Innovation by Design
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Module – 04
Start of section 6
Lecture - 26
Understanding the Technology: Performance in different locations

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We said now we will get into manufacturing, if I go for manufacturing of polycarbon; polycarbon is very expensive. So, we tried can we use floated boards because we know this boards are used for shelters have you seen this its used in bus stops these are dual walled polycarbonate sheets which are there.

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So, we took the sheets and we made one quick model and we found that it's not working.

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Here we realize that the efficiency model is so narrow flask that any experimentation is taking us back through the drawing board.

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The transitivity in this is reduce of 20 percent and even 20 percent reduction in transparency is not allowing us to go forward. So, that is a very big lesson for us.

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So, this you know picture shows you how we tested it and it did not work and our temperatures are as low as 60 degrees. 60 degrees is just warm water, not even boiling water.

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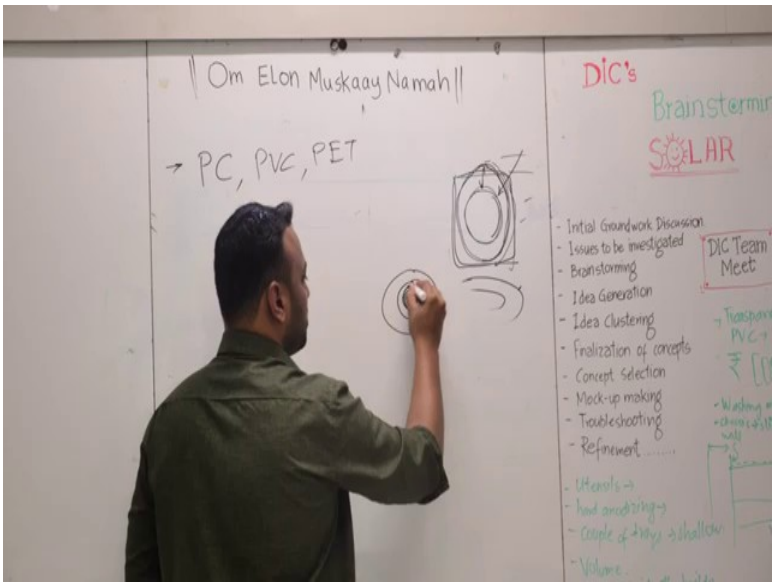

Then Avinash called for a brainstorming session. there are engineers there, researcher there, there are designers all working under the project will join in and when you have this group discussion there are some interesting ideas which can come up during your you know brain storming session itself.

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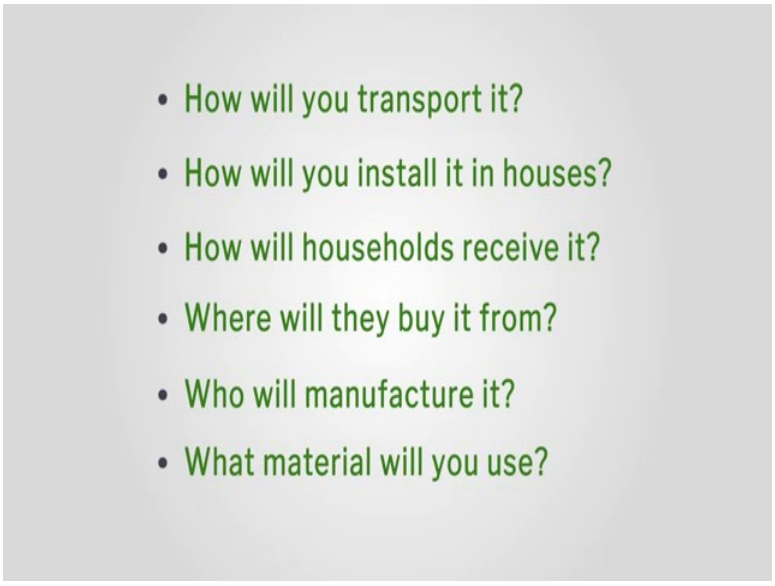

You start even worrying about how will you transport it, how will you fix it in people's houses, how will they receive the product, where will they buy it from, who will

manufacture it, what materials they use, will it be economical or not? So, you take care of all the aspects in your brain storming session and map all of them together.

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Look at the type of options rigs we made for various trials, then we also had this doubt: will a smaller volume be better; smaller box the better is the conduction and heat valuation. Then came the breakthrough we went to professor Kedare; Kedare is our head of the department of energy science, but here we did a mistake we did very late and professor Kedare gave us some wonderful insights of what happens.

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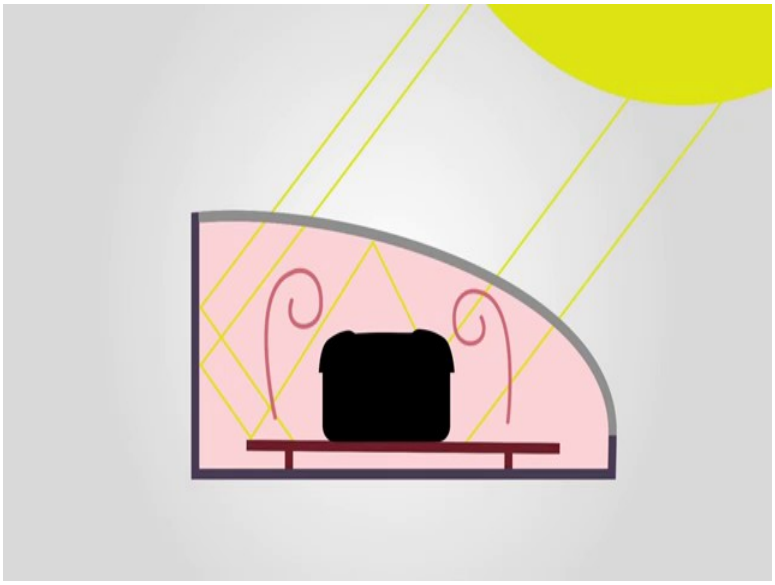

And we cleared all our doubts, but he gave us full idea behind science.

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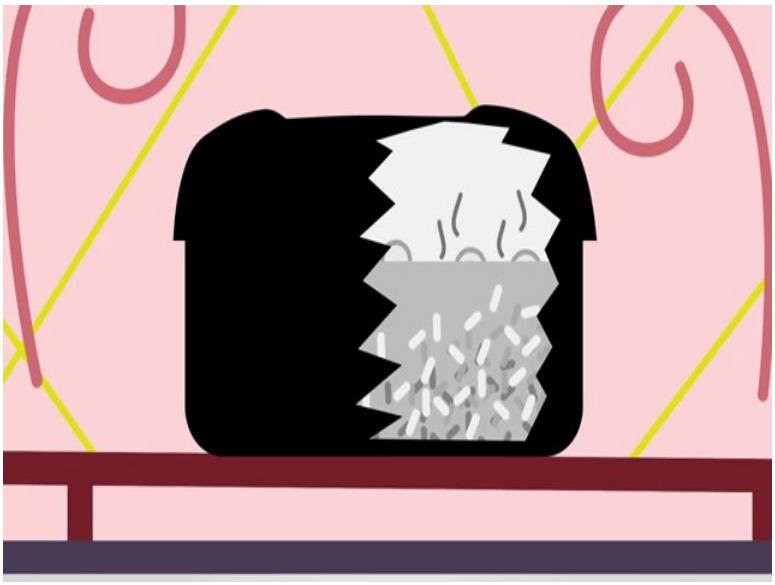

Behind the thermal conduction the value of proposition of each material in the product we are using how conduction happens between the hot plate inside the oven to the utensil having the rise. So, we did it all those studies.

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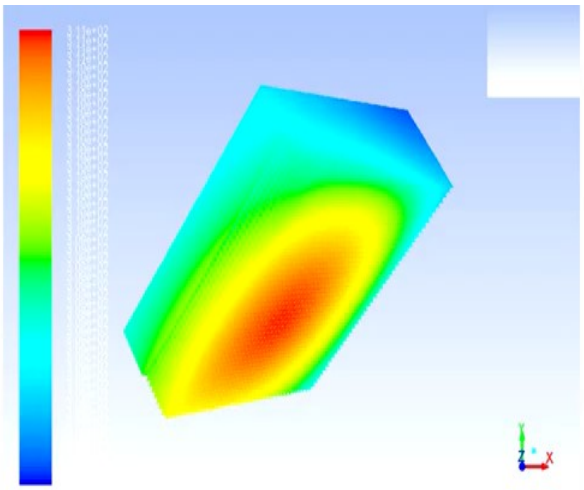

And we also did thermal analysis using softwares to check out in different conditions in the country.

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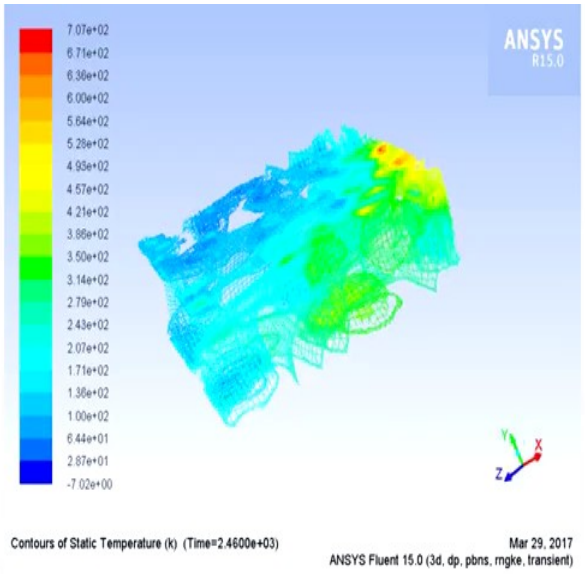

You can create different environments you can create different temperatures we did all that.

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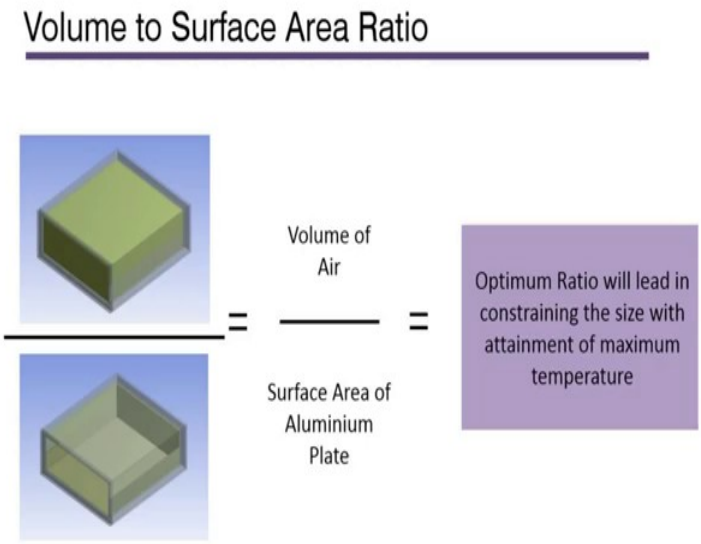

And we actually came up with the parameters of the material thickness which is very critical.

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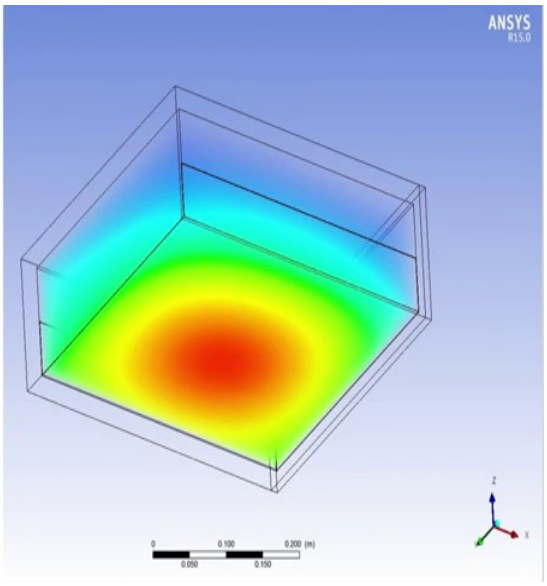

We looked at you know the cooking temperature by you know constant measurement and the volume of the surface ratio was also very very critical. In comprehensive you should understand that that is you are talking about cooking right.

So, we checked up what temperatures you know for various food requirements and then here I had a very interesting encounter with a businessman in Surat. So, then he asked this you know person [FL] *'yaar meko ye solar owen bechna hai'* (Translation: Friend i want to sell this solar owen) What do you think? He said do not sell as the solar oven sell it as a rice cooker. See such a good insight if you sell it as rice cooker everybody will buy and nobody will complain saying that [FL] *'Daal nahi pak raha hai'* (Translation: Pulses are not cooking). See so, smart you are using a solar oven. So, you just call it as rice cooker and then buy while your rice is cooking you can do the other cooking in your regular gas stove and you are still saving a huge amount of fuel.

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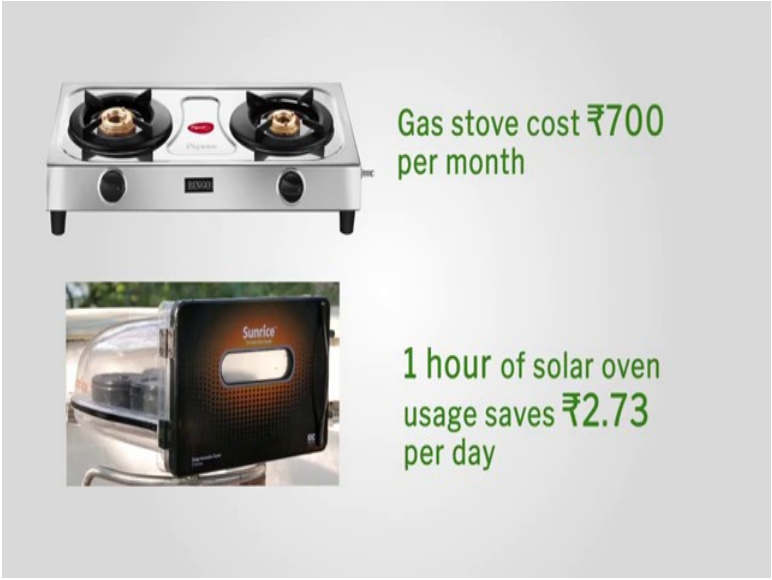

And in three years you get the cost of your solar oven back.

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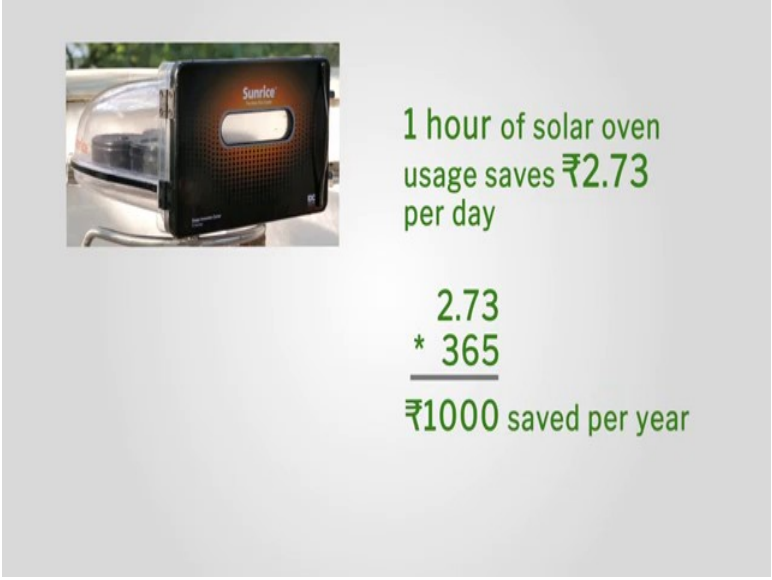

You can just calculations whenever thought about all these.

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He said I am going to sell it and tell them then in 3 years they are going to get the cost back and they are going to get good health because slow cooking is very good for health and its tasty food.

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So, multiple levels start coming, so that was the utilization which happened then you know we went back to the drawing board.

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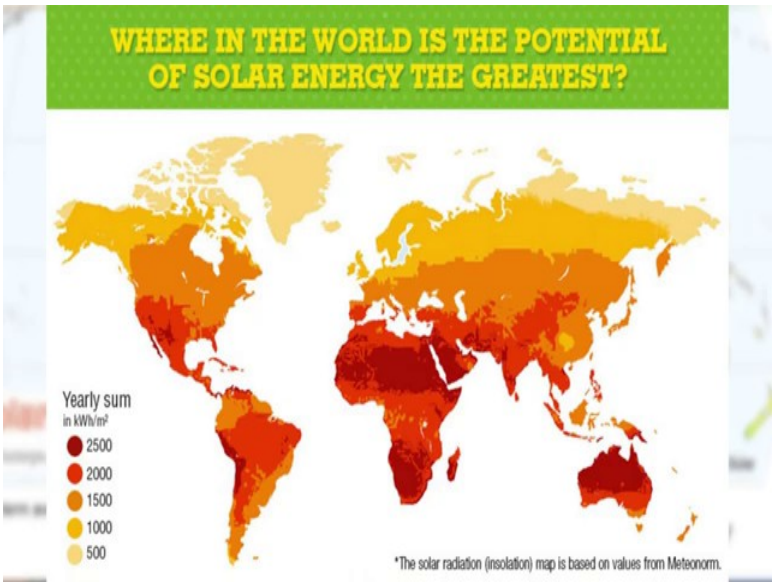

We checked out what is happening in various you know aspects of locations and workability.

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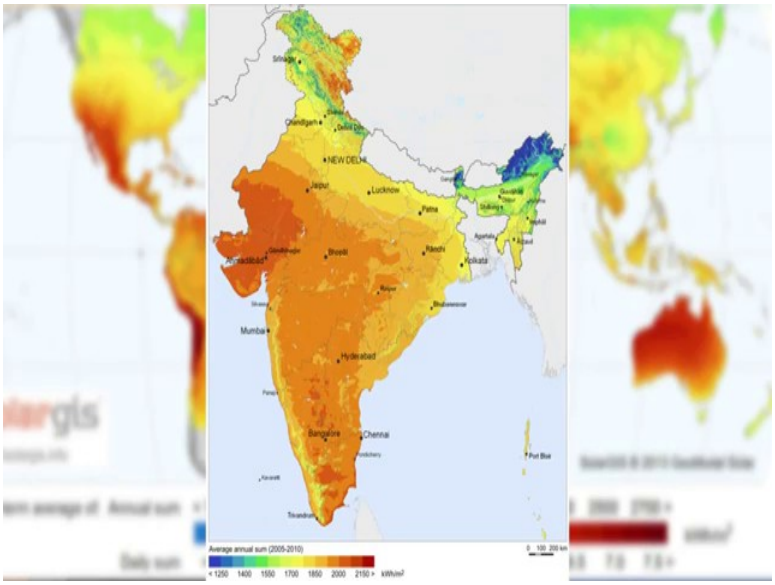

We checked out the temperatures ranging at different locations.

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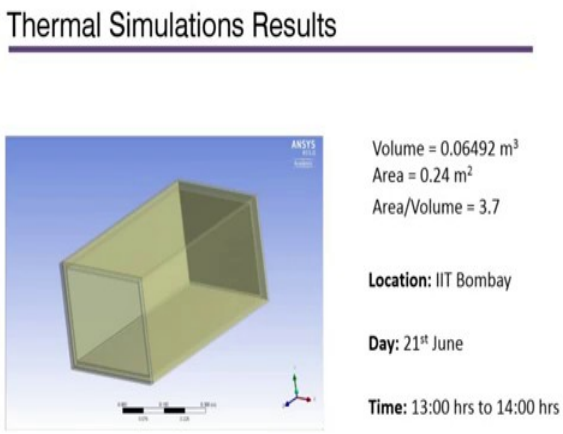

We looked at the thermal simulation results because of very good simulations done.

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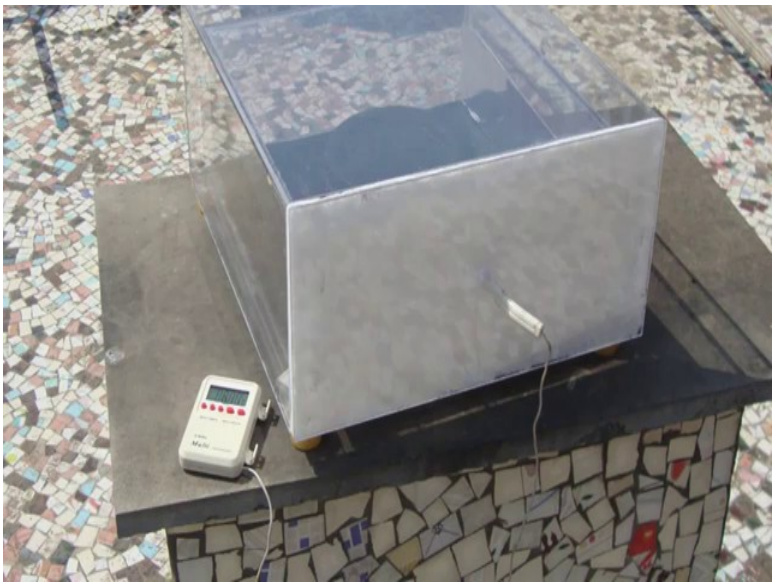

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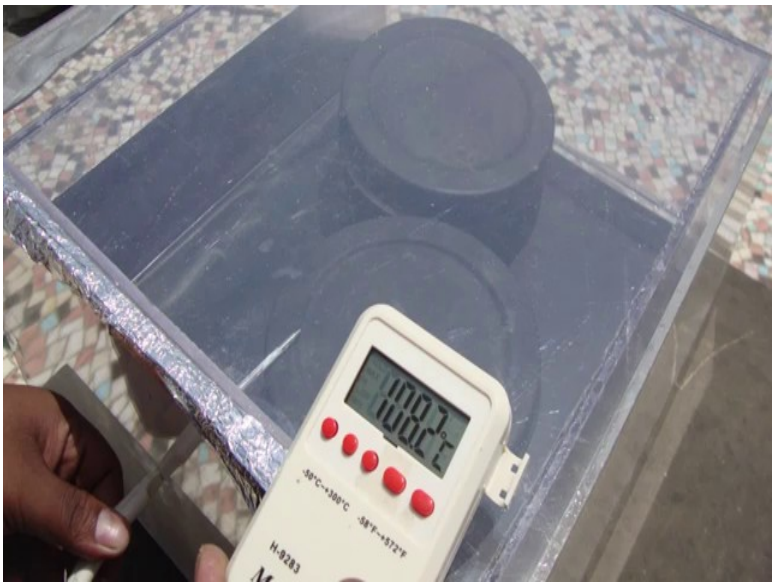

And in the simulation we actually you know got very good temperatures of around you know 98 108 degrees.

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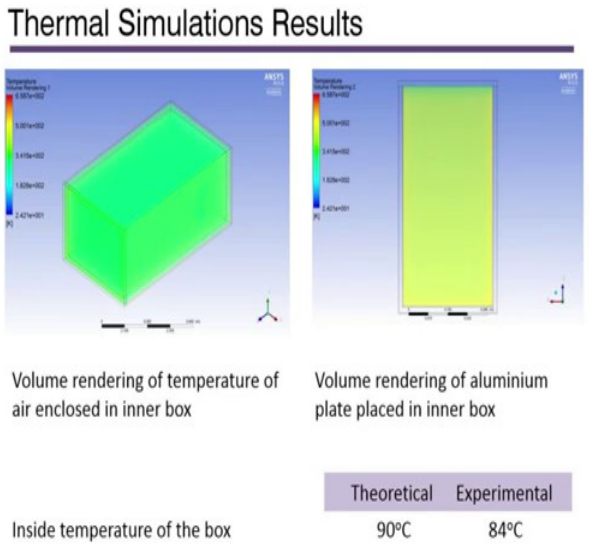

Then we went did theoretical studies forget what about temperature we getting in Bombay, what is the temperature we are getting elsewhere and we then know in 90 degrees you can cook rice.