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• **“Energy, the Environment and Everyday Life:”
130+ YouTube videos by The Illinois Energy Prof**

Professor David Ruzic, Abel Bliss Professor of Engineering, Department of Nuclear, Plasma, and Radiological Engineering at University of Illinois at Urbana-Champaign

tinyurl.com/W5-EnergyProfPlaylist

tinyurl.com/W5-IEProfIntro

bloomenergy.com/how-fuel-cells-work

Since I teach an online course on energy for HS physics teachers, I have been greatly enjoying a new set of online videos by Prof. Ruzic introducing energy engineering, physics, and the associated economics to freshman non-physics majors at UIUC. These 5- to 30-min engaging videos use simple algebra, sketches, and charts to introduce basic energy ideas and explore their cost effectiveness and current and near-future deployment in a very friendly stand-and-deliver didactic style. The videos are mainly Ruzic sketching at a lightboard (see Nov. 2019 *TPT* article by Hay and Wiren to construct your own) with semi-transparent web and PowerPoint graphic overlays, and are aimed at freshman engineers and technical folk often ending with the punchline “And that’s what you need to know about _____.”

For example, in his video “Fuel Cells and the Hydrogen Economy,” Ruzic describes the simple functioning of the widely distributed (but inefficient) classroom Proton Exchange Membrane (PEM) Hydrogen-Oxygen fuel cell, and includes a short vignette from his class with students using the cell and manipulating a concrete model made of simple materials. He then goes on to discuss PEM limitations and inefficiencies, largely dismissing the “Hydrogen Economy” and leading to the solid oxide fuel cell that “burns” natural gas (flame-less chemical reaction at 800 C over 50% efficient) marketed by the Bloom Corporation, and rudely calculating the cost per kW-hr and discussing the impact these 100-kW “Bloom Boxes” are having on current Californian industry. Hence he includes a cost analysis and practical impact of a currently deploying relevant technology.

Ruzic’s video *series* titles (each containing several videos) include “The Basics of Energy,” “All About Climate Change,” “Transportation and Energy,” several series about *renewable energy* on each of “Wind Power,” “Hydropower and Geother-

mal Energy,” “Biofuels,” and “Solar Power.” Also several series on *fossil fuels* including “Coal,” “Natural Gas and Fracking,” and “Oil and Pipelines.” My favorite series are his treatments of *nuclear energy*, including “Basics of Radiation,” “Nuclear Power,” “Nuclear Accidents,” and “Nuclear Fusion and Plasma.” See especially his “Economics of Nuclear Reactor” and “Reactors of the Future” episodes. Full disclosure here: I believe some form of limited nuclear energy is absolutely necessary to reduce greenhouse gas emissions and control climate change.

There are highly approachable, practical, well-focused interdisciplinary physics, engineering, and economic videos by an expert in the field, and I strongly feel many of our students who are going to be living with the consequences of climate change and energy decisions we make today (and they will be making soon) will be very interested in this content. Take some time to explore the Illinois Energy Prof’s offerings, and consider directing your students to his work as well

• **National Academies Release Lecture “Recognizing Unconscious Racial Bias”**

tinyurl.com/W5-RBias

The (U.S.) National Academies (of Science, Engineering and Medicine) have released a new lecture examining stereotypes and their impacts by Stanford University social psychologist and NAS member Jennifer Eberhardt.

• **Proton size refinement excitement**

wired.com/story/physicists-finally-nail-the-protons-size-and-hope-dies

science.sciencemag.org/content/365/6457/1007

Protons are 0.833 fm (10^{-15} m) in radius. Now you know.