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Renewed Energy

My daughter Renee is a serial appliance unplugger. She wants to reduce our carbon footprint, save energy and do the right thing. Sometimes this is frustrating, like when I flip the switch on the coffee maker, expecting that everything is good to go for my morning cup of brew — only to return a few minutes later to discover that nothing has happened. And while this is occasionally inconvenient, I can't really argue with what she's trying to do. Her heart is in the right place, and if she keeps at it, someday I'm sure she's going to save the planet.

Energy consumption isn't just an issue at home, though. It's one of today's key issues facing individuals, businesses and governments all over the world. And it's not just how much we use that's up for discussion, but also how we produce it and what effect it's going to have on our planet and our future .

Of course, that discussion is loaded with many diverse opinions about the best courses of action, and perhaps nowhere is that better illustrated than in the recent change in administration of the U.S. government. Clearly, the Biden administration has very different ideas about climate change and environmental policy than did the Trump administration. But no matter your political leanings, it's hard to ignore that there's a sea change going on. Even over the last four years, clean energy has grown, auto companies have continued to focus on reducing fuel consumption, businesses have committed to reducing their carbon footprints, and governments have continued to enact legislation aimed at change.

The energy discussion isn't going away. If anything, that discussion will be brought more to the forefront. That's why we've chosen "Energy" as the focus of this issue of *Power Transmission Engineering*. All those choices being made by consumers at the micro level and corporations and governments at the macro level are going to continue having a profound impact on mechanical devices and their design, manufacturing and use.

Wind Turbines are just one example. There's great interest in expanding the offshore wind turbine industry. But mechanical components running out at sea pose their own challenges. When the cost of replacing a single offshore wind turbine gearbox can be $1 million, predictive maintenance becomes a key issue — with challenges of its own. The article from ONYX Insight (p. 22) explores these concepts in detail.

Electrification of vehicles is another area where significant changes are in process. Every major auto manufacturer is working on developing vehicles for e-mobility, which means — among other things — that new gearboxes have to be designed, and they have to be adapted to the unique demands of being driven by an electric motor along with the increased requirements for reduction of NVH. We explore this in our technical article (p. 46) from the Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University.

Lastly, efficiency of mechanical and electrical components will continue to be paramount in our industry. After all, the best way to prevent your energy consumption from harming the environment is to simply use less energy. Component efficiency is explored in depth in our articles on development trends in gearboxes (p. 30) and high power density motors (p. 40).

We've tried to tackle the subject of energy from as many different angles as possible this issue, because there's no one idea or solution that's going to solve all of our energy-related problems, and every little bit helps. Just ask Renee.