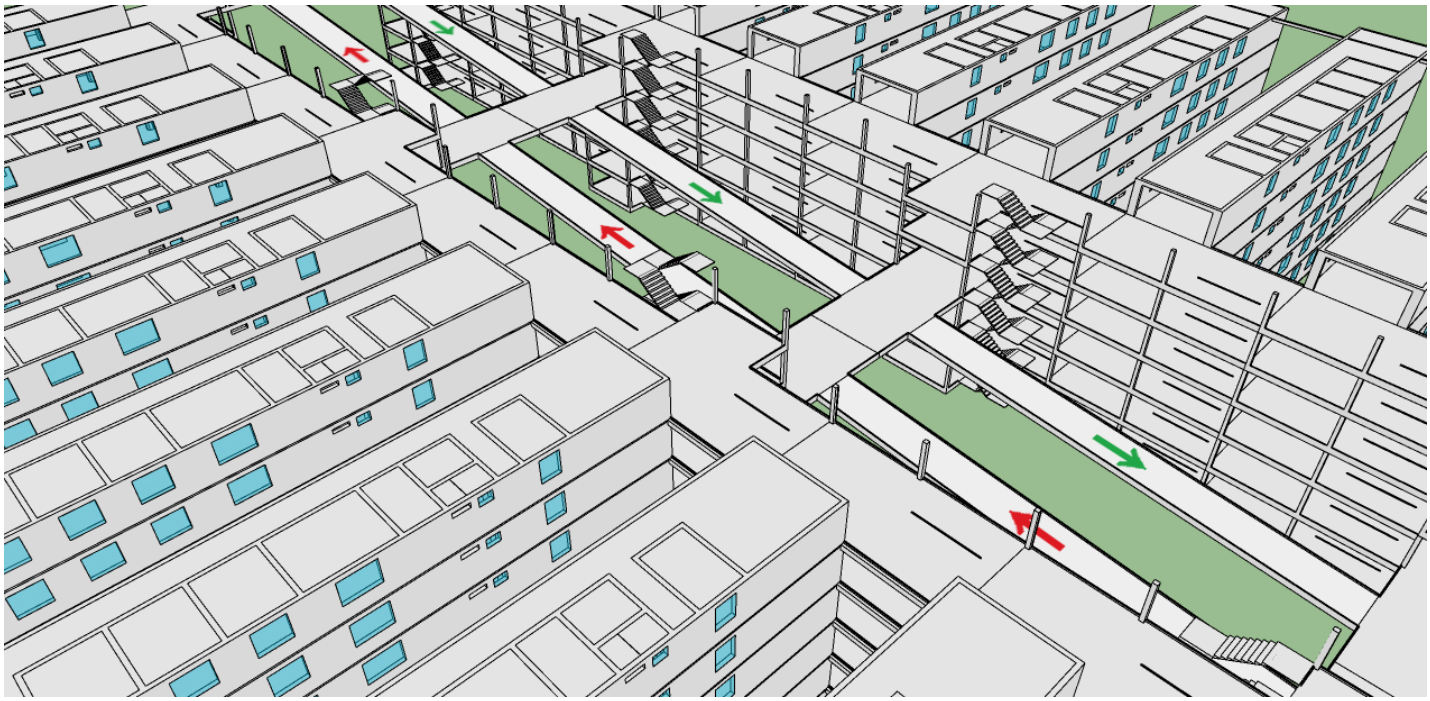

Figure 1-3: The Transportation System in a Standard Module of Living Building

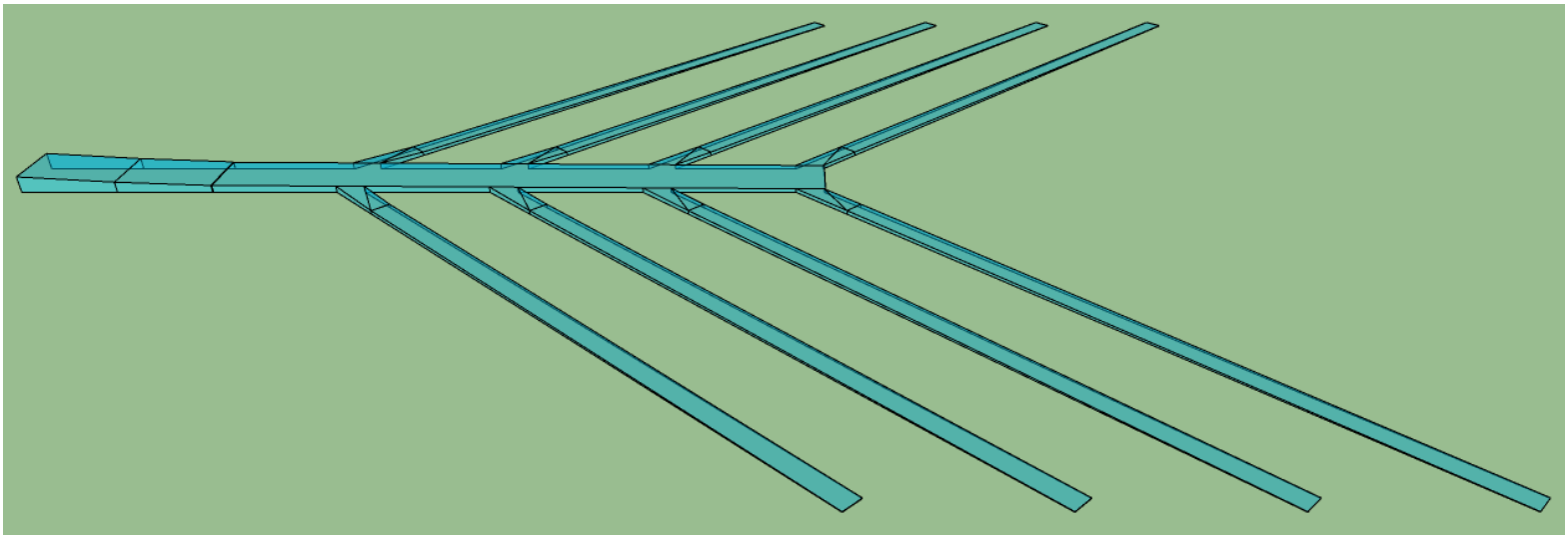

Figure 1-4: Gradient Transparent Roof

2. Hot Air Power Station

Hot Air Power Station is composed with Hot Air Input Port, First Stage Cooling System, Second Stage Cooling System, Cold Air Output Port, Condensed Water Collecting Pool.

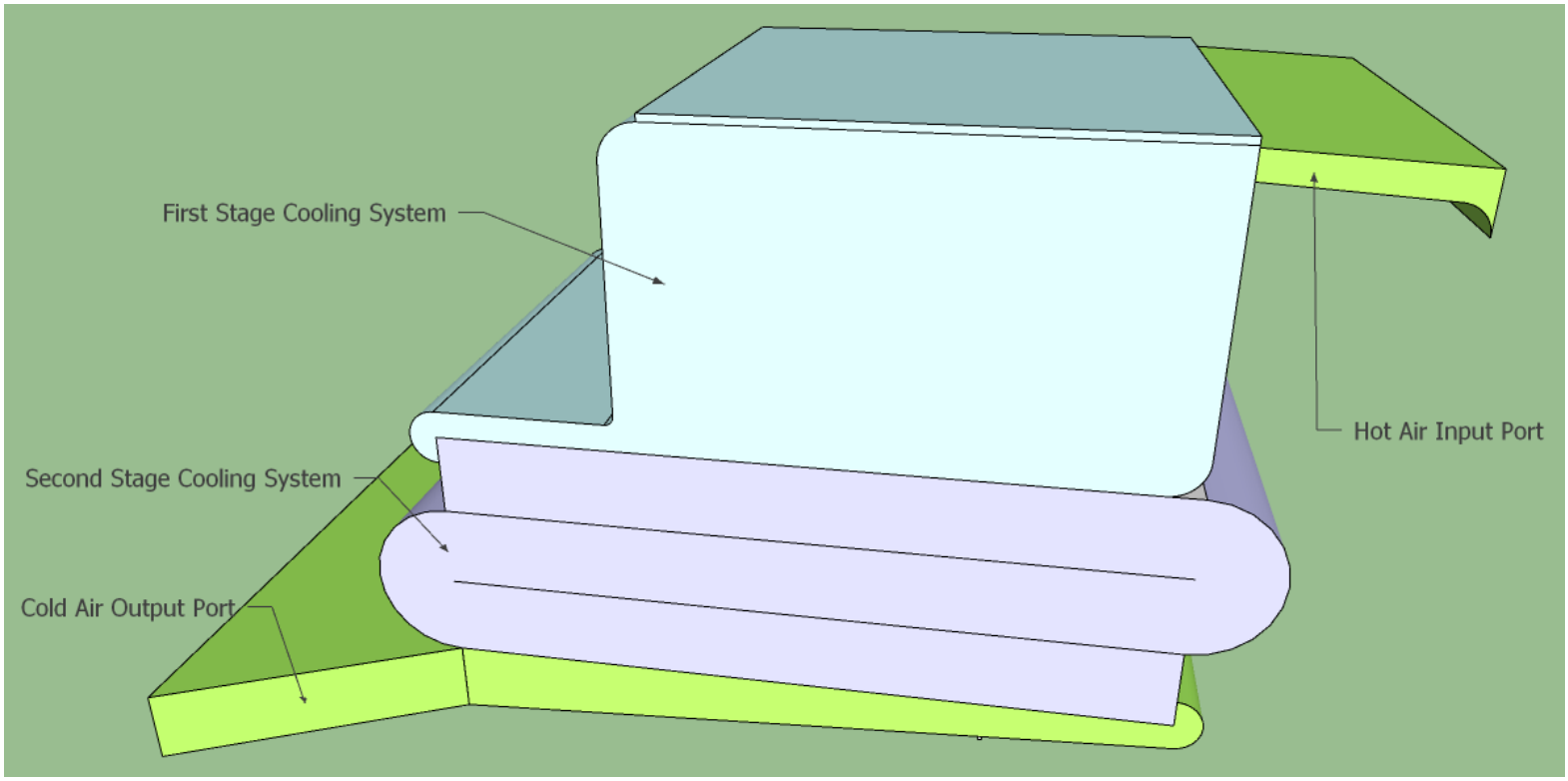

Figure 2-1: Hot Air Power Station

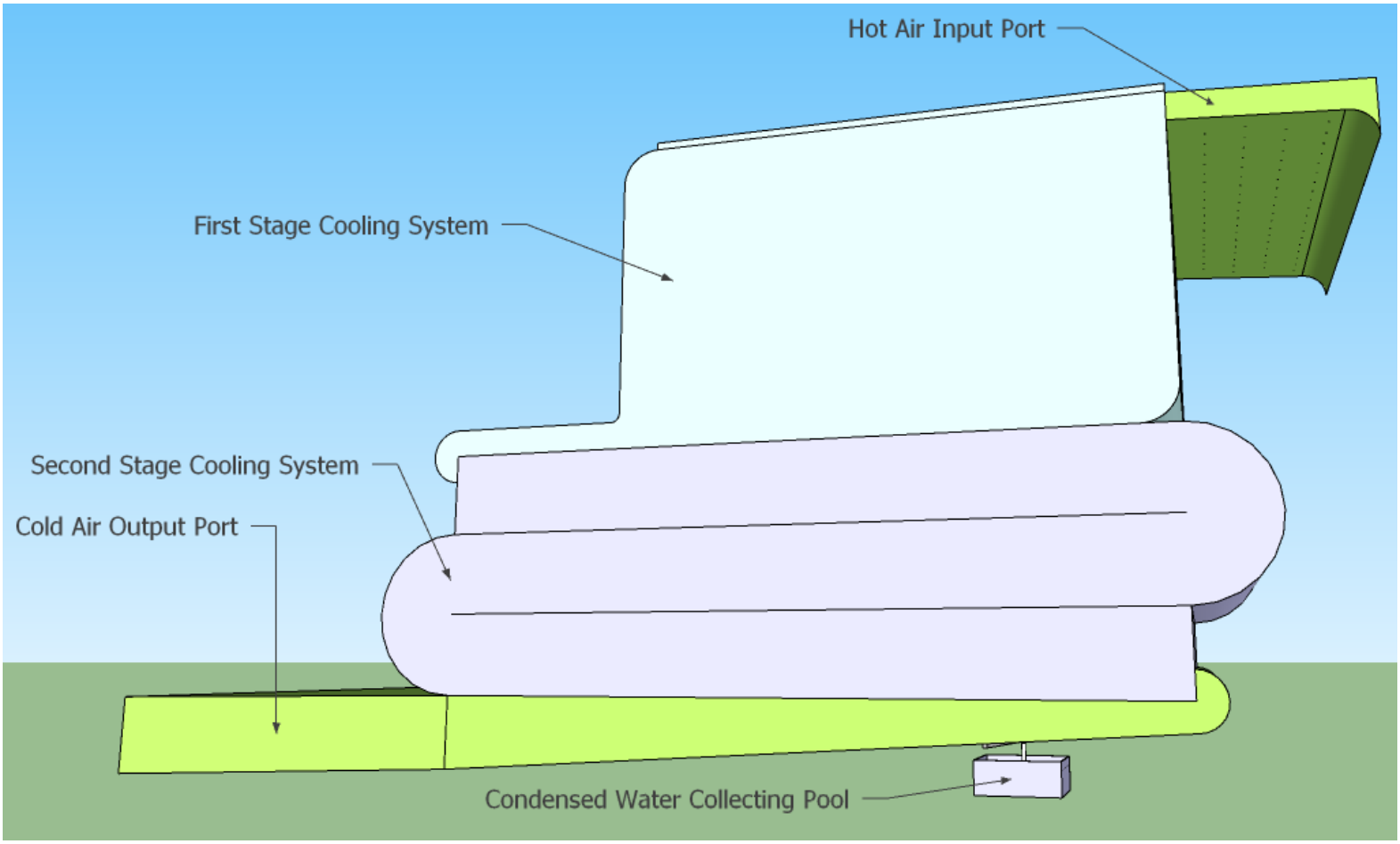

Figure 2-2: Hot Air Power Station

2.1 Hot Air Input Port

Hot Air Input Port just let the hot air go into First Stage Cooling System. And there are some Wind Turbines in it. Hot Air Input Port is at the top position to make it allow the hottest hot air go into First Stage Cooling System.

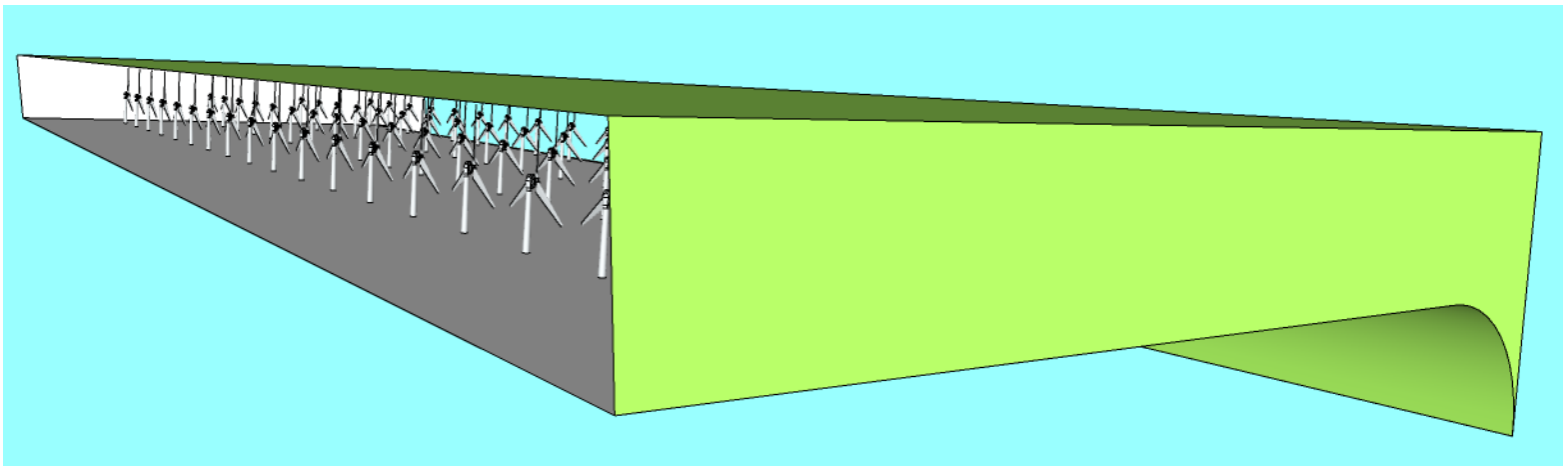

Figure 2-3: Hot Air Input Port

2.2 First Stage Cooling System

First Stage Cooling System is a very important part of Hot Air Power Station. It can make the hot air cool down and then drop. Most heat of the hot air will be absorbed in this stage.

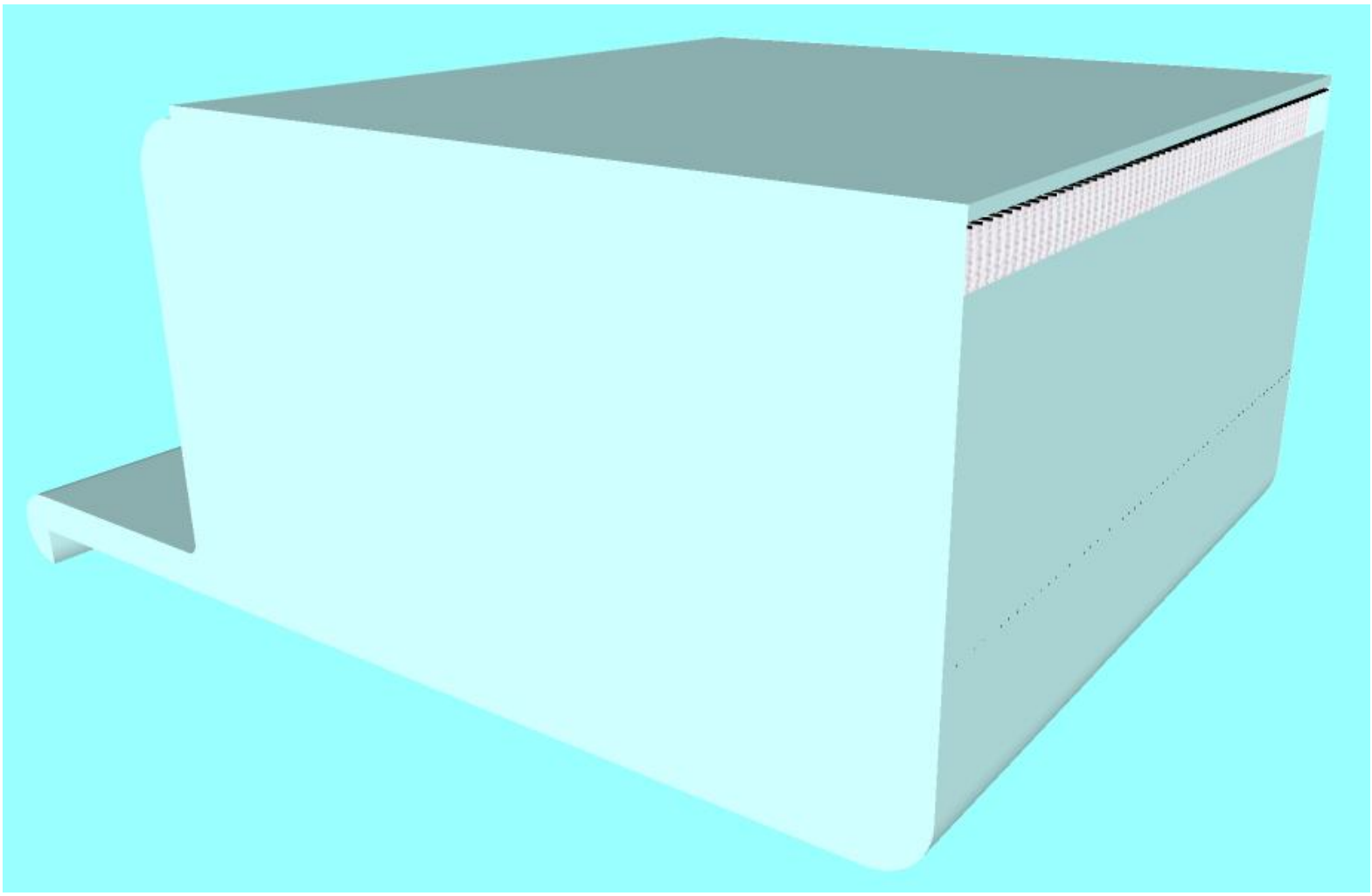

Figure 2-4: First Stage Cooling System

In the First Stage Cooling System there is Drooping Cold Water Infiltrated Cotton Strip Array. Drooping Cold Water Infiltrated Cotton Strip Array is composed with many dropping cotton strips which are infiltrated by cold water. While the hot air passes through Drooping Cold Water Infiltrated Cotton Strip Array, a lot of water will evaporate and absorb a lot of heat. And the hot air will cool down quickly and then turn into cold air and then drop. The evaporation area of Drooping Cold Water Infiltrated Cotton Strip Array can over one million square meters. The cotton strips can absorb cold water from the top of First Stage Cooling System to compensate for evaporated water and keep cold and wet.

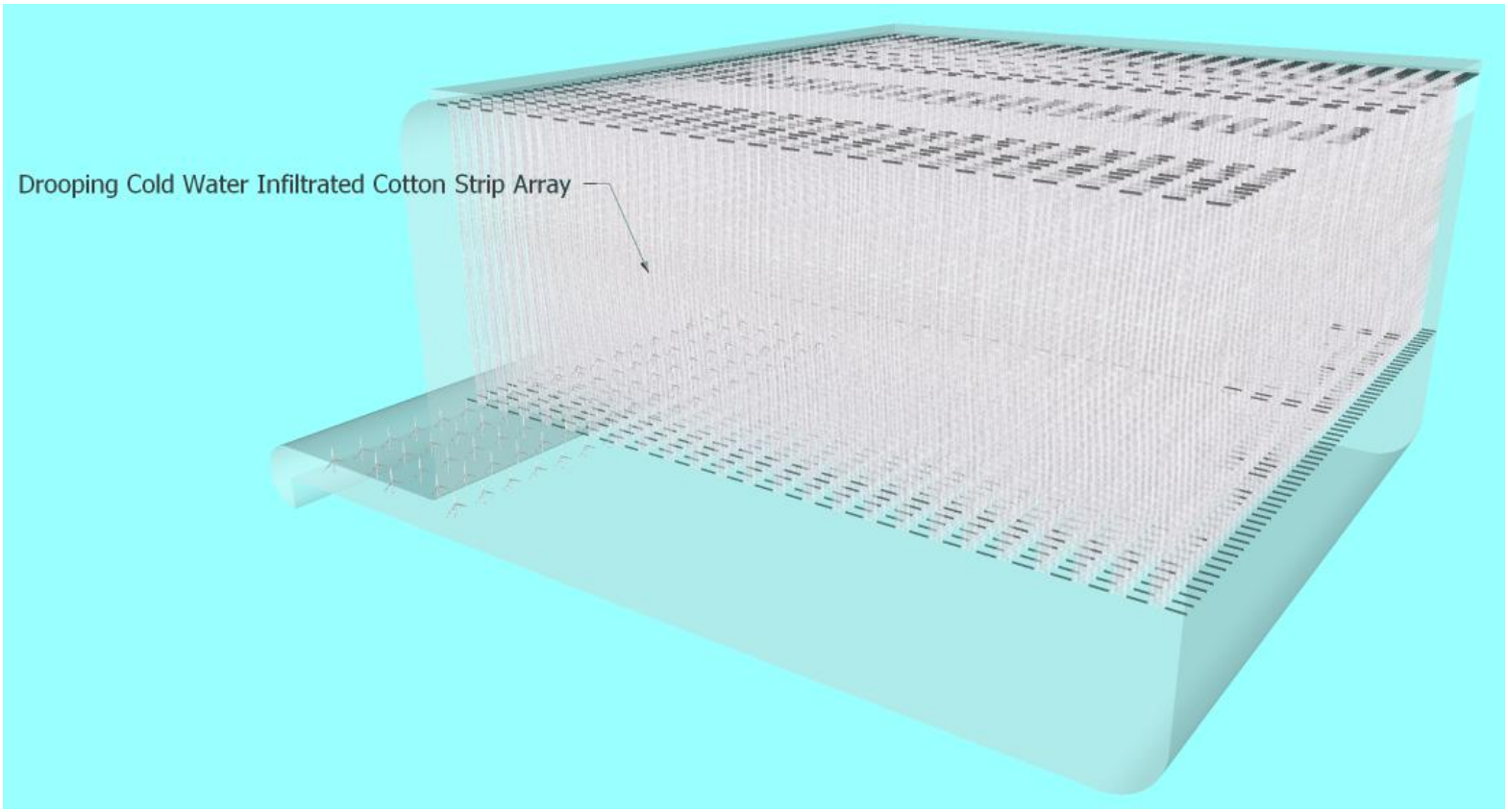

Figure 2-5: Drooping Cold Water Infiltrated Cotton Strip Array

The cold air will be output from the left down position of First Stage Cooling System. This output air is cold and wet. There are also some Wind Turbines at this position.

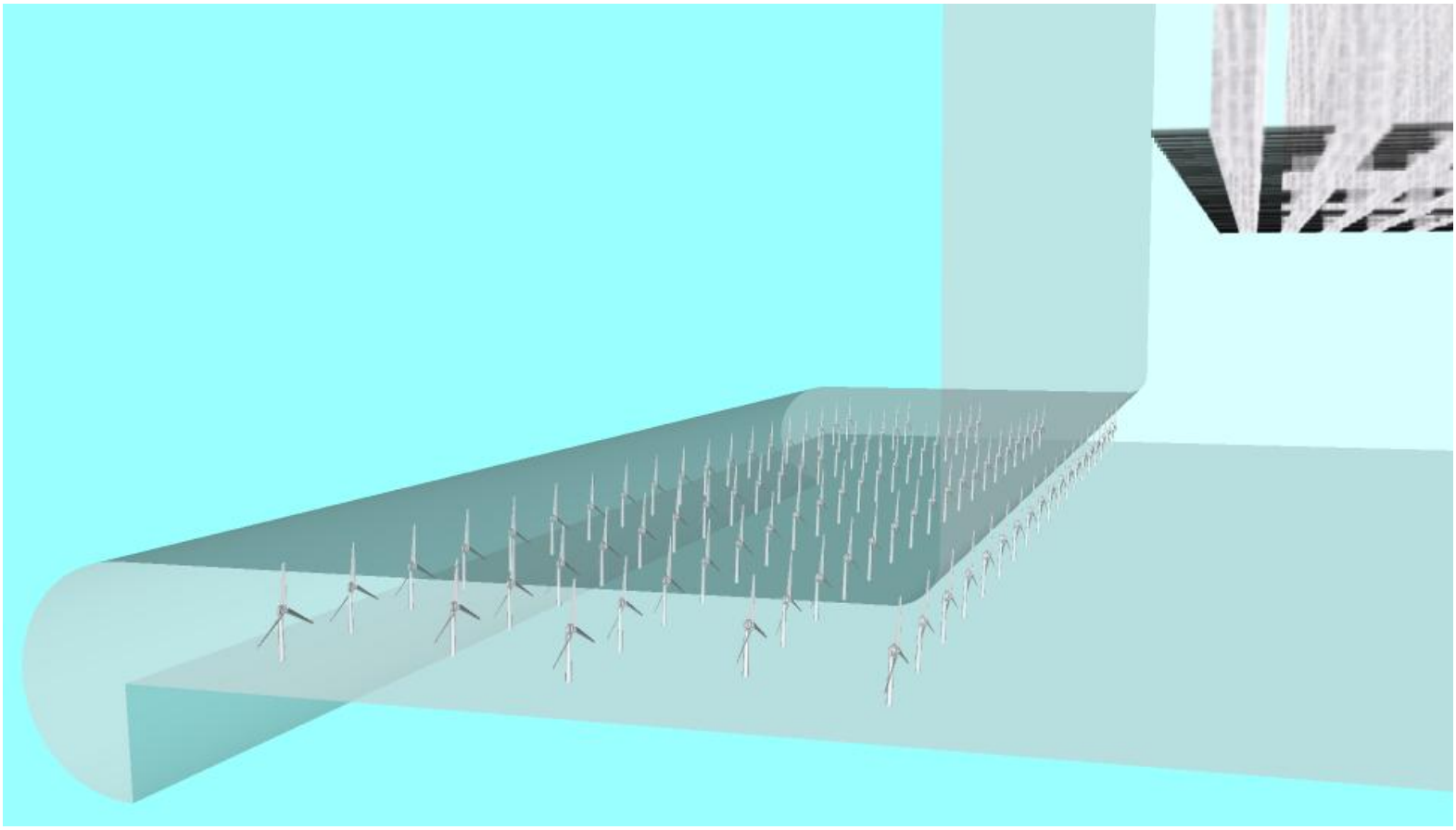

Figure 2-6: First Stage Cooling System output port

2.3 Second Stage Cooling System

Although the output air of First Stage Cooling System is cold and wet, but to produce fresh water significantly, we need to make the air cool down a little more. And this is why we put a Second Stage Cooling System here.

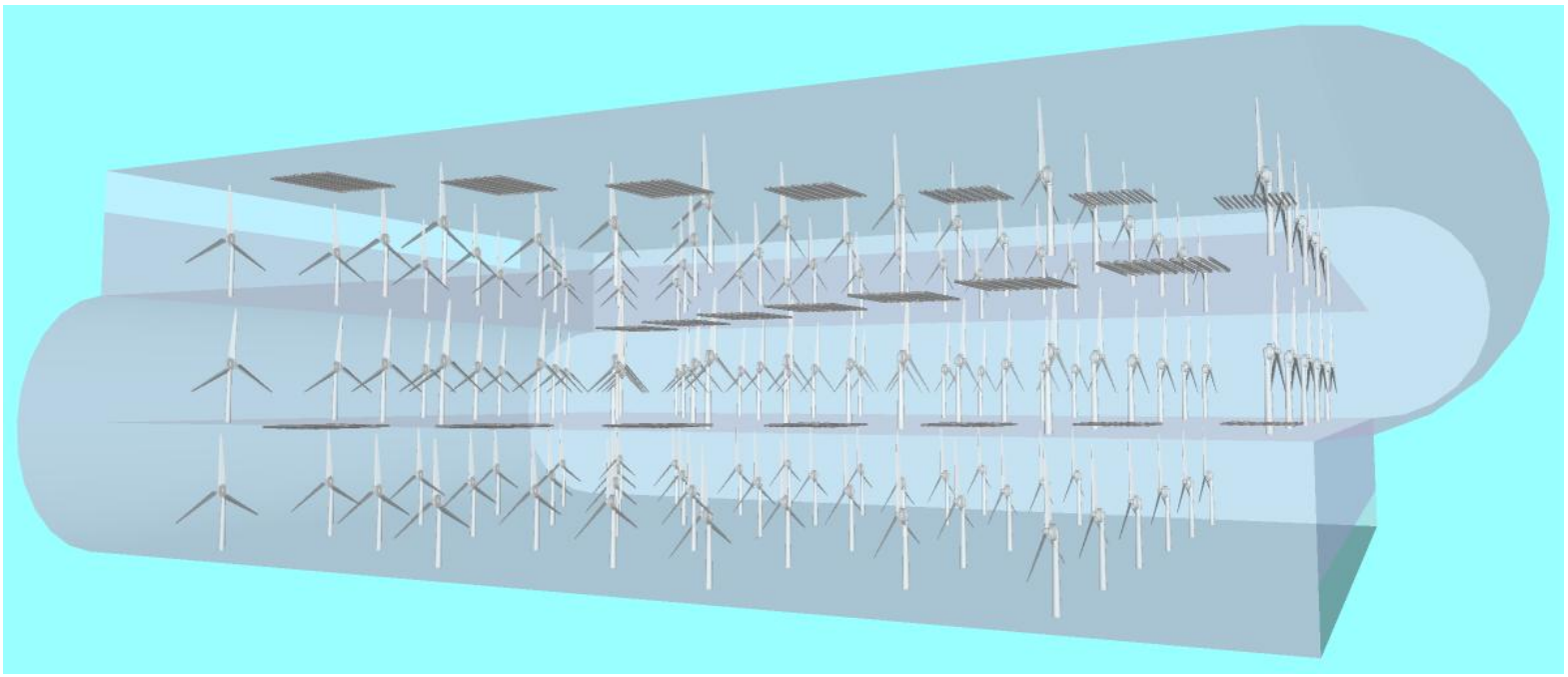

Figure 2-7: Second Stage Cooling System

In Second Stage Cooling System, on the top of the pipe there are some Coolers to make the air cool down a little more. Because most heat of the hot air has been absorbed in First Stage Cooling System, so the Coolers will only need to use a bit of energy to make the air cool enough to output a lot of fresh water. And part of the heat which generated by the Coolers can be recycled by the system. The heat recycle mechanism will be introduced in the following chapters. The pipe of Second Stage Cooling System is wide to make the air flow slow and make the Coolers can work better. There are also some Wind Turbines in this stage. The air in this stage will be cooler and continue to go down.

The environments in First Stage Cooling System and Second Stage Cooling System are both very wet, so they can absorb dust in the air, clean the air and eliminate haze.

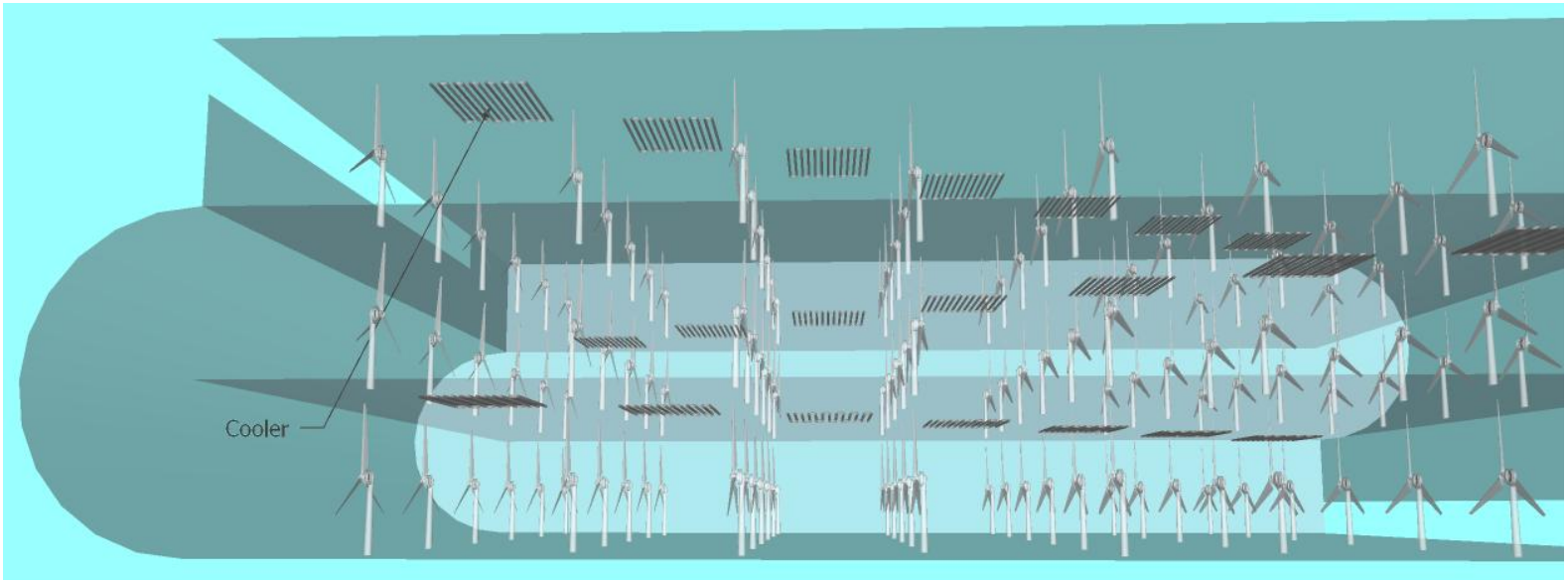

Figure 2-8: Cooler

2.4 Cold Air Output Port

The port of Cold Air Output Port is gradually opened and there are many Wind Turbines in it. And there is a Condensed Water Collecting Groove in it which can collect the condensed water and put them into Condensed Water Collecting Pool.

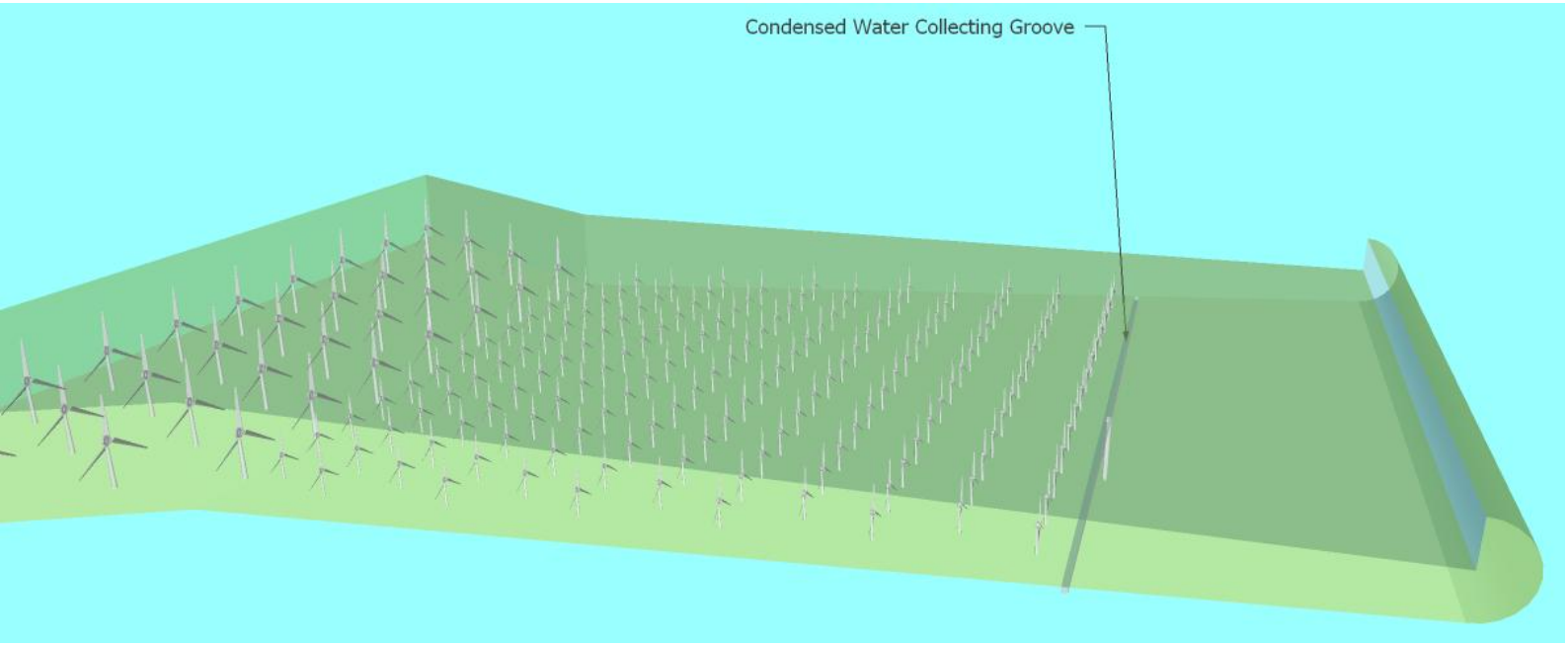

Figure 2-9: Cold Air Output Port

2.5 Condensed Water Collecting Pool

Condensed Water Collecting Pool is under Cold Air Output Port, it is just a pool which can collect the condensed water which output by Condensed Water Collecting Groove in Cold Air Output Port.

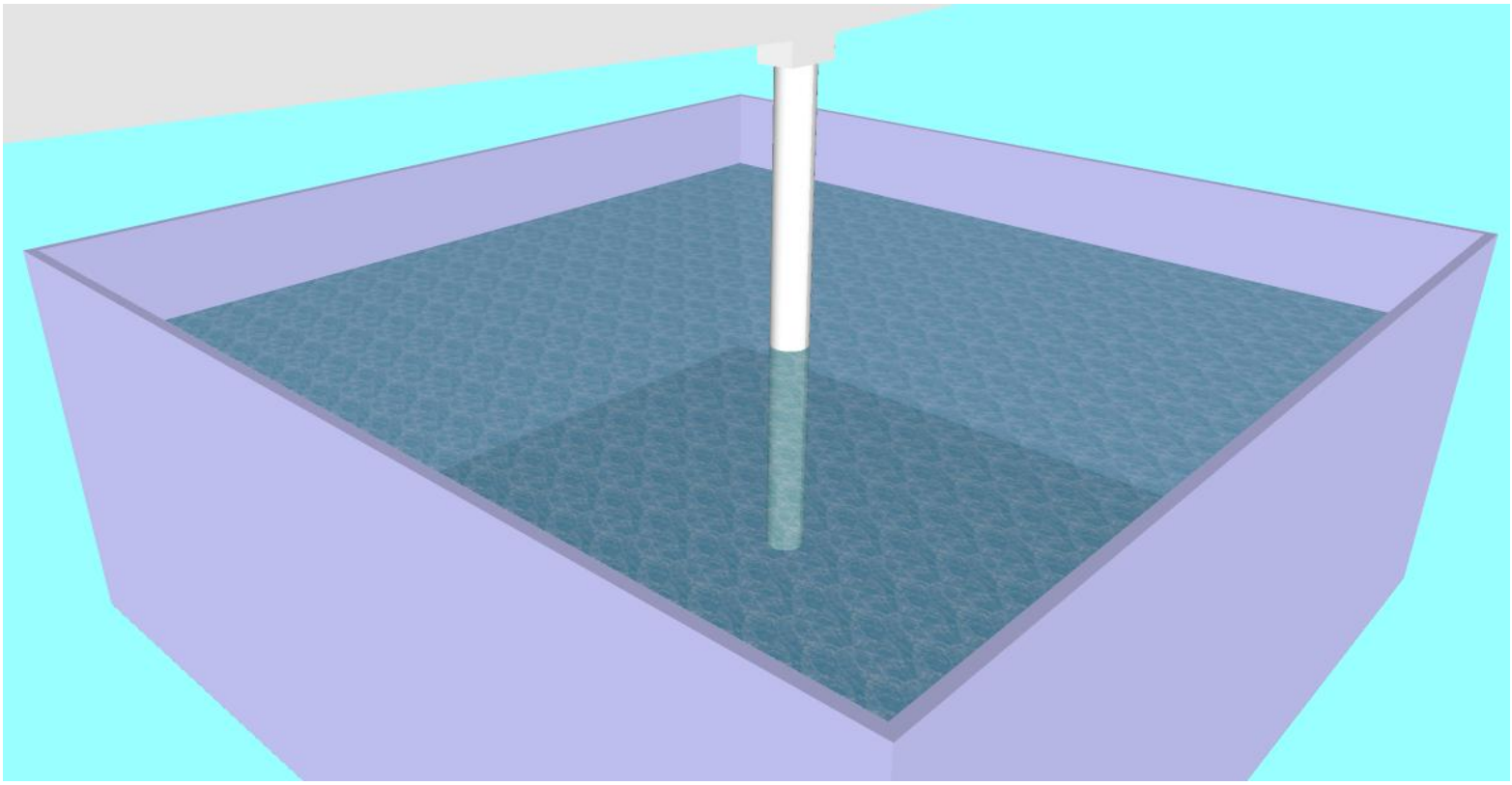

Figure 2-10: Condensed Water Collecting Pool

3. Living Building

Living Buildings is the major heat source of Hot Air Power Station. In the sample of this paper, a Living Building has 90 floors. There are many heat sources in a Living Building. A Living Building is made up with many Standard Modules. For a 90 floors Living Building, it uses 15×15 = 225 Standard Modules.

Heat sources in a Living Building:

1. Sunlight
2. Human body
3. Cooking

4. Household electrical appliances
5. Any other objects and activities that generate heat

When there is no sunlight, there are still many other heat sources that will generate heat to make Hot Air Power Station keep working.

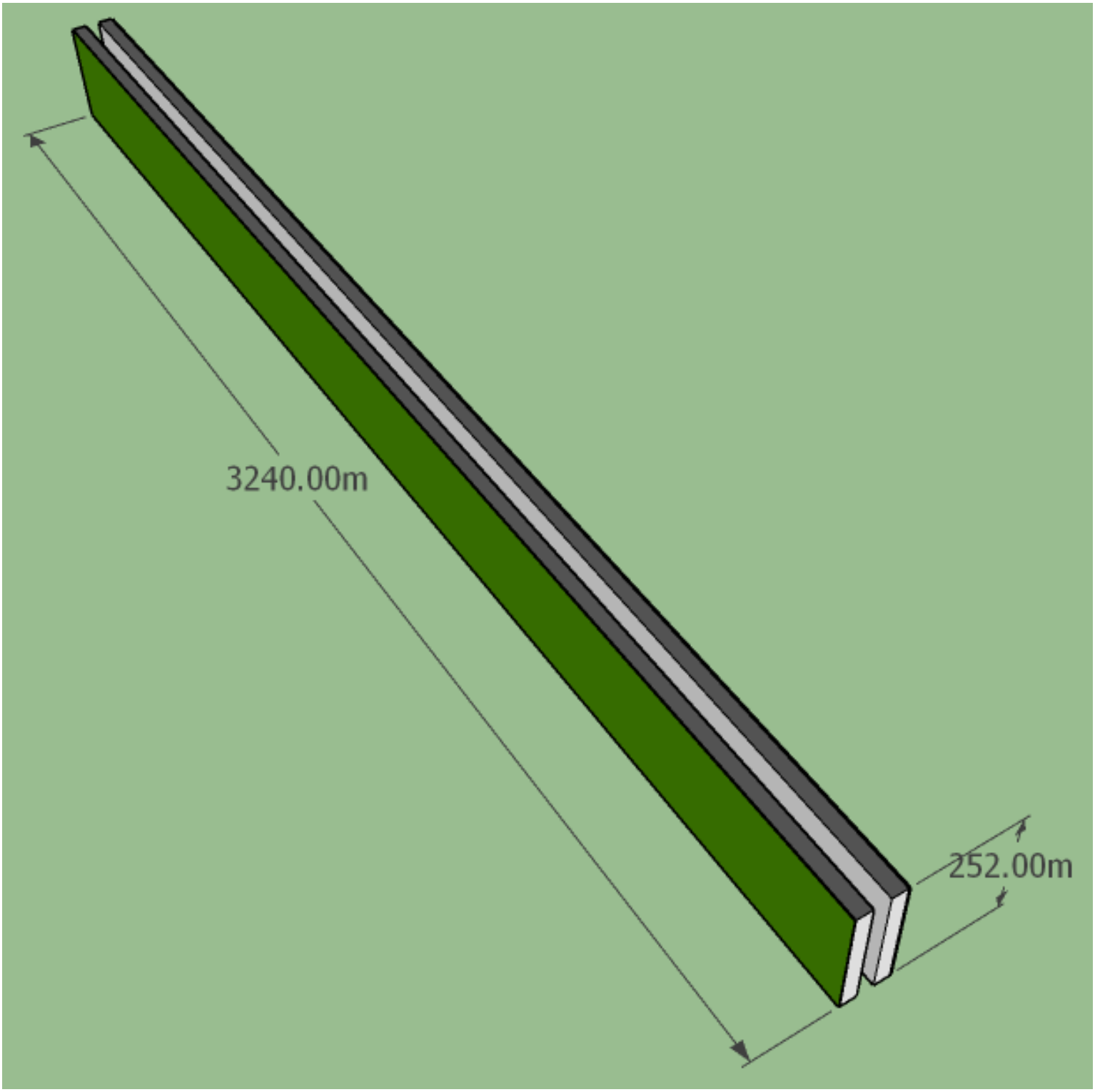

Figure 3-1: Living Building

Living Building has a transparent roof which height is gradient. The roof can let light come in and collect and transfer hot air which generated in Living Building.

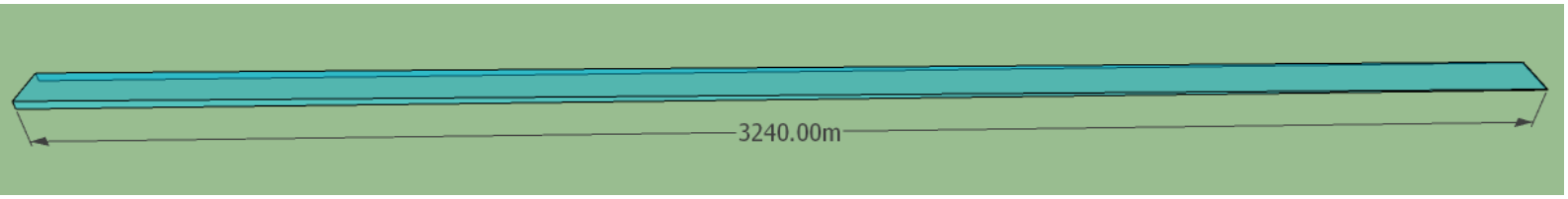

Figure 3-2: Roof of Living Building

3.1 Standard Module

A Standard Module has 6 floors, 204 Living Houses, 6 Service Houses. There are gaps between houses to let light come in.

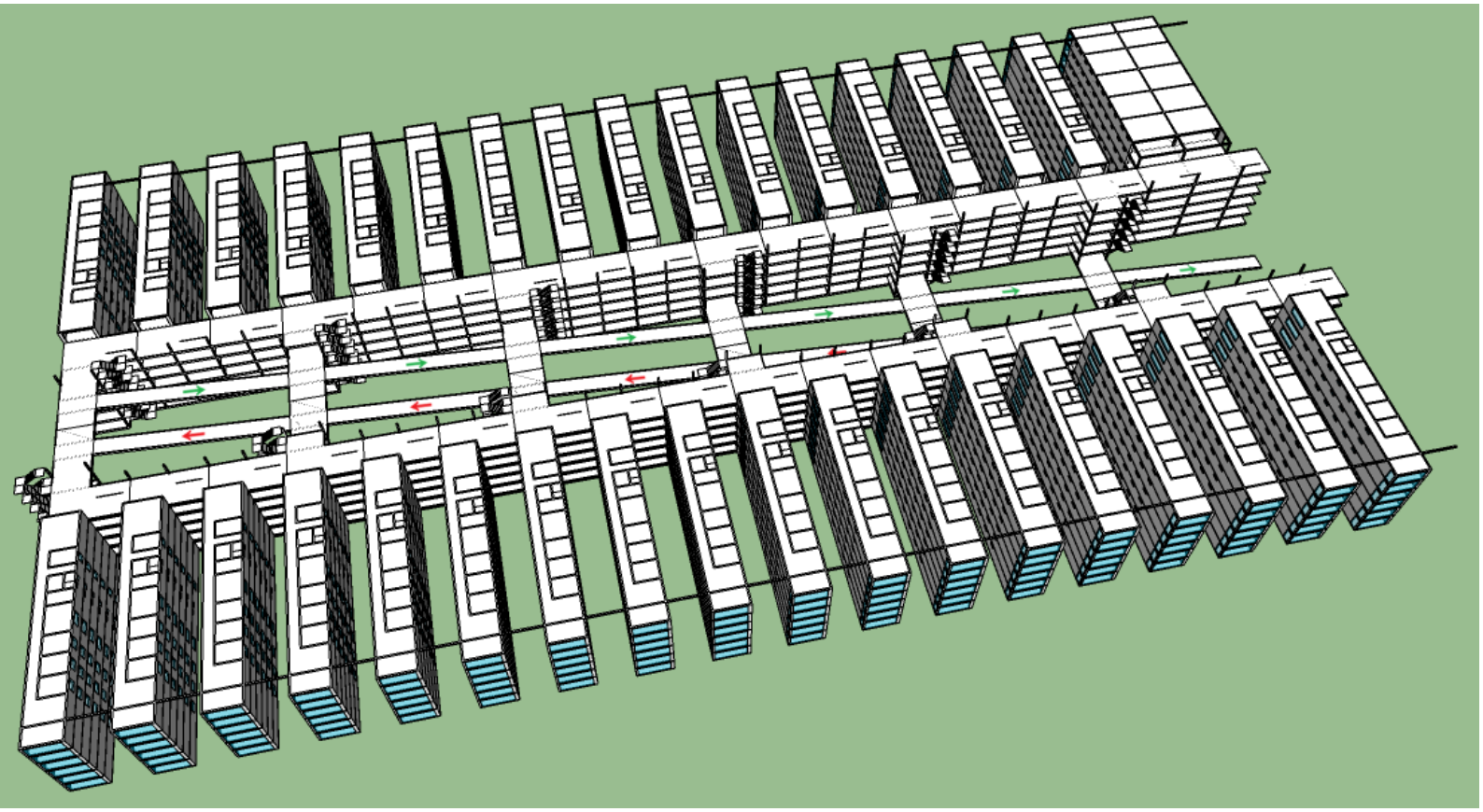

Figure 3-3: Standard Module

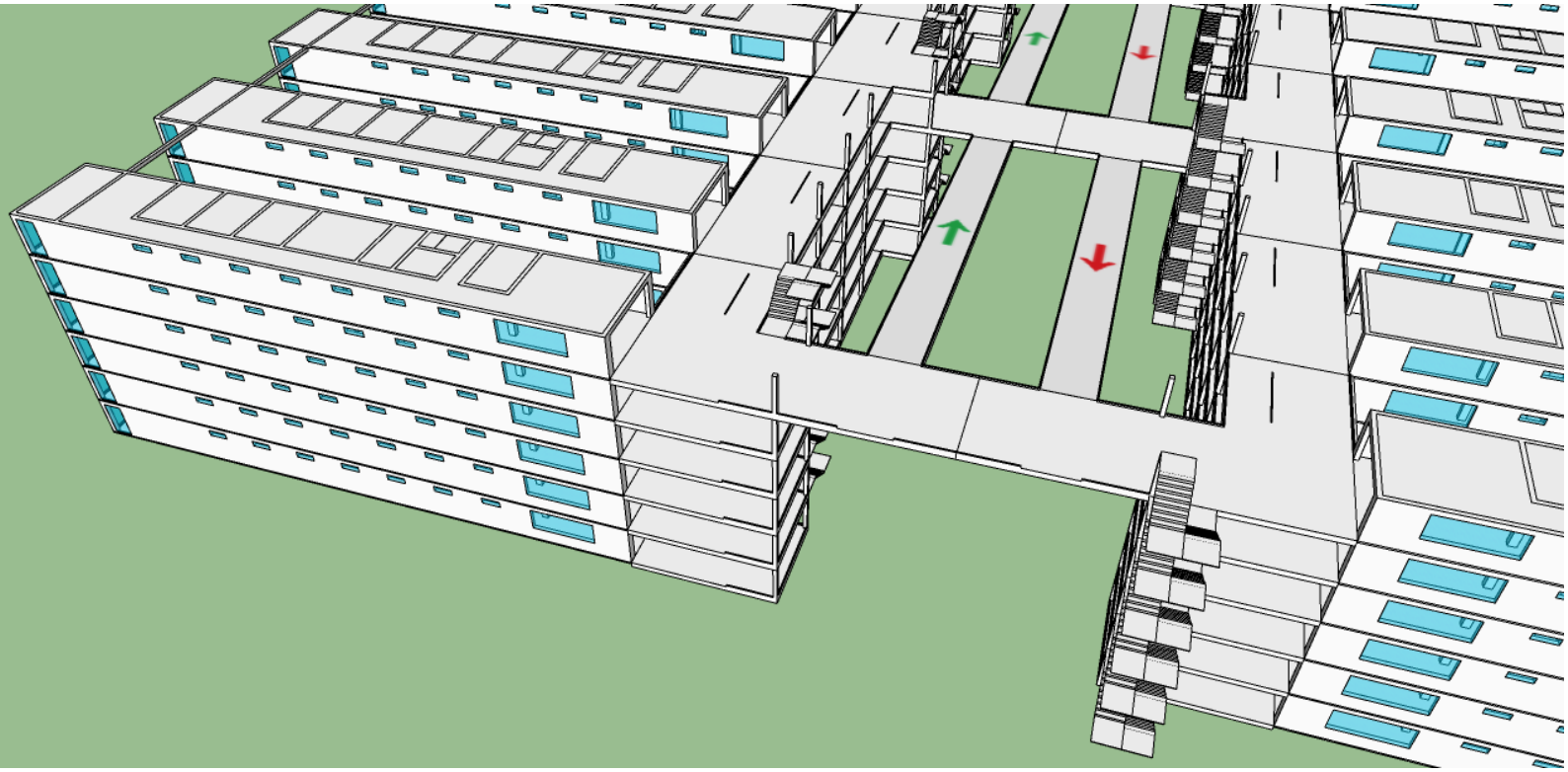

Figure 3-4: Standard Module

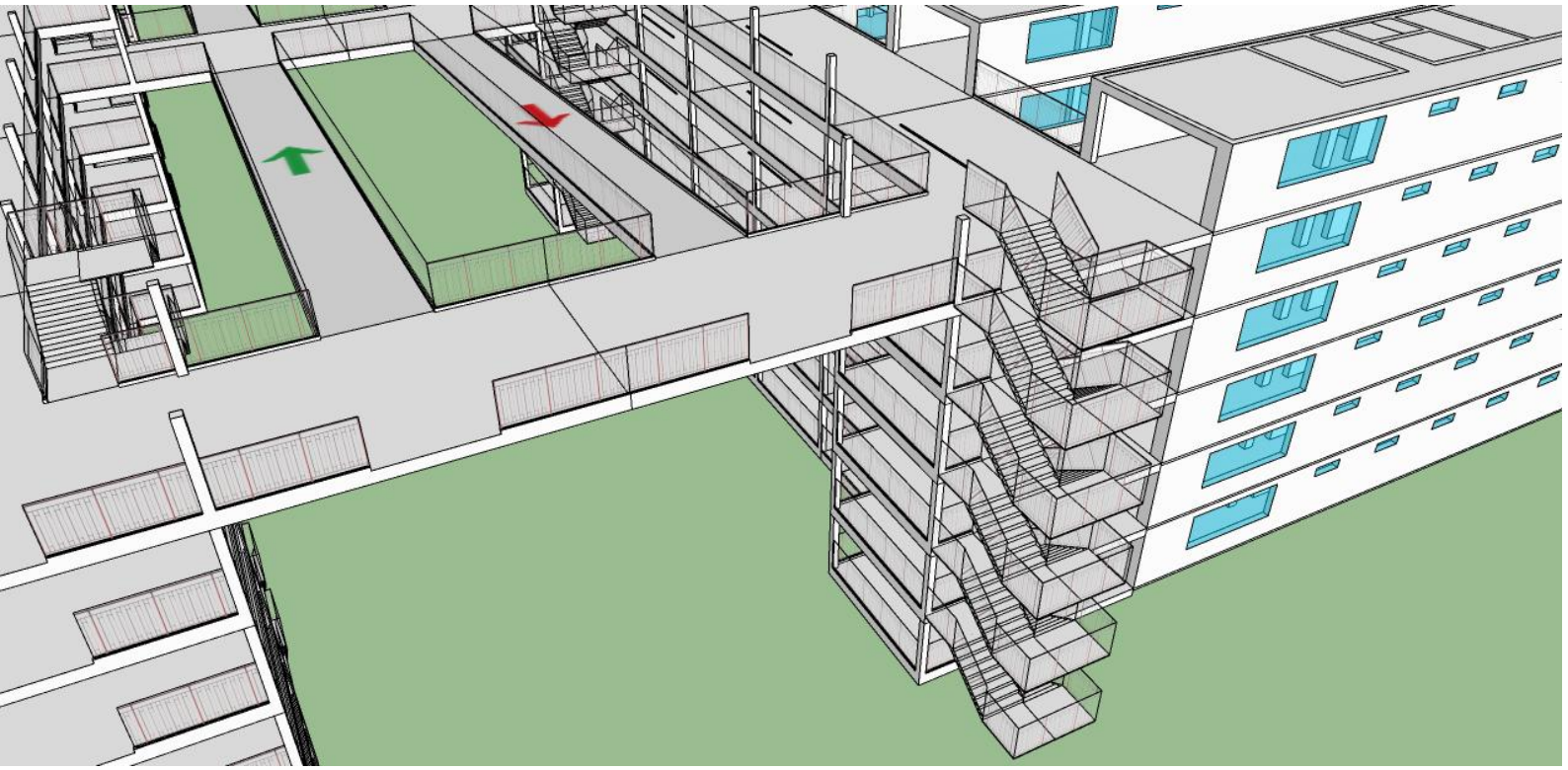

Figure 3-5: Standard Module with fences

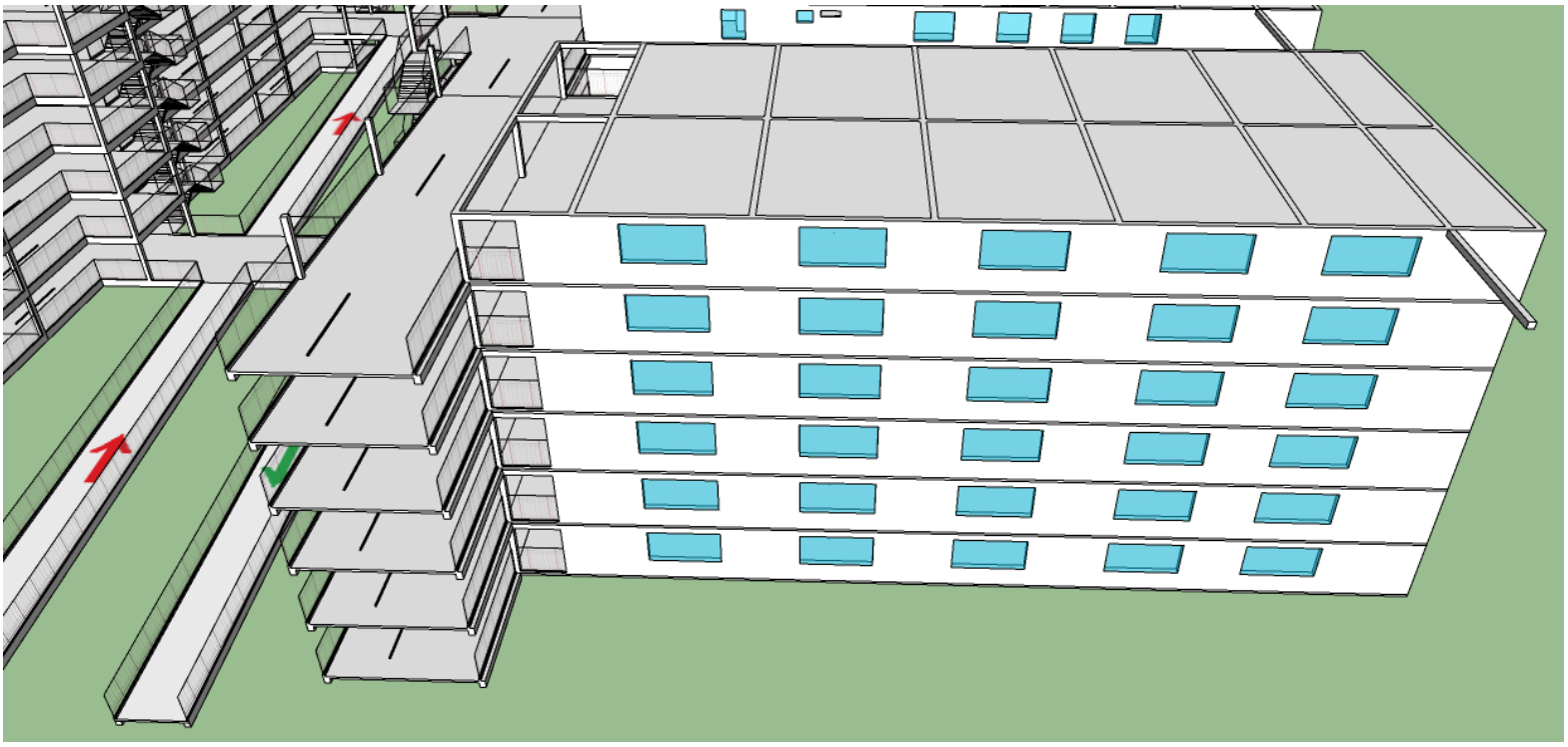

Figure 3-6: Service Houses

3.1.1 Living House

A Living House is 37 meters long and 6 meters wide. It is big enough for most families.

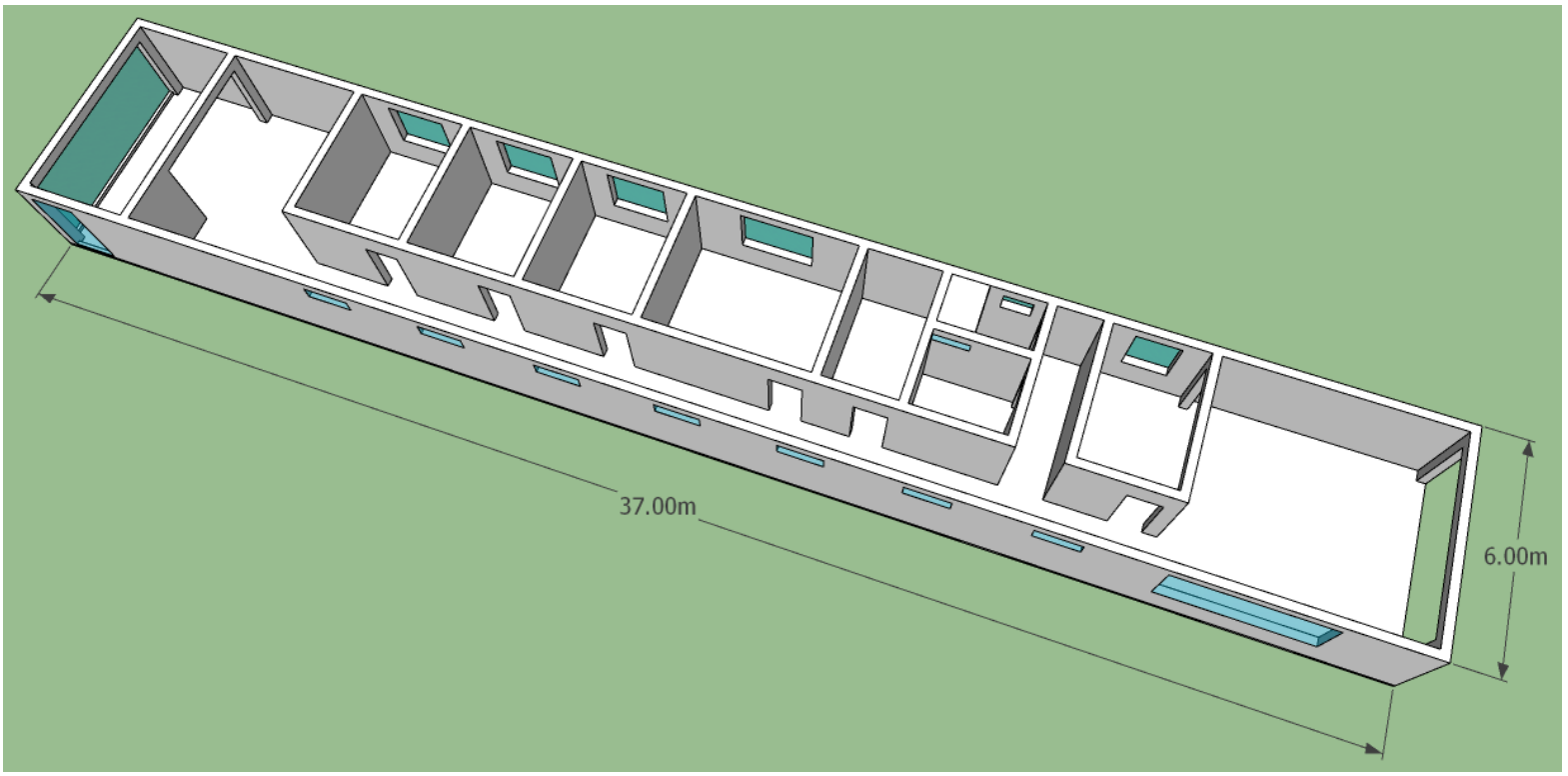

Figure 3-7: Living House

3.1.2 Service House

A Service House is much larger than a Living House to support commercial activities which require a large area.

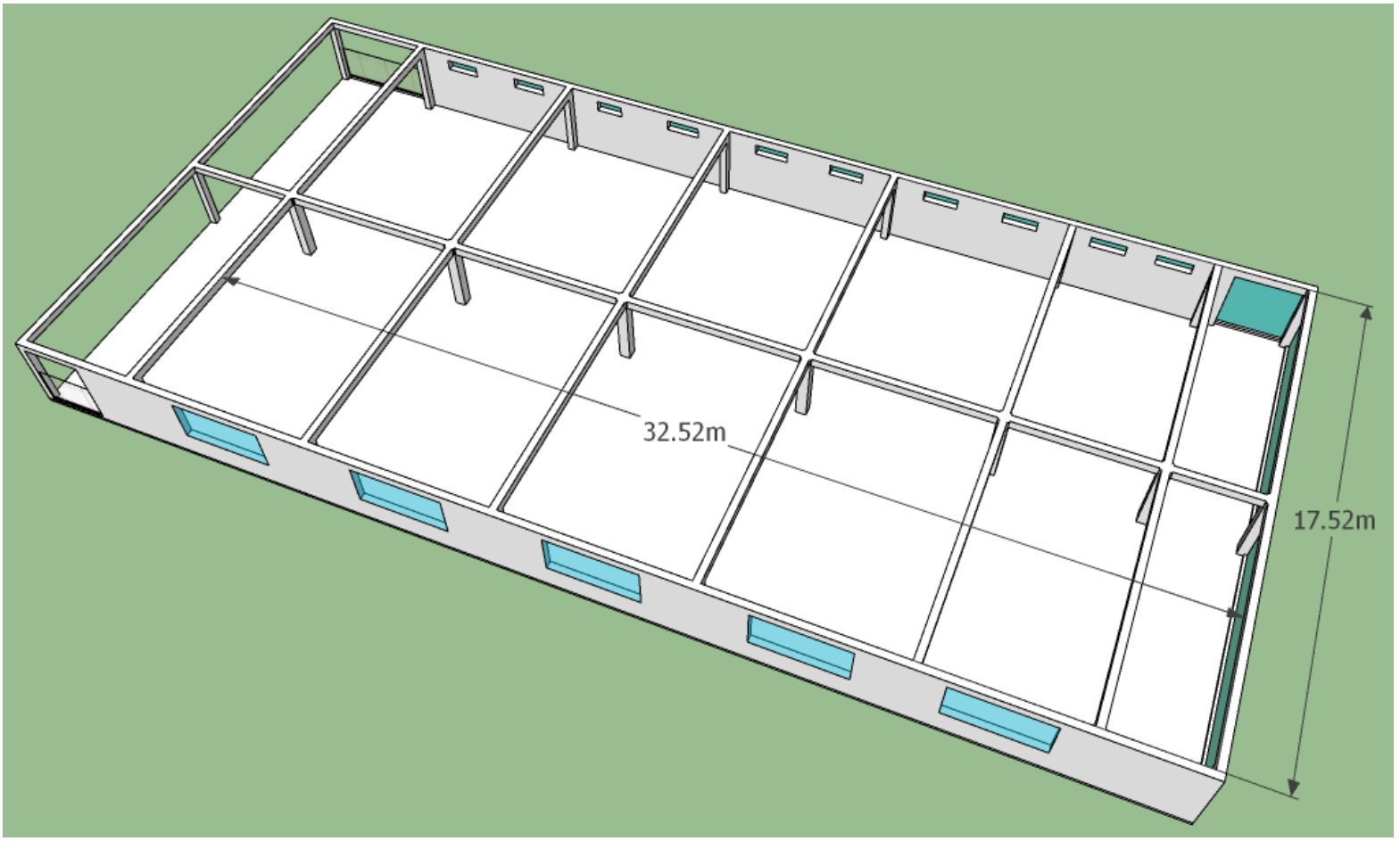

Figure 3-8: Service House

3.1.3 Slope Modules

In a Standard Module there are 6 Slope Modules to allow scooters to move from one floor to another. One Slope Module allows scooters to go up one floor or go down one floor. The width of a scooter needs to below 900 mm. Electric scooters can replace elevators and they are more efficient and more reliable. With an electric scooter, a driver can go any floor and anywhere in the Living Building.

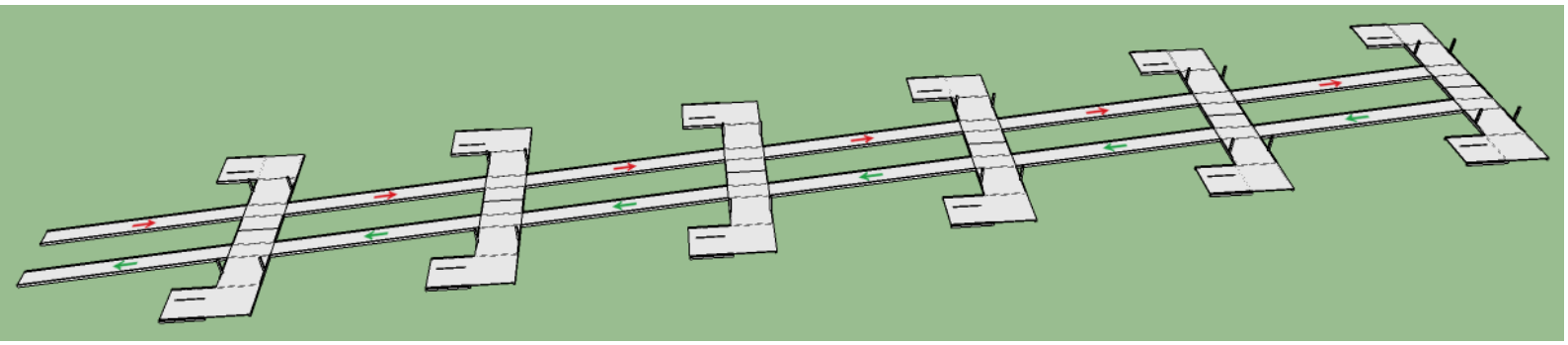

Figure 3-9: Slope Modules

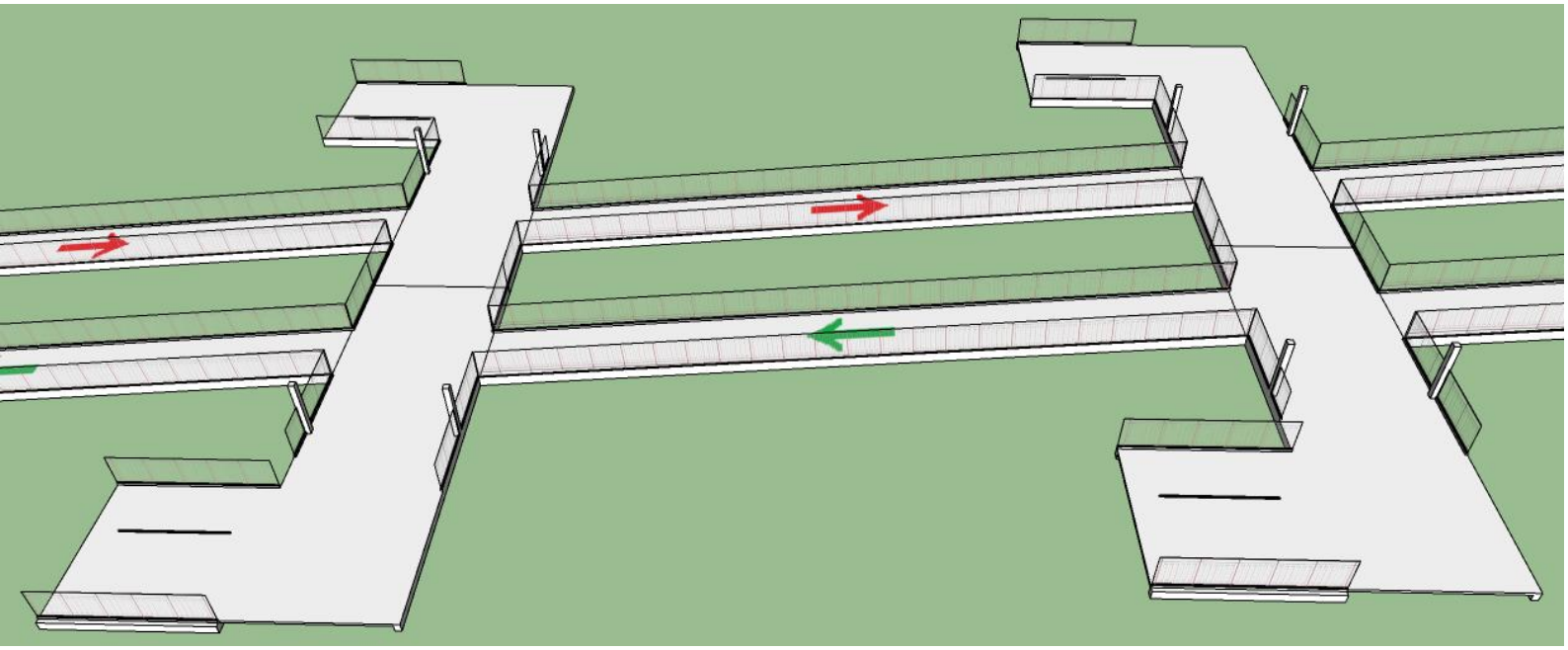

Figure 3-10: Slope Modules

3.1.4 Horizontal Road

The Foot Path allows people to walk on it, and the Scooter Path allows scooters to drive on it. The scooters can only go one direction in one Scooter Path. The width of a scooter needs to below 900 mm.

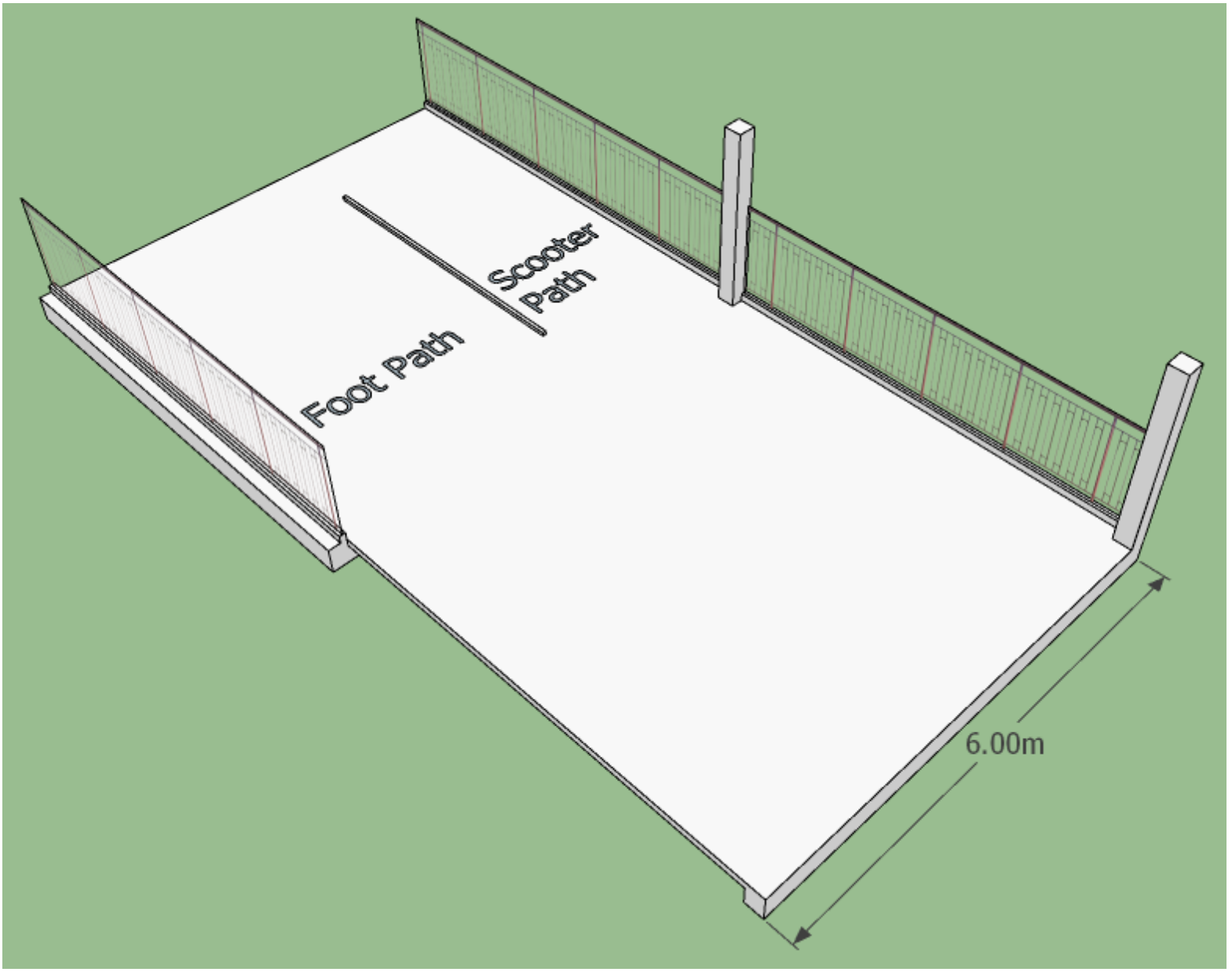

Figure 3-11: Horizontal Road

4. Hot Factory

Hot Factory is just a place where contains a lot of industrial equipments, and the industrial equipments can generate a lot of waste heat. In the past, industrial waste heat is usually directly emitted to the atmosphere. But with Hot Factory, we can collect industrial waste heat and put them into Hot Air Input Port. Then Hot Air Power Station will generate more power. This means we recycle part of the waste heat, and this is the heat recycle mechanism. For example, we can put the heat which generated by Coolers in Second Stage Cooling System into Hot Factory, then part of the heat

which generated by the Coolers can be recycled. We can put many industrial equipments into Hot Factory to recycle waste heat. Hot Air Power Station is very close to Hot Factory, so it is convenient that Hot Air Power Station provides power for the industrial equipments which in Hot Factory.

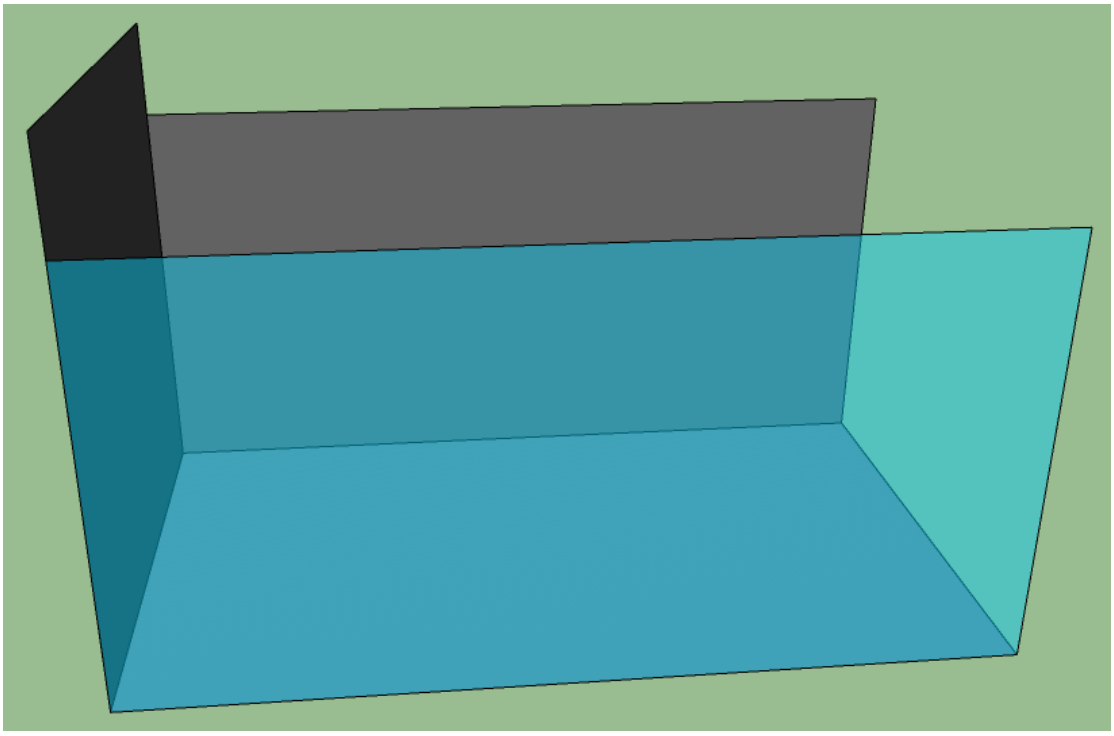

Figure 4-1: Hot Factory

The height of Hot Factory’s roof is much higher than the height of Living Building.

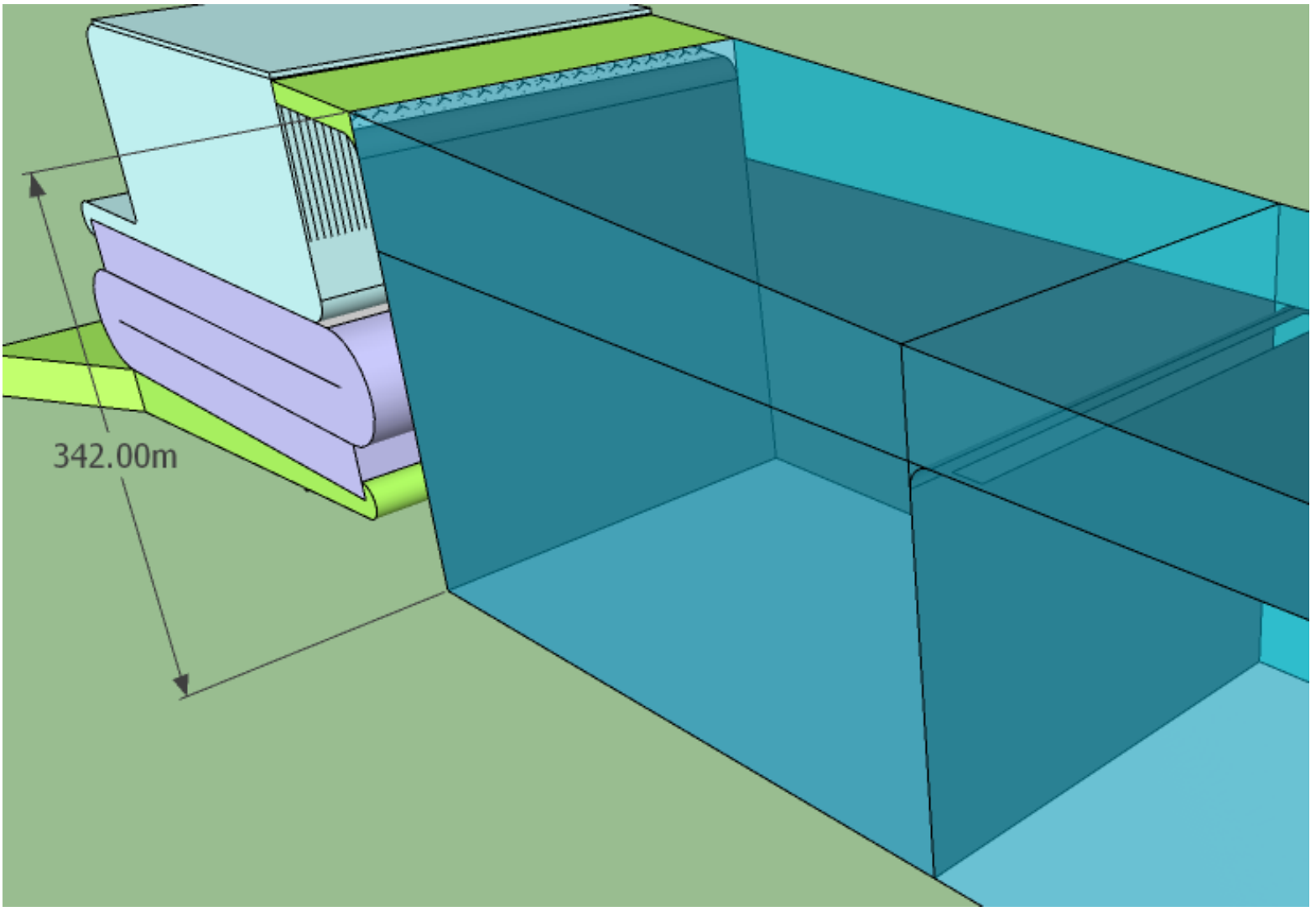

Figure 4-2: Hot Factory

5. Vertical Farm

Vertical Farm is not necessary, but it can separate Hot Factory with other buildings. Vertical Farm needs a lot of electricity and water, and it is just what Hot Air Power Station can provide. Vertical Farm will also generate a lot of heat and Hot Air Power Station can recycle some of the heat.

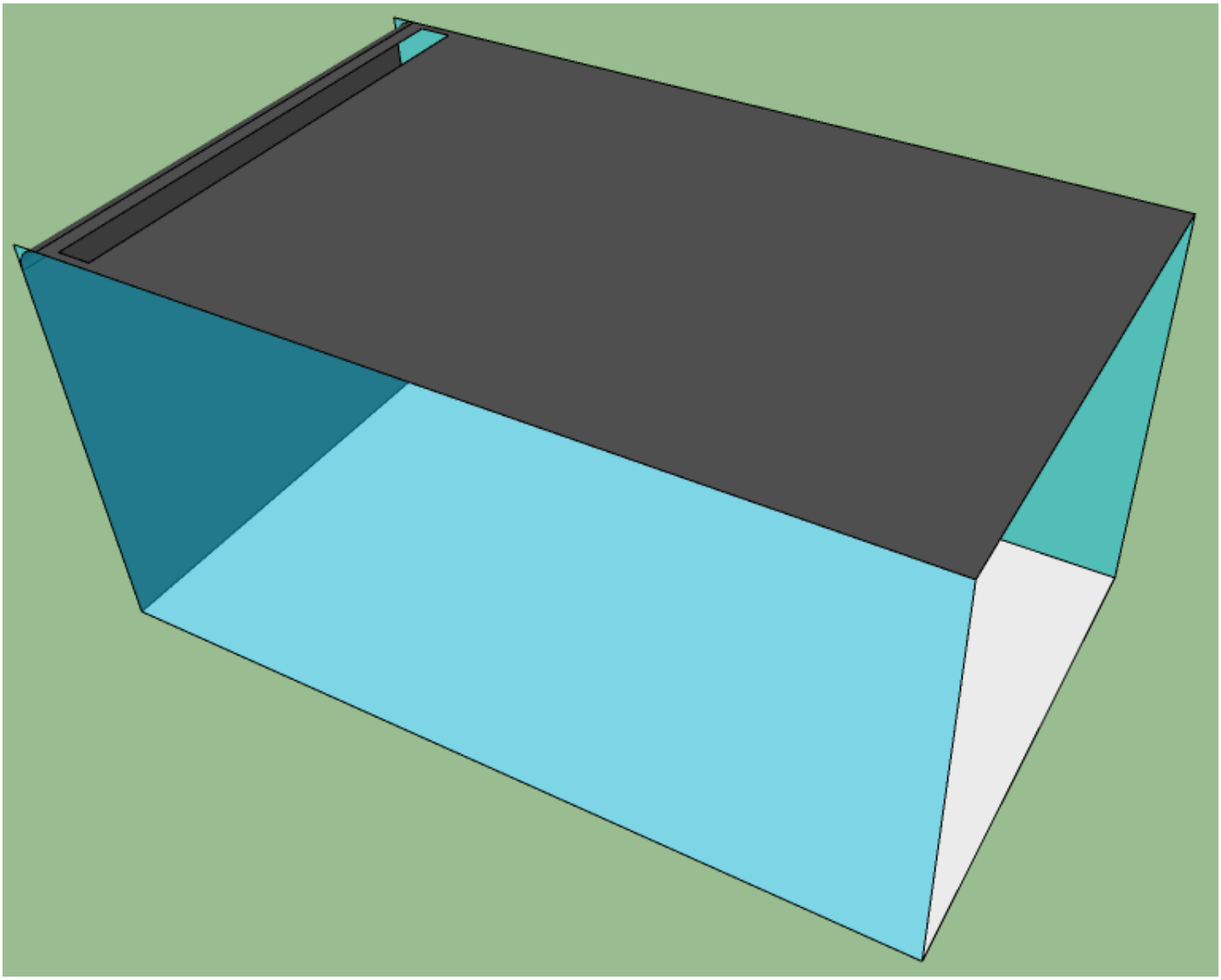

Figure 5-1: Vertical Farm

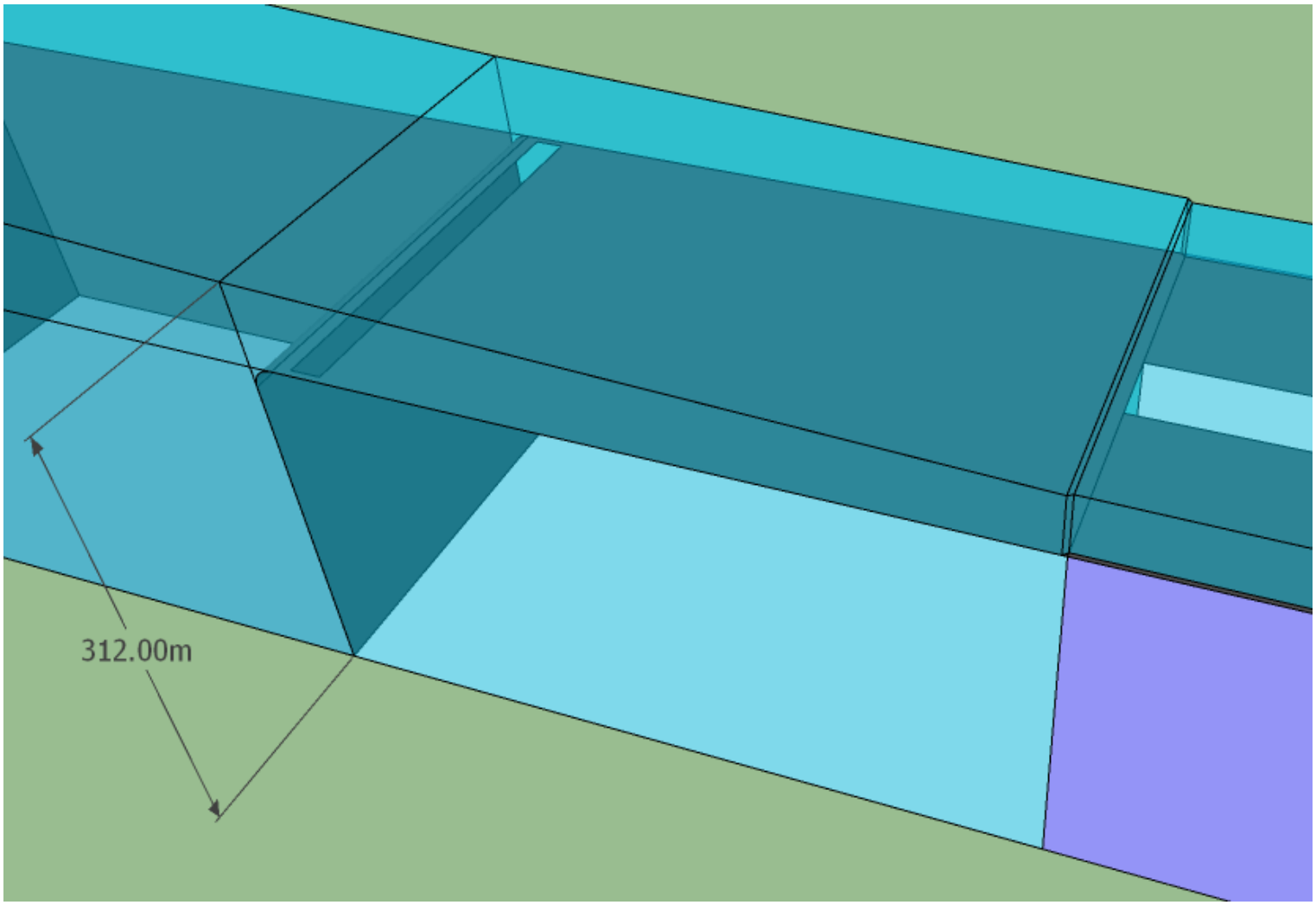

Figure 5-2: Vertical Farm

6. More Power

If the power of Hot Air Power Station is not enough, then we can put some more Wind Turbines on the top of some other buildings to create more power.

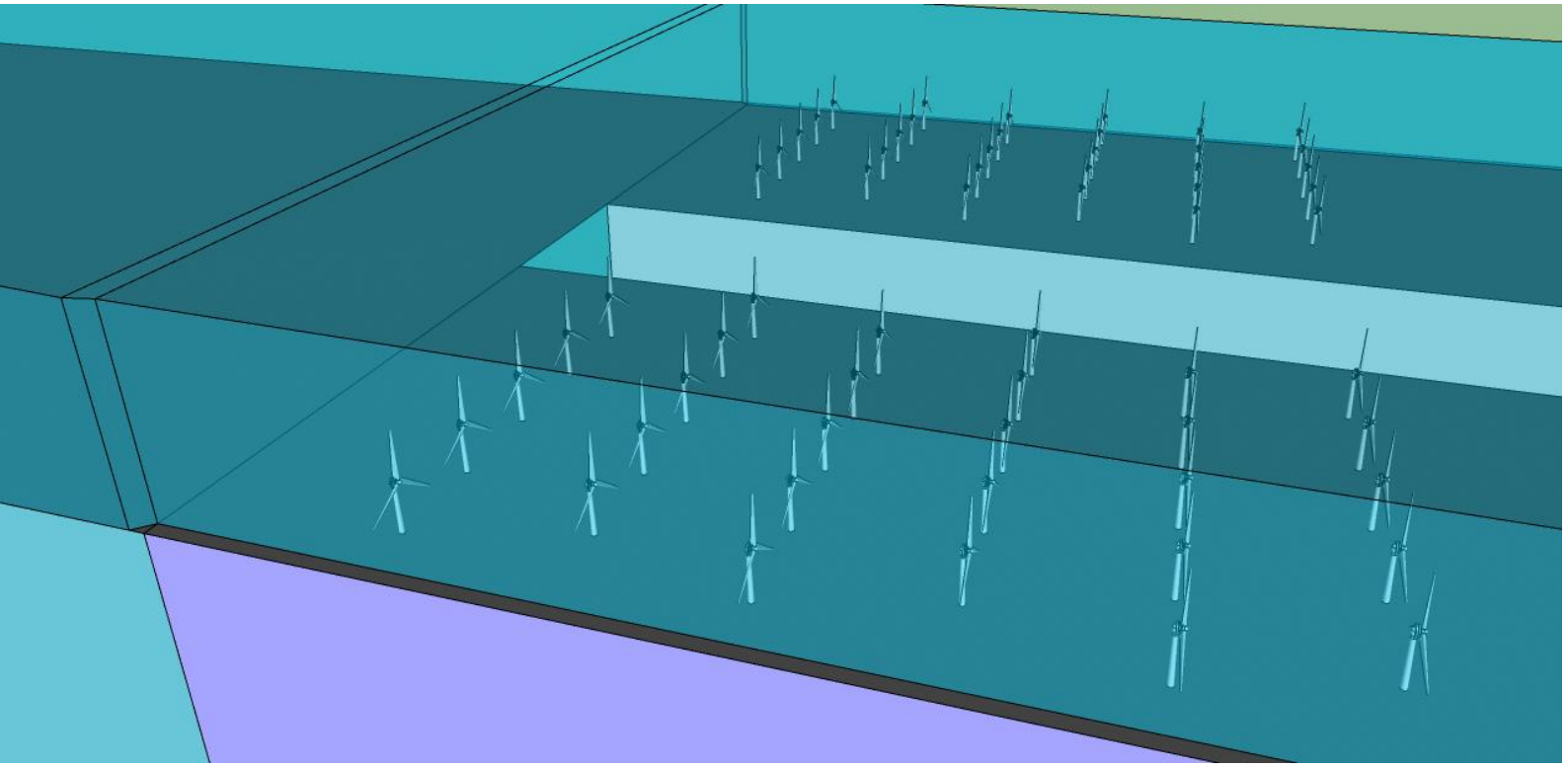

Figure 6-1: More Power

7. Conclusion

With hot air Hot Air Power Mega City Building can create electric power and fresh water. And it does not require an elevator to make it work. It has efficient transportation systems which are more reliable than elevators. The transportation systems can be completely powered by electricity and with zero automobile exhaust. In order to make a Living Building work efficiently and suitable for living, this paper proposed a Standard Module. With many Standard Modules, we can make up a mega Living Building. It allows humans to develop high space at a lower cost. And Hot Air Power is sustainable green power. Hot Air Power Station is not just clean, it can even clean the air and eliminate haze. Hot Air Power Station can also recycle part of the energy which has been used in the building. Hot Air Power Station uses the heat exchange reaction between hot air and cold water to generate power. To make the hot air cool down quickly and efficiently, this paper proposed the Drooping Cold Water Infiltrated Cotton Strip Array. The fresh water is a by-product of Hot Air Power

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