[SQUEAKING]

[RUSTLING]

[CLICKING]

PROFESSOR: And then, so the reason why all this matters is heat is a big deal. 90 percent-- and you can study this. These are wonderful charts to study. But depending on what you want to do, heat is almost always involved, heat being a transfer of thermal energy. And so 90 percent of the current energy budget basically goes through the middle in some way. That's a lot.

But then if you look at things like this-- which you shouldn't, because you can't read it-- but if you blow up-- these are all the inputs on the left, all the ways we make energy. Here's how we use it. And here's the result.

Here's where I want to get the punch line, is rejected energy. Whatever these units, doesn't matter, it's 60 percent. What does rejected energy mean? Wasted. All this precious fossil fuel, stuff we're burning, and all the solar energy we're collecting, anything we're doing here-- 60 percent of it goes into heat, wasted heat.

And so the reason why this matters is because there are these materials that we can use to try to capture some of that. All right? There are materials we can use to try to capture some of that, and it all comes down to chemistry. These are called phase change materials.

And if you plot the melting temperature-- that's this. That's this melting temperature, right? Tm-- versus how much of its delta H, how much delta H you have, you get all sorts of classes and materials.

But, you know, so you might want a certain melting temperature from wherever you're operating, but then you might not get a high enough delta H. Or you might want really high delta Hs, but then the thing doesn't melt until 700 C, which is way too high. So we've got to fill this out. We need materials here. We need materials here. That's a call to chemistry. That's a call to chemistry.

And it all has to do with the phase change. It's a weird name. These are called phase change materials, but that's true of all materials. But here, when you're talking about storing thermal energy, we use the term phase change materials.