If any of us profit from these ideas, we split it 50+50.
Consider old technologies that you can replace.

Fridges!

Individually packaged cooling!

Biodegradable material and thermal insulator! - Sasha

Doors

Selective barrier

Retractable crystal that is opaque, rigid, and thermally insulating.
Cheaper than wood.

Texting, Writing, and Speaking

Measure the electric current from muscle movements to type text and select/generate images

Already used for Stephen Hawking (with eye muscles).

Receive messages from something tactile (or just a visual display like an app)

Bathroom

Shower Heads

Shower heads on the walls of the shower

I think rich people might buy it. - Marcos

Weight Efficient Long Term Thermonuclear

Order of magnitude a comprehensive plan for nuclear, then ask someone in the field for specifics.

Things to Investigate

Shielding

Current plan for shielding: 1mm of water sandwiched by 1micron plates of lead on each side.

How do the fungi (radiotrophic) around Chernobyl attenuate radiation? Much more promising!!! doi.org/10.1101/2020.07.16.205534

Bottlenecks: Any constraints in time, availability, or cost that hinder these facilities and/or batteries

Radionuclide Availability

Energy Surplus Prevention

Reduce the flux of energy to the thermocouple?
The easiest way to do this is retractable and expandable shielding and/or rotating an asymmetric/nonuniform thermocouple?

Are there cheap widely available thermocouples with easily (in real time) adjustable efficiencies?

Simple automated Way to Find the Ideal Nuclides

Script in (a) Colaboratory cell(s) that quantifies the merits of each isotope (in no particular order yet): availability, cost, time to produce and acquire, and proximity of half-life to a century.

Ideally this would be a very general set of functions and/or classes to evaluate isotopes and an automated (or just fast/low effort) way to acquire relevant data.

First, determine which decay paths are most promising (the ones that need the least shielding?)

Brief Outline and Description of Supply Chain and Implementation

Inclusive and Welcome Campaign to Increase the Public Acceptance and Support of Nuclear Power

Practical Domestic RTGs

(Encased in lead) encased in water?

Why can't it be miniaturized?

Thermoelectric conduit attached to a small rod of plutonium/uranium.
Is there something sufficiently hot/radioactive that is not Fissile?
https://doi.org/10.1016/j.rser.2019.109572
doi.org/ 10.1109/ICT.1999.843442

Rough Estimate of Energy Production:

https://github.com/MarcosP7635/Nuclear

Energy production exponentially decays :(

U238 Production

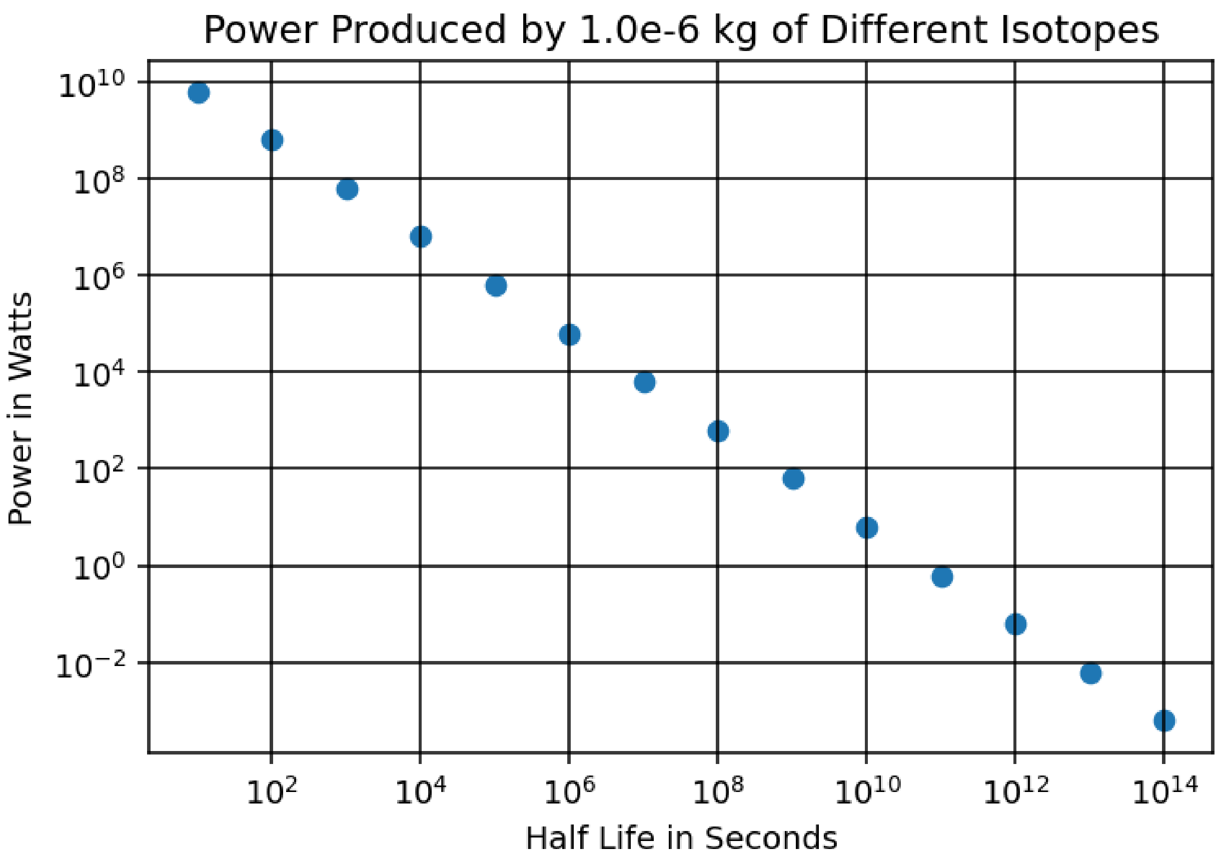
Can you melt and centrifuge out uranium from minerals?

Electrothermal Conduit

Thermocouples!

Nuclear isotopes as energy storage?
https://doi.org/10.1016/j.mtener.2021.100688

Half-life vs. Power Output Colaboratory



Potential Applications

A smartphone needs on the order of 20 W, so assuming we need the isotope to produce on the order of 10^1.9 W/mg = 80W/mg the graph implies this could be powered continuously for 30 years! Could this be used for supercomputers too?
Only 1g needed to produce a kW for a century. Surely a hospital would benefit from this?
It doesn't even need to be fissile!!
There are around 10^4.5 hospitals in the US and they each consume ~5% of the total US energy supply which is has grown by ~1000x since 2007 which was then estimated to be 10^17 J cumulatively in the US. Thus we have 17-1.5 = 16.5.
Thus a hospital in the US needs 10^16.5 J. This seems wrong. Revise later.
Revising ->

The US uses around 1.3 kW/person
(Handy conversion- 1Btu ~ 10^-3.5 kWH)
Thus, according to https://www.eia.gov/international/rankings/world?pa=12&u=0&f=A&v=none&y=01%2F01%2F2019, the US uses .03 quadrillion Btu = 30 trillion kWH. Assuming hospitals use on the order of ~5% of the US energy supply we jave 1.5 trillion kWH used by US hospitals in 2019. Assuming there are 10^4.5 hospitals we have 2*10^7 kWH consumed by the average US hospital in 2019. Thus, each hospital each year needs about 2*10^15 J. This is nearly one order of magnitude off from the sketchy estimate before revising. If 1mg of a 100-y half life isotope can provide 1W for a century, then (by the revises estimate of annual power consumption), on average in 2019 a US hospital needed 2*10^7.5 W. Thus, each hospital would need ~10^8 mg or 100 kg to be powered autonomously without interruption for a century. The entire US's energy needs (at the 2019 rate of consumption) for the next century would only need 10^8 kg.

Radionuclide Availability

Old paper https://www.ncbi.nlm.nih.gov/books/NBK11468/#a200130bcddd00075

Cheap radioactive minerals?

Is there a cheap fast way to purify uranium containing minerals?

Assumptions to account for

Under what criteria is half-life constant? What decay paths will occur? What shielding is sufficient?