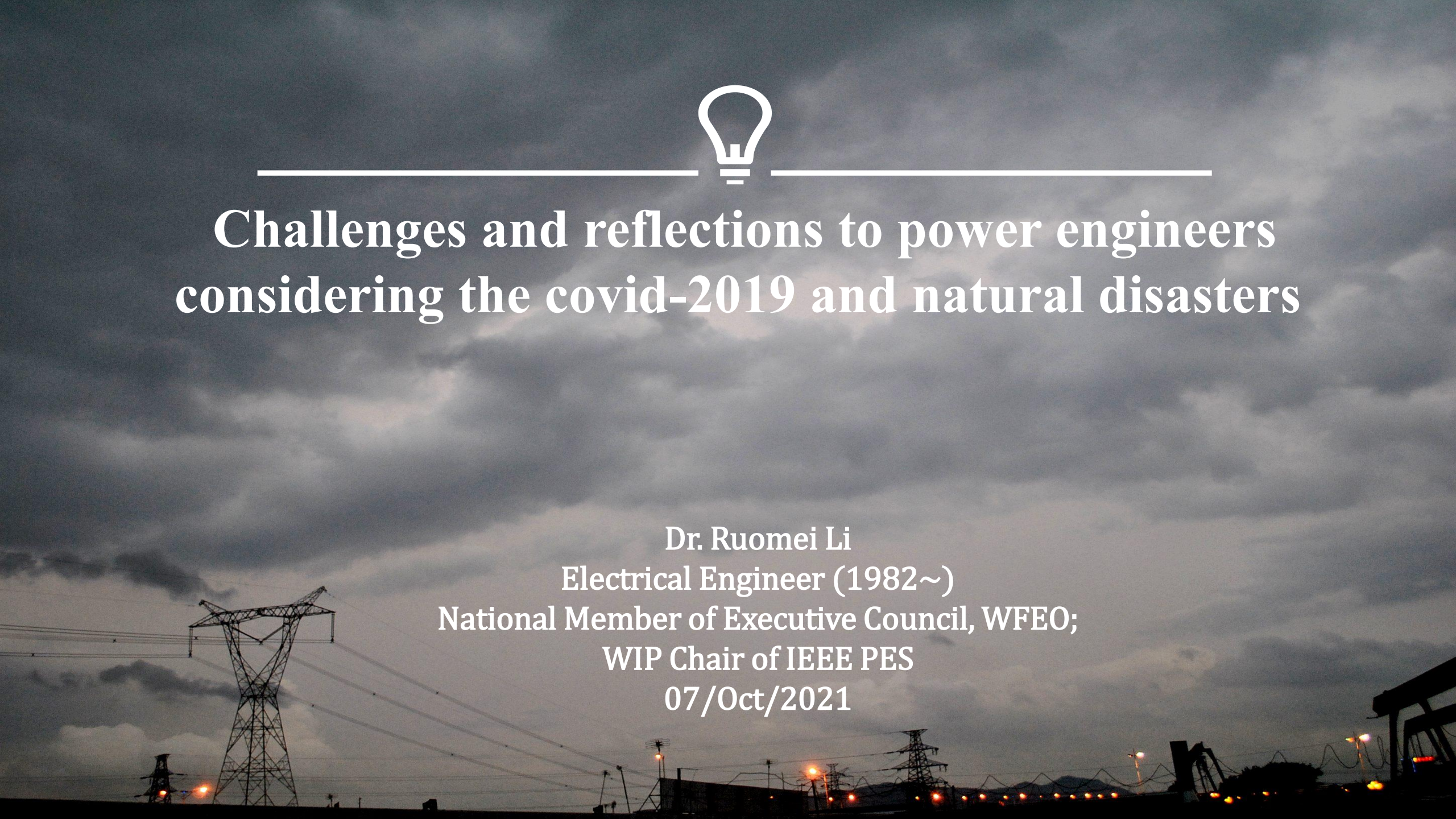

Challenges and reflections to power engineers considering the covid-2019 and natural disasters

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The outbreak of COVID-2019 in Wu Han: Insufficient emergency equipment and strategies

Challenge 1: Power load dropped 35-38%, hydropower and new energy generation increased rapidly, and grid regulation capacity became a big problem.

Challenge 2: due to the isolation measures of the epidemic, electric equipment cannot be properly maintained and overhauled on site, resulting in increased safety risks.

Challenge 3: the task of maintaining electricity has been multiplied by the construction of temporary wards. Instead, the field staff is reduced to 30-50%. Engineers are at high risk of infection.

Challenge 4: Due to transportation problems, lack of materials, lack of people, security problems, user services.

Henan Province, flood disaster
July/2021

For Power Transforming station

The importance of power grid have been increasing, **whose reliability in extreme weather condition** is quite critical.

The typical events for overhead transmission line

Insufficient risk expectation

Vulnerable infrastructure:

especially the distribution network under the extreme weather.

The substations are closed due to the flood.

The underground cables can neither be monitored nor repaired in time.

The switching rooms in residential area are flooded, which causes large blackout.

Unreliable sensors and the intelligent units

The state perception and real-time control of transmission and transformation equipment are still at a lower level. The intelligent internet of things technology and the administration and control platform of equipment operation and inspection failed to play an effective role during the extreme events

The primary and secondary equipment in substation, smart or intelligent units on transmission line need to be further developed, the live monitoring technologies aren't yet full-mature, especially, the quality of the monitor equipment need to be further improved.

My thinking

How to continually perform the function of an engineer, under the special situations?

First, we should be good at thinking and consider risks and countermeasures in system design, construction and maintenance.

Second, to have professional skills and special reaction ability to perform the functions of an engineer in all kinds of extraordinary circumstances;

Third, at all times, the safety and needs of people should be put first, and the needs of humanity should be given priority, as well as the safety of customers and engineers themselves.

Fourth, not necessarily advanced technology is reliable, the work of engineers should be based on actual testing data and implementation.

Digitization and artificial intelligence are the direction of the future, but there is still a long way to go before it is reliable and practical, as the practice under the epidemic in Wuhan and the disaster response process in Henan have proved.

Thanks for attention!