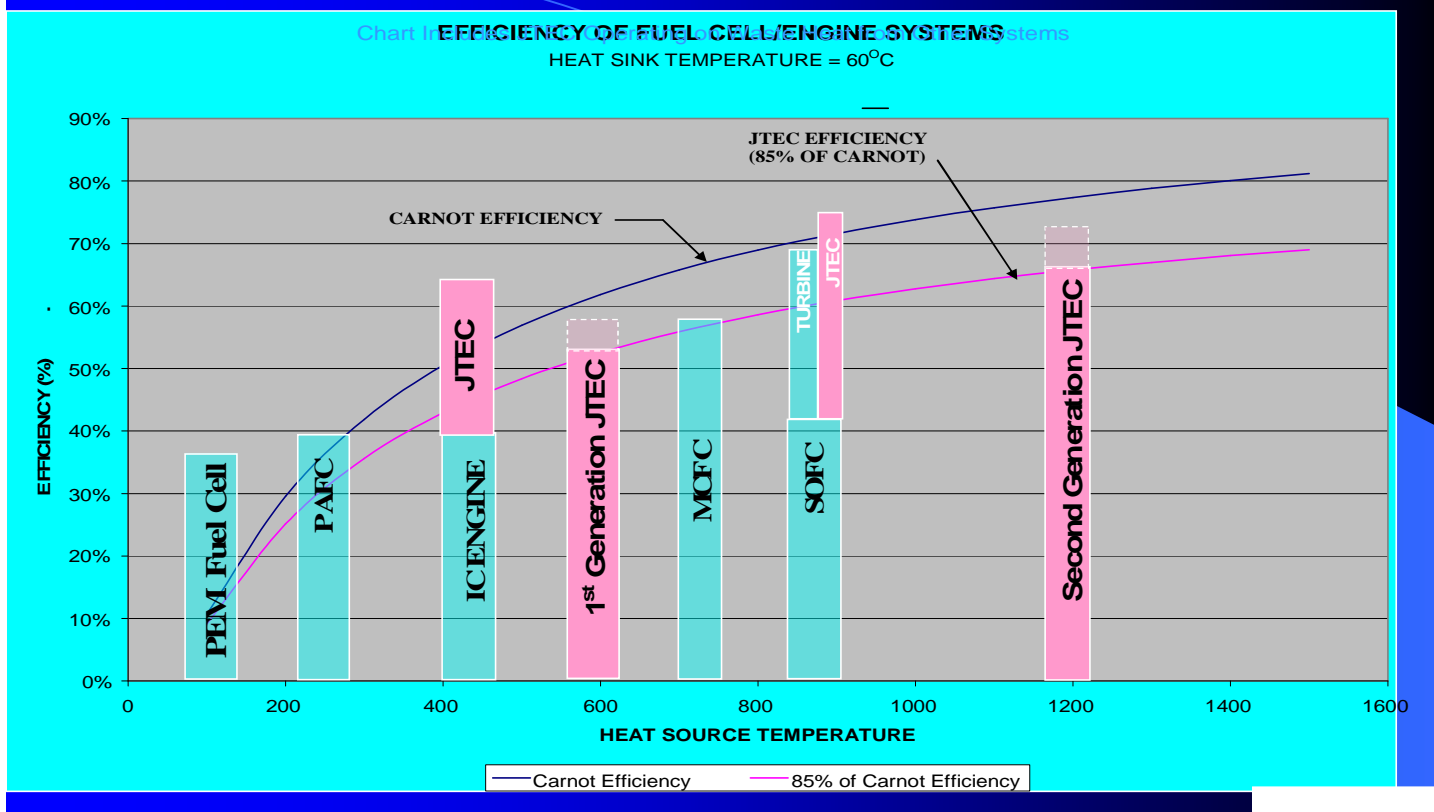


Global Significance of New Energy Technologies from Johnson Research (Atlanta) and Tuskegee University

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Background: You all know that high gas prices are a big issue for the consumer, and that we need to worry about what happens in case gas prices really start going through the ceiling over the years to come. In recent polls eighty percent of the US people say that the nation is on the wrong track. A substantial majority expect their children to be worse off than we are today. You also know that our growing dependency on oil imported from the Middle East presents a growing threat to national and world security, with the potential to grow into an intractable kind of world war, if we don't find some way to ease it off. I've spent a lot of time trying to understand all the technology options available to us today to try to cope with these challenges, as well as the economics of bringing these technologies to the real world.

If JTEC works, we **don't need fuel cells** for cars & can use **any fuel!!!**



That's why I was really amazed, intrigued, skeptical but curious and open-minded when I saw this bar chart from Lonnie Johnson's company sitting on a poster board at Tuskegee University, when I attended my NSF Division's Grantees Meeting there a couple of months ago. What it says on this graph

sounds almost outrageous. It shows a new technology, "JTEC," which I never heard of before, offering 'way better efficiency than anything else you could ever use on a car.

Now when you think about it -- how can we reduce the amount of gasoline we need to buy, in order to get to work or get to stores? There are only two ways. We can improve EFFICIENCY -- that means, reducing the gasoline we need per mile. ("Raise mpg.") Or we can create FLEXIBILITY -- our car's ability to use other kinds of fuels, especially the fuels which industry could produce cheaply and efficiently in large quantity.

According to this curve, this unknown JTEC can give us a lot more mpg than anything else anyone is working on!!! What's more, another slide on that same poster board said that JTEC is a technology to convert HEAT to ELECTRICITY. It's not like a traditional car engine, that burns fuel inside a special chamber ("internal combustion"), and requires a very special kind of fuel to "fit" in that special chamber. It can use any source of heat -- which means any fuel at all that can be burned, or any other source of heat -- like heat from the sun!! That implies a monumental amount of fuel flexibility -- and more applications than cars alone. If this works, and if we can afford it, it makes every other engine on the road obsolete, and it does the same for every other source of daytime electricity. It still would need the same kinds of electric motors and solar reflectors that we are developing today; however, it offers a kind of plug-in replacement for the engines and generators we use today, and doubles what we can get.

That's what the curve says. But can we take the curve at face value? Certainly, after 18 years at NSF and ten years at EIA/DOE before that (starting with the Office of Energy Information Validation), I have seen a whole lot of misleading claims in the energy business. In fact, I learned very quickly 25 years ago not to believe most of what people claim, even -- especially -- when it seems to come from authoritative sources. "Authoritative sources" often turn out to be big vested interests, and vested interests can be very uninhibited sometimes about fighting for what they want. And so -- I knew I had to "kick the tires" and "look under the hood," to figure out how much to believe this truly amazing story.

I did, and it holds up. I *can't* give you a guarantee that this JTEC will really work as well as Lonnie now estimates, or that it will be cheap. But frankly, when I look at the world situation today, I can't give you a rational guarantee

that the human race will be alive at all after the present trends all play out. JTEC is a very solid and novel concept for a fundamental breakthrough, and there are no real show-stoppers. It is extremely valuable as a way of *reducing* the risk that really matters -- the risk that energy problems will cause extreme damage (perhaps even extinction) to the whole human race. It's the kind of risky early-stage idea that requires government funding for now, but it's also the kind of serious huge potential idea that really deserves full support. If it works, it's in the trillion dollar class of idea, with all kinds of exciting ramifications for the world, for the US economy, for Alabama and Georgia, and even for cultural progress in our world. When summer students from poor and rural parts of Alabama start showing up, changing the world... people will notice, and it can help raise our morale in ways that people badly need right now. I am delighted that NSF can help a bit in making this happen -- and I hope we can find a way to get this ball all the way to the goal post.

Finally, let me note that this brief report is just one part of a larger story. Johnson and Tuskegee have other very important ideas for batteries and for heat dissipation, which is a crucial issue in space. There are a number of other very exciting, risky but solid high-potential ideas that we have been working with, important to the future of humanity. We shouldn't put all our eggs in one basket -- but somehow, I really wish we could find a way to do a whole lot more justice to the really good eggs like this. I am attaching a [slide show, for a talk in Tuskegee](#), which says a lot more about the larger world energy situation (updated to July 2006) and about JTEC, and points to more details and a few other essential “good eggs”...