

# Stop at The Red-Light Is No Longer Boring

By Sadegh Bamohabbat Chafjiri

Faculty of Environment and Technology  
University of West of England Bristol  
sadegh.bamohabbatchafjiri@uwe.ac.uk

Architectural drawing partners

Sepideh Charmforoush, S. Fatemeh Mirmousavi, Hamed Ahaki Lakeh  
Hamde Ahaki Architects Co.  
<http://hamed-ahaki.com/>

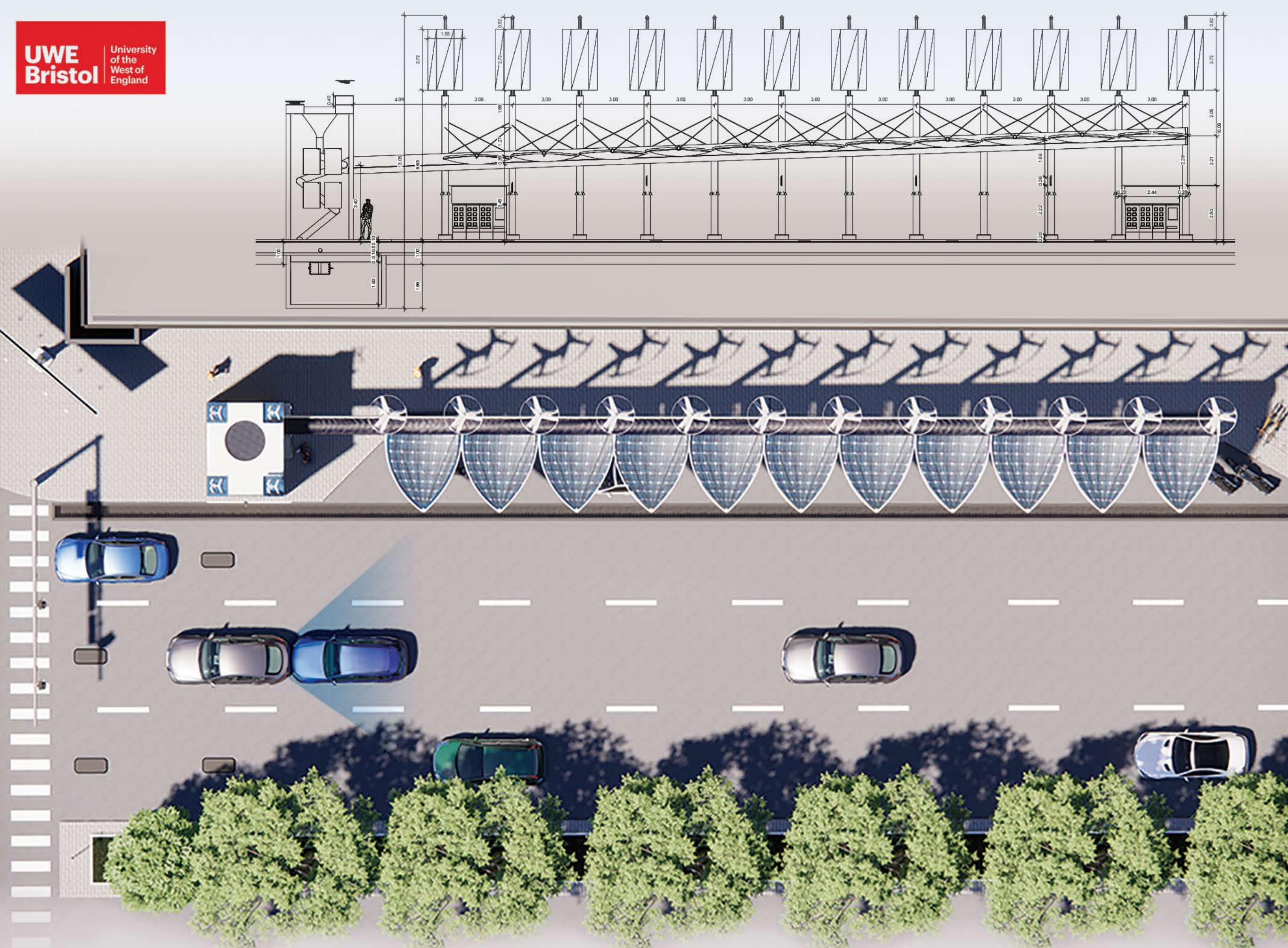
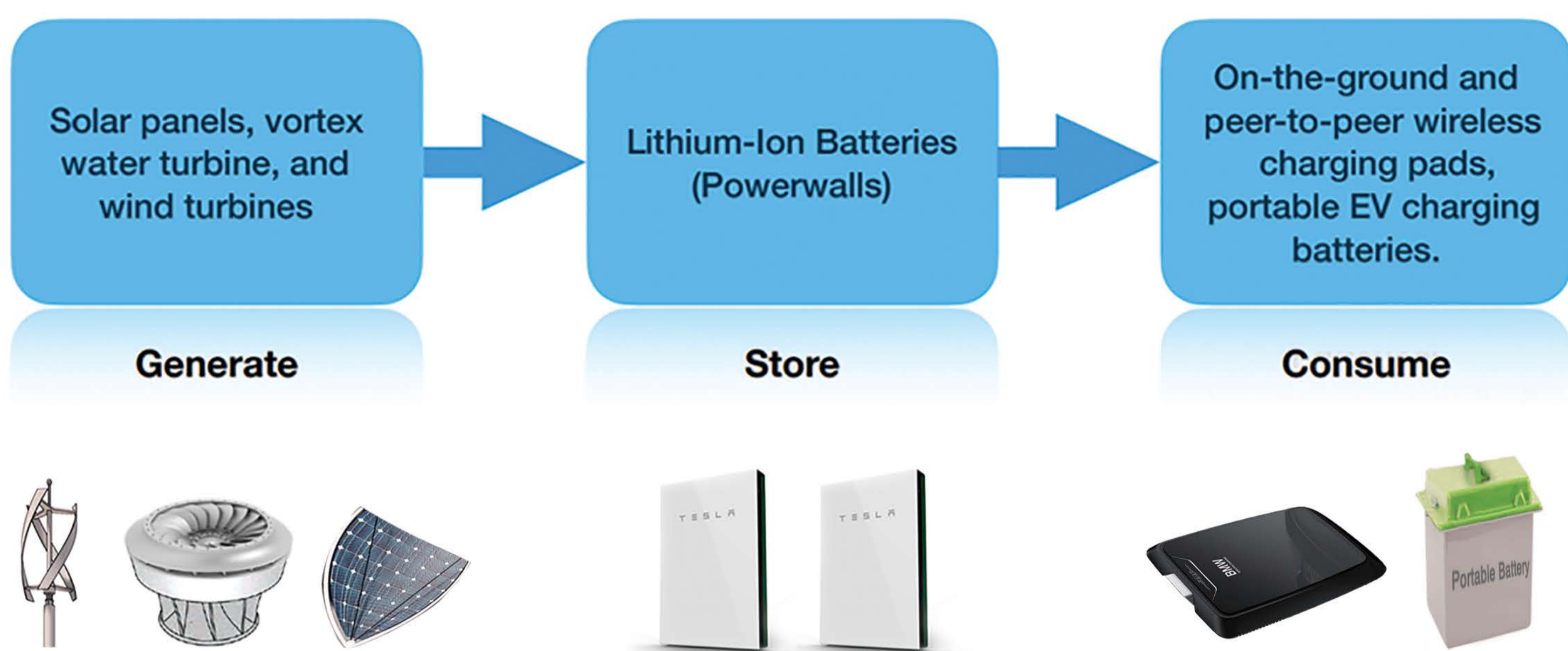
## Project background:

Electric Vehicles (EVs) will shape the future of our smart cities in this decade. EVs will change urban design planning with the electrification of shared spaces, particularly at intersections for a variety of services. The EV charging service is one of them that can be installed at intersections.

## Project aim:

- Save the driver's time.
- Be a cost-efficient plan for service providers.
- Use the shared spaces and to save the cost of renting or buying land to set up the EV charging station.
- Provide a new model for generating electricity from renewable resources such as solar, wind, and water energy at intersections.
- Manage the surface water after heavy rainfall in the city.

## How it works:



## EV charging modes:

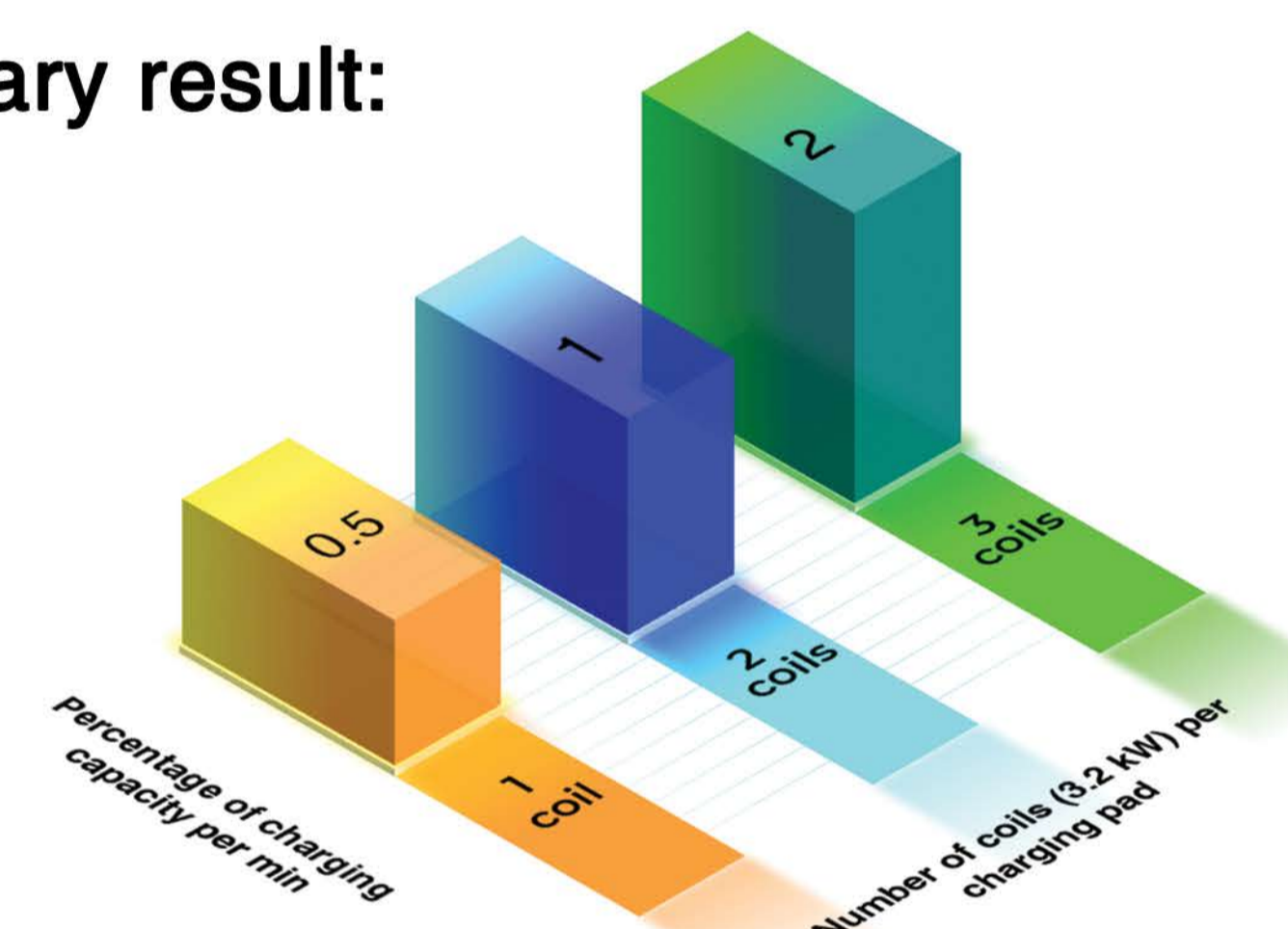
- The coils are without cables, and they charge electric vehicles at the portable charging station and in the first and second rows of traffic lanes at different rates, from 3.2 to 10 kW for one coil to three coils. EVs also have car pads installed on the underside of the vehicle to receive electricity.
- Peer-to-peer wireless charging technology uses the same technology as the integrated primary coil at the back and front of every EV.
- Portable battery charging station provides fully charged EV batteries. Drivers put their empty batteries inside the charging station. The system will calculate the extra fee for fully charged batteries. Then, after purchasing, drivers can take the fully charged battery out of the charging station.

## Technological specifications:

- The wireless charging pads at the intersection use the available technology of the BMW 530e in 2018 [Satanovsky, 2020].
- The electricity is transmitted from three integrated primary coils installed behind the crosswalk, on-the-ground.
- Portable batteries are lightweight batteries suitable for small cars with an average weight of 4.5 kg [Battery knowledge, 2021]. These batteries are ready to be used by EVs on the move.

## Statistical analysis and preliminary result:

When the charging capacity of 1 to 2 percent per minute is multiplied by the average time loss of 8880 minutes in traffic jams in London in 2021 [London congestion, 2021], it shows how our solution will save a considerable amount of drivers' time compared to when they charge their EVs at private charging points.



## Next step:

To upgrade to the higher technology of induction for EV charging pads.

## Conclusion:

This model can improve the sustainability and availability of the EV charging stations across the city, and more importantly, it can save drivers' time at intersections.

## References:

- Satanovsky, O. (2020), "BMW 530e Inductive Charging Pilot Program Named Green Car Journal's 2020 Green Car Technology of the Year", BMW group, Retrieved from [https://www.press.bmwgroup.com/usa/article/tail/T0304927EN\\_US/bmw-530e-inductive-charging-pilot-program-named-green-car-journal%E2%80%99s-2020-green-car-technology-of-the-year?language=en\\_U](https://www.press.bmwgroup.com/usa/article/tail/T0304927EN_US/bmw-530e-inductive-charging-pilot-program-named-green-car-journal%E2%80%99s-2020-green-car-technology-of-the-year?language=en_U)
- EV charging time calculator. (n.d.), Home Charging Stations, retrieved from <https://www.homechargingstations.com/ev-charging-time-calculator/>
- London congestion: Capital becomes world's most congested city. (2021), retrieved from <https://www.bbc.co.uk/news/uk-england-london-59559863>
- Battery knowledge. (2021), "How Much Does a Battery Weigh - Electric Car and Comparison", retrieved from <https://www.large.net/news/8zu43pm.html>
- Sharma, P. (2021), "Beautiful 3D BAR CHART Design Tutorial for Business Presentations | Online PowerPoint Training", Retrieved from [https://drive.google.com/file/d/1vx\\_VIXWEbAztz-Zz\\_fz0KGLKBdFst1fSn/view](https://drive.google.com/file/d/1vx_VIXWEbAztz-Zz_fz0KGLKBdFst1fSn/view)