HOW CONFLOW POWER'S NEW BATTERY TECHNOLOGY COULD LOWER ADOPTION COSTS OF ELECTRIC VEHICLES.

As the world becomes increasing environmentally sensitive, Electric vehicles (EVs) are **gaining popularity worldwide**. However, they still come with a big price tag despite various tax credits that governments provide to make them more affordable.
At some point these purchase incentives that keep their prices artificially low **will go**.
Worse, to offset lost revenue from decreasing numbers of fossil fueled cars, governments may deal EVs a blow by levying fossil fuel-style "fuel" taxes at public charging stations.
Could all these headwinds halt the EV gravy train?

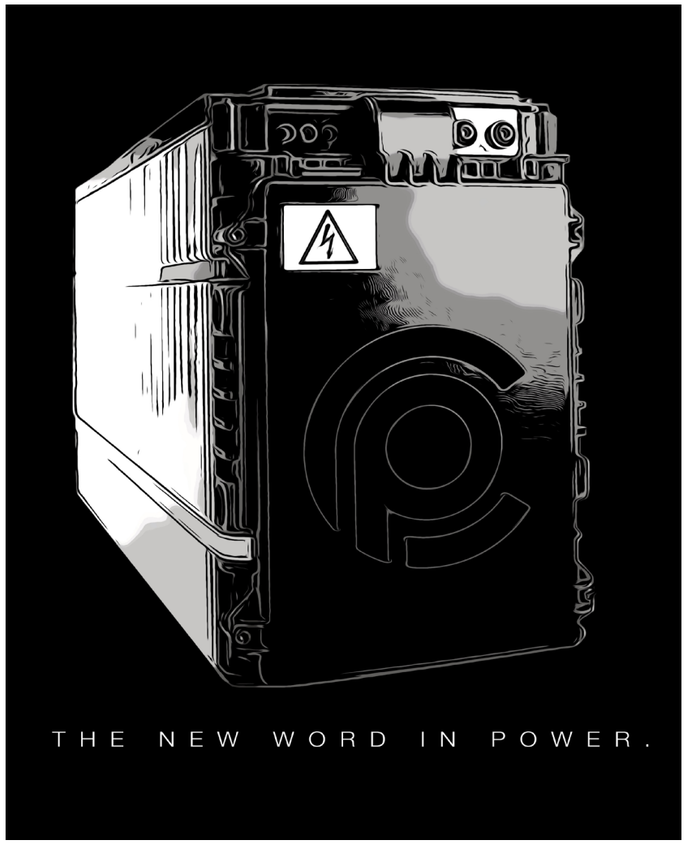
Not if technology has a say.

ConFlow Power, a renewable power technology company based in the U.K., has developed revolutionary technology that could reduce the adoption costs of EVs and at the same time improve the EV user experience.

This write-up discusses the implications of ConFlow Power's battery innovation for Electric Vehicle (EV) affordability and overall user experience.

The article starts with a brief look at how the second industrial revolution was the earliest example of how technology's timely intervention helped us overcome mobility challenges.

Then it examines how governments fell in and out of love with diesel and whether EVs could suffer a similar fate.
Finally, the article delves deeper into the features of ConFlow Power's new device and what the future may hold for its use in EVs.



TECH IT OR LEAVE IT

Since technology has not solved all of humankind's problems, for example, depression, you could argue that technology has not improved our lives on every conceivable level.

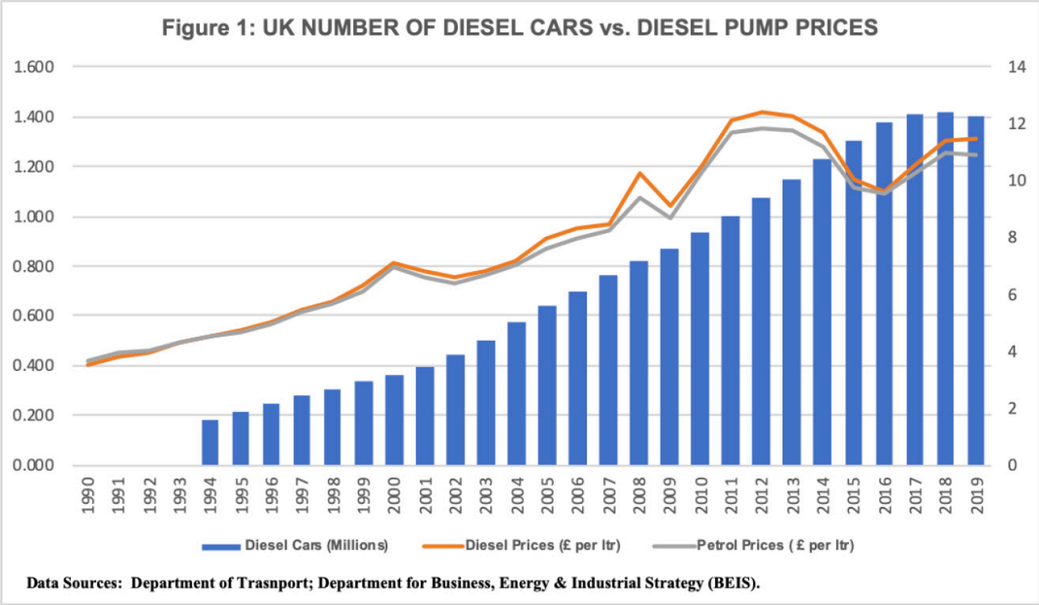
However, what is indisputable is that technology is often our last stand against existential threats to our way of life.

During the First Industrial Revolution of mechanization in the late 18th century, steam technology saved us from the extremities of manual labor across many industries.

Then came the Second Industrial Revolution of mass production in the late 19th century and the Third Industrial Revolution of digitization in the late 20th century.

Now, while the Third Industrial Revolution saved us from being buried under mounds of paper, the Second Industrial Revolution was the real game-changer because it ushered in the automobile and the age of transportation. The automobile, which freed us from the clutches of the horse and carriage, is now **the most widely used mode of transportation in the world**.

Imagine how dreary road travel will be today if we still had to rely on the horse and carriage?



THE RISE AND FALL OF DIESEL

Unfortunately, while the automobile solved the problem of limited mobility, it created a bigger and more sinister problem: pollution. When industrialized countries started to levy fuel taxes on cars in the early 20th century, their goal was primarily to generate revenue to maintain their road infrastructure.

The issues of anthropogenic global warming and climate change had not yet crystallized around the world.

But by the time the Kyoto Protocol was agreed in 1997, it was like a global confirmation of the already growing speculation that carbon dioxide emissions from automobiles and other man-made sources were primarily responsible for global warming.

In response to the alarm Kyoto raised, Europe started to push diesel cars as a "greener" alternative to petrol cars because diesel combustion produced less carbon dioxide emissions that petrol combustion.

In the United Kingdom, the government in 2001 enthusiastically cut vehicle excise duty (also called "car tax" or "road tax") on diesel car purchases to encourage a switch to diesel. Consequently, diesel car ownership soared. At the end of 2000, there were 3 million diesel cars in the UK - 13% of all cars. By the end of 2017, there were 12 million - 40% of all cars. Even as diesel pump prices rose in response to increases in fuel taxes, diesel car ownership continued to rise – see Figure 1.

Meanwhile, diesel was having a harder time across the pond in the U.S., where **for a variety of reasons** it's never been popular with car drivers.

In America, only truckers care for diesel. According to a 2015 Bureau of Transportation fact sheet, "most diesel-powered vehicles in the U.S. are medium and heavy trucks".

Still, diesel's popularity with truckers has remained steadfast over the years, evidenced by the long-term growth of heavy trucks sold even in the face of rising diesel fuel taxes – see Figure 2.

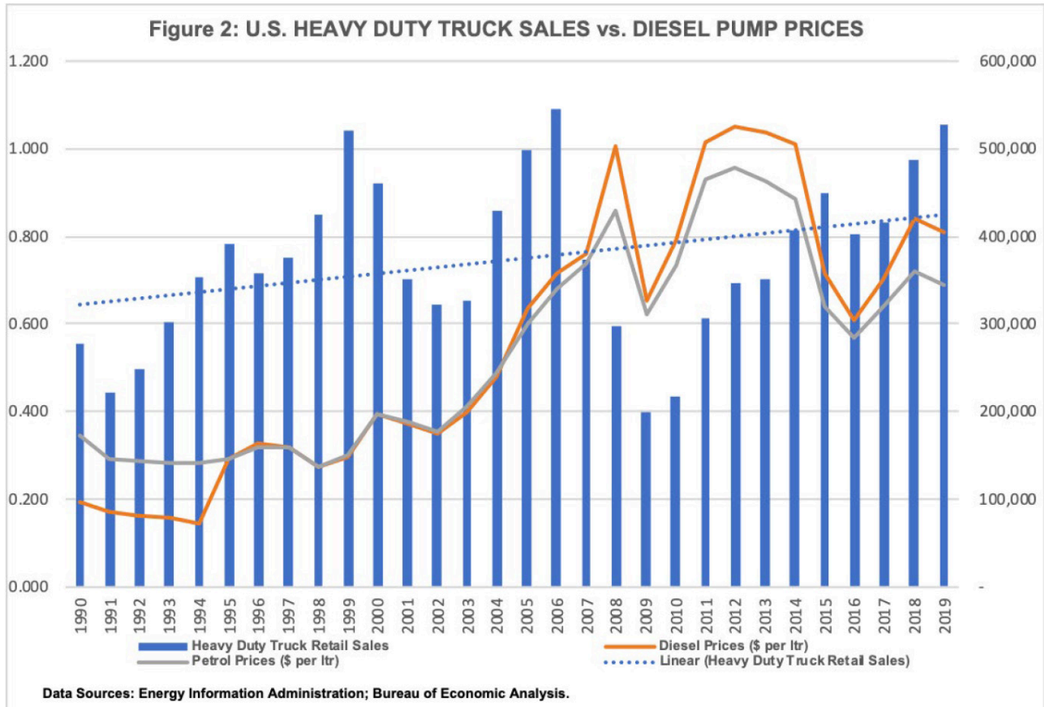
So, on both sides of the Atlantic diesel's fortunes were rising in the 1990s and 2000s. Then in 2015, the **Volkswagen diesel emissions scandal** hit and knocked the winds out of diesel's sails.

As governments realized that diesel was not the solution as they once thought to the problem of carbon dioxide pollution, **they hit diesel vehicles harder with higher taxes and surcharges**.

Inevitably, these taxes started to take a toll on the sale of diesel cars in many European countries.

In the UK, where diesel cars were a record high 40% of the all cars in 2017, **sales crashed in 2018** and has since been on a downward trend.

All told, governments once promoted the diesel car as a greener alternative to the petrol car, but then started to heavily tax its use as it became popular. And when it fell out of favor for being "environmentally disappointing", they sounded its death knell.



WILL ELECTRIC VEHICLES (EVs) GET THE DIESEL TREATMENT?

Now electric vehicles (EVs) are all the rage.

According to the International Energy Agency's (IEA) May 2019 "Global EV Outlook 2019" Report, "Electric car deployment has been growing rapidly over the past ten years, with the global stock of electric passenger cars passing 5 million in 2018, an increase of 63% from the previous year."

In a January 2020 report titled, "Who Will Drive Electric Cars to the Tipping Point?", consultancy giant Boston Consulting Group stated that, "Electrified vehicles will seize a third of the (auto) market by 2025 and 51% by 2030, surpassing sales of vehicles powered purely by internal combustion engines (ICEs)." So, from all indications EVs are on the cusp of mass adoption.

Just as diesel was once touted as the panacea to carbon monoxide pollution, EVs are now seen as the panacea to automobile pollution. Will governments tax them as they become popular?

It's possible.

Here are four reasons why.

One. Falling revenues from taxes on disappearing ICE cars; Afterall, EVs still use roads and money to maintain road infrastructure must come from somewhere.

Second. The costs of constructing and maintaining any public charging infrastructure.

Third. If hybrids become a mainstay of the EV marketplace, then governments will certainly feel justified to tax those for their ICE components.

Fourth. Environmental impact of EVs. While it may sound odd that governments will tax EVs for environmental pollution, the fact is that the most important component of an EV, the lithium-ion battery, is not eco-friendly (see why in table 1).

Ultimately, taxes on EVs will make potential buyers think twice about buying them, and this may slow or prevent their mass adoption. Technology could help lower EV adoption costs to such an extent that taxes don't feel so bad.

CONFLOW POWER TO THE RESCUE

The most expensive part of an electric car is the battery, which is primarily the lithium-ion (Li-on) type.

So, until electric vehicle (EV) Li-on battery costs come down to a level that makes EVs cost-competitive with pure internal combustion engine (ICE) cars, EVs may have a hard time getting on the driveways of buyers worldwide.

Unsurprisingly, researchers and automakers have in recent years been frantically working to bring these costs down.

However, there's still one problem: Li-on batteries are not environmentally friendly. They have the following environmental drawbacks:

- They are made from finite resources like metals or metal amalgams
- They are not made in an environmentally friendly manner
- They're harmful to the environment because **many cannot be recycled and yet cannot be safely discarded**

ConFlow Power has developed a potentially superior alternative to the Li-on battery.

This unique "battery-generator" combines power generation[1] and battery recharging technologies.

Remarkably, it uses air as fuel and is completely self-recharging. Therefore, it can generate a continuous flow (conflow) of limitless, useable power.

Furthermore, the device has few, if any, of the Li-on drawbacks (see Table 1)

[1] But it does not have any moving parts like the traditional generator.

Li-on Batteries	*ConFlow Battery-Generator*
They are made from scare or non-renewable materials.	It doesn't use any exotic metal or metal amalgam.
They're not manufactured in an environmentally friendly manner: Their manufacturing process uses a lot of water and produces toxic sludge.	Its manufacturing process produces no emissions, and the device produces zero waste when in use.
Some cannot be recycled or safely discarded.	It never needs to be replaced.
They degrade from repeated recharge.	It's self-recharging.
They have limited energy storage capacity.	It doesn't store energy as much as "harvests" it by capturing electrons from the air using nanotechnology. It's scalable to any size for any application.

TABLE 1. CONFLOW BATTERY/GENERATOR vs. LITHIUM-ION BATTERY FEATURES

As the table indicates, the battery-generator uses no scarce metals or amalgams. Therefore, it could be cheaper and easier to manufacture than the Li-on battery.

Also, imagine the peace of mind you'll have if you don't ever have to scamper to a charging point to recharge your EV because the battery-generator is self-recharging.

Or, or you don't ever have to worry about the cost of replacing your battery because the battery-generator never needs to be replaced.

"Range anxiety" could be a thing of the past.

However, its unique selling point (USP) and probably biggest advantage over the Li-on is its low environmental impact.

It makes no sense for EV battery manufacturing and efficiency costs to come down but not their environmental impact costs; governments and buyers could then turn against them, reminiscent of what happened to diesel cars.

The battery-generator has cheap manufacturing costs, high efficiency, and little or no environmental impact costs.

Undoubtedly, it could have huge positive implications for the affordability and user experience of the EV.