

The WindEEE Institute

World-Unique Wind Facilities

Designed to protect us from storms, harness the power of wind and develop sustainable cities, the *Wind Engineering, Energy and the Environment (WindEEE) Institute* at Western University is home to the world's first three-dimensional wind-testing chamber. Its facilities allow scientists to address important scientific, economic and societal challenges related to wind, while evaluating energy potential and damage risks.

About the WindEEE Institute

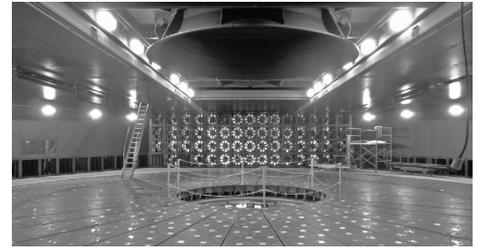
- The world's most advanced experimental facility for studying the effects of damaging winds on structures, and for designing wind turbines, wind farms and sustainable cities
- Has the capability of physically simulating high-intensity wind systems – including tornadoes, downbursts, gust fronts or low-level nocturnal currents – that cannot be recreated in other wind tunnels
- Will help researchers understand the impact of local storms on buildings and structures, wind turbines, forests and crops; and improve the positioning and design of wind farms
- Using scale models, researchers will also explore new ways to retrofit old buildings and build new ones to maximize energy savings and production from the power of wind

Disaster Mitigation Research

- According to *Munich Re America*, North American thunderstorm activities, including tornadoes and downbursts, have led to a five-year average insured loss of more than \$6 billion
- Although thunderstorm activity causes the majority of insured property loss, we do not currently design or test buildings and structures to withstand these types of local, high-intensity winds
- Researchers are performing controlled experiments to unify full-scale monitoring data and predictive numerical models of surface wind fields, which are crucial to better designing structures, optimizing wind farms and assessing environmental impacts

Alternative Energy and Sustainable Cities

- The *Canadian Electricity Association* estimates the nation's electricity demand will rise by an average of two per cent annually between 2010-2020, increasing the need for renewable energy
- Canada experiences approximately 15 per cent energy losses because of model uncertainty due to wind farm siting, terrain effects and wake and array effects, which can be remedied through studies conducted at the WindEEE Dome
- Sustainable urbanization is one of the present and future global challenges and opportunities that needs to be addressed by innovative solutions
- This new facility has triggered a set of interdisciplinary collaborations to tackle multi-faceted energy problems, including grid connectivity and solar- and wind-distributed nodes, as well as green energy policy and implementation
- Research at the WindEEE Institute will lead to better design and retrofitting of both individual buildings and city-wide infrastructure to maximize energy savings and production



Researchers at the revolutionary WindEEE Institute are uncovering aspects of wind storms and wind energy that cannot be elucidated by wind tunnels alone.

Highlights:

- With four unique facilities, Western is home to the world's most significant complement of wind research infrastructure
- This strength is based on 45 years of experience and a strong, interdisciplinary team of more than 20 researchers
- Builds on expertise of the *Boundary Layer Wind Tunnel Laboratory*, which has led more than 1,000 globally recognized industrial projects
- As the world's first three-dimensional wind-testing chamber, represents a technological breakthrough in studies of wind-related phenomena
- Western is the only Canadian institution offering a graduate program in wind engineering



Western
Research

For more information, please visit: www.windeee.ca