

An MIT professor has a great idea for a molten metal battery that could outperform lithium batteries. Of course, like many great ideas, this one might not pan out. But even if it does pan out technically, [Grist](#) explains one reason why it might never get to the commercial stage:

"Ultimately, the thing that makes lithium-ion so tough to topple is something called the "experience curve." The curve maps how, over time, in many different sectors, increases in scale lead to a reliable and predictable decrease in price. It works for solar panels and semiconductors, even contact lenses and motorcycles, and it definitely works for lithium-ion batteries, says Chris Shelton, chief technical officer at energy company AES. In other words, every time you double the volume of lithium-ion battery production, you reduce the cost by more than 15 percent."

A 2017 [paper](#) by Liscow and Karpilow explains the problem more fully. As they explain, there are two other reasons why the innovation process tends to snowball, making it harder for newer technologies to take hold. The first is that an established technology has already been the subject of a lot of research and invention, so a new inventor has a lot of ingredients needed for taking another step forward. Inventions often involve taking existing ideas and putting them together in a novel way, rather than creating something new out of whole cloth. The second reason that innovations snowball is that there's already a substantial market for that technology, providing a ready market for incremental improvements.

Because of the snowball effect, Liscow & Karpilow advocate government funding for new energy technologies, including help in making the transition from lab to market. They also argue that the government should *not* fund research into improving undesirable technologies like fossil fuels, because this just increases the innovation advantage these technologies already enjoy. The idea that R&D funding for dirty technologies can cause lock-in is supported by a more recent economic model ([here](#)).

This is one reason the Trump Administration's antipathy to ARPA-E (Advanced Research Projects Agency-Energy) which funds cutting edge energy research, is so wrongheaded. A recent [report](#) by the National Research Council assesses the ARPA-E . It concludes that "ARPA-E is in many cases successfully enhancing the economic and energy security of the United States by funding transformational activities, white space (technology areas that are novel or underexplored and unlikely to be addressed by the private sector or by other federal research programs), and feasibility studies to open up new technological directions

and evaluate the technical merit of potential directions.” The [NY Times](#) recently described some of the projects funded by ARPA-E, which cover everything from flexible gigantic blades for windmills to using sea kelp as a biofuel. Thirteen percent of ARPA-E projects result in patents. ARPA-E is modeled on DARPA, the Defense Advanced Research Projects Agency, which laid the groundwork for the Internet. It only takes one big success like that to make it all worthwhile. Even Rick Perry has [praised](#) the program, calling it “impressive” and “simply a preview of our possibilities,” and touting it as “one of the reasons the department “has had and is having such a profound impact on American lives.”

One major argument for funding innovation is that new technologies create change around the world. It’s the simplest way of having a global impact. The “snowball effect” simply amplifies that benefit, since innovation begets more innovation.

Bottom line: We need *more* funding for these activities, not less. Congress took a step in the right direction in the latest funding bill with a modest boost to ARPA-E’s budget. And, as I wrote in an earlier [post](#), states like California should jump in with funding of their own.