

SNEEC wind energy test site

Sharing experience with the industry

Presented by:

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Content

- Introduction to TechnoCentre éolien (TCE) and its infrastructures
- What is the status so far?
 - Projets réalisés (nb, type), nb de clients
 - How to do business with us
- Future projects
 - Louer des bases
- Concluding remarks/Discussion
 - Commencer avec les low hanging fruits – importance de bien choisir son turbinier
 - L'importance du PPA
 - Penser aux coûts d'opération – there is a cost (VS commercial windfarm)

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Introduction to TechnoCentre éolien (TCE)

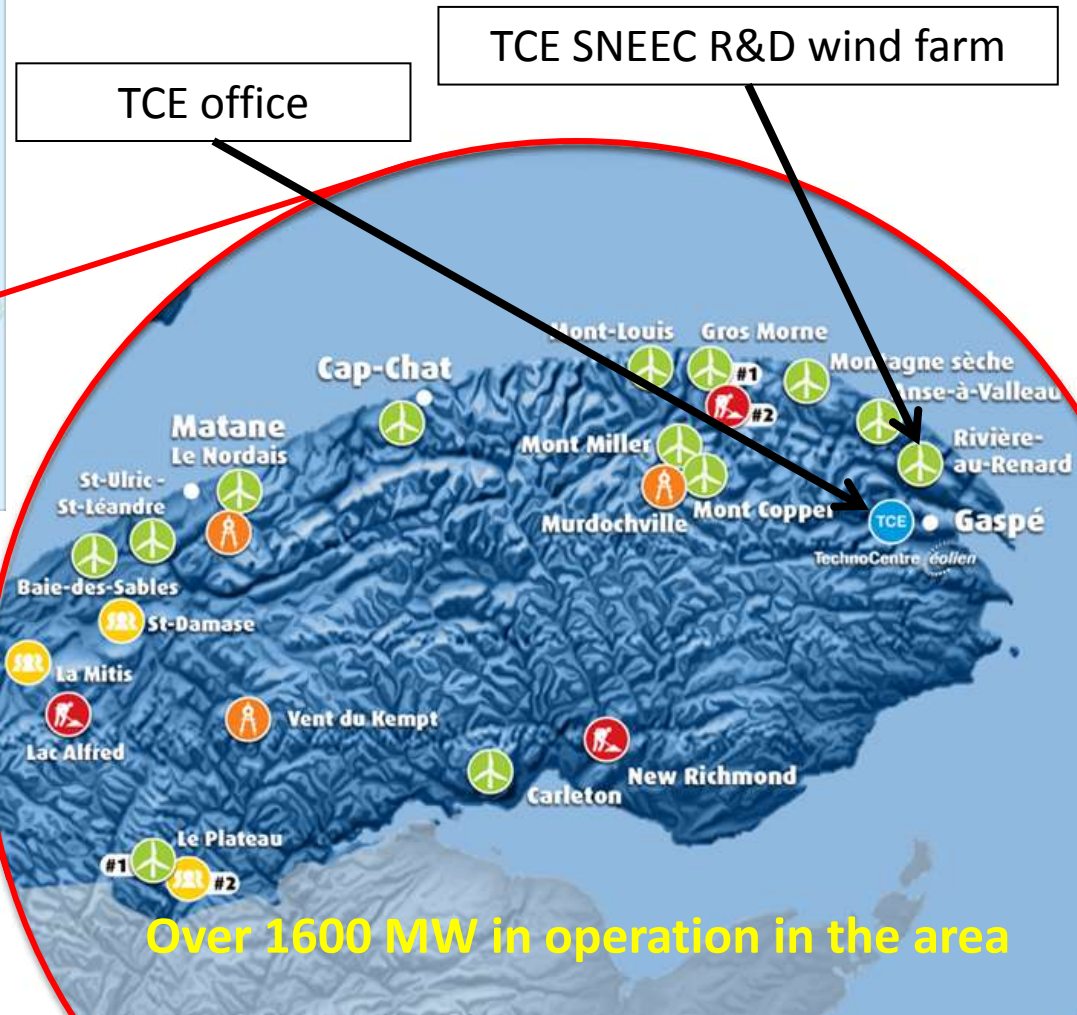
Areas of intervention

- Applied research
- Technical aid for businesses and organizations
- Training and information
- Wind energy and economic development
- Networking events and conferences

Expertise

- Wind farm operation and maintenance (cold climate & complex terrain)
- Validation, development and adaptation of technologies
- Supply chain

TCE infrastructure location



- Compliant with IEA task 19 “cold climate” site definition
- In Quebec’s wind energy cluster
- 2 flights daily from Montreal
- Deepwater harbour & railroad
- Nearby a LM Windpower blade manufacturing plant

Over 1600 MW in operation in the area

Why a cold climate test site in Canada?

- Wind energy grew 900% in the last decade (6500 MW total in 2012)
- According to a recent Natural Resources Canada study 6,5% production losses due to cold climate (yearly average)
- Relatively new industry for Canada
- Test site to support development of Canadian expertise and international collaboration

Test sites : two « typical » models

- Rent-a-space
 - Provide testing infrastructure to OEMs
 - Certification of wind turbines
 - Temporary projects (36-60 months)
- Buy a wind turbine
 - Wind turbine is the testing infrastructure
 - Technological showcase and qualification of sub-suppliers
 - Focus on O&M
 - Long term projects (15-20 years)

TCE R&D Wind Farm



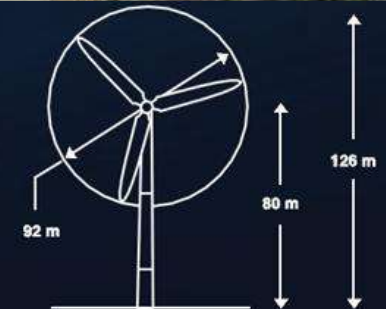
- Icing & complex terrain
- Commissioned in March 2010



- Research, development and technology transfer projects. Technological showcase.



Description	Value
Number of wind turbines	2
Model	REpower MM92 CCV
Rated power / Wind turbine	2.05 MW
Frequency	60 Hz
Rotation speed	7.8 – 15 RPM
Start-up speed	3 m/s (10.8 km/h)
Shut-down speed	24 m/s (86.4 km/h)

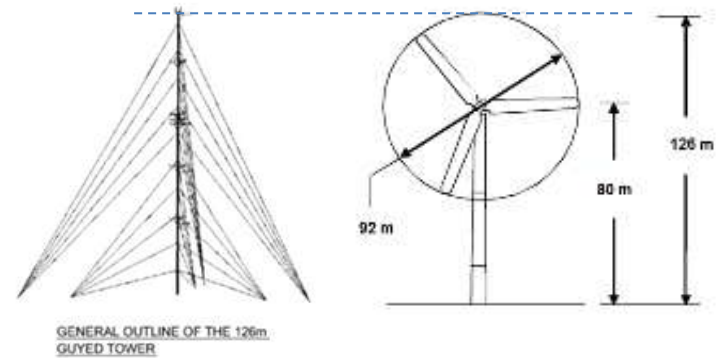


IEC wind class: 2
 Annual average wind speed: 7.9 m/s
 Topography: Complex site with high turbulence, near the sea
 Temperature: -30°C to +30°C
 Ice conditions: Up to 40 mm of ice

TCE 126m Met Mast

Compliant with
CSA-S37-01
(DLC: 40 mm of ice and 57
m/s)

Commissioned January 2012



Wind-diesel-solar microgrid

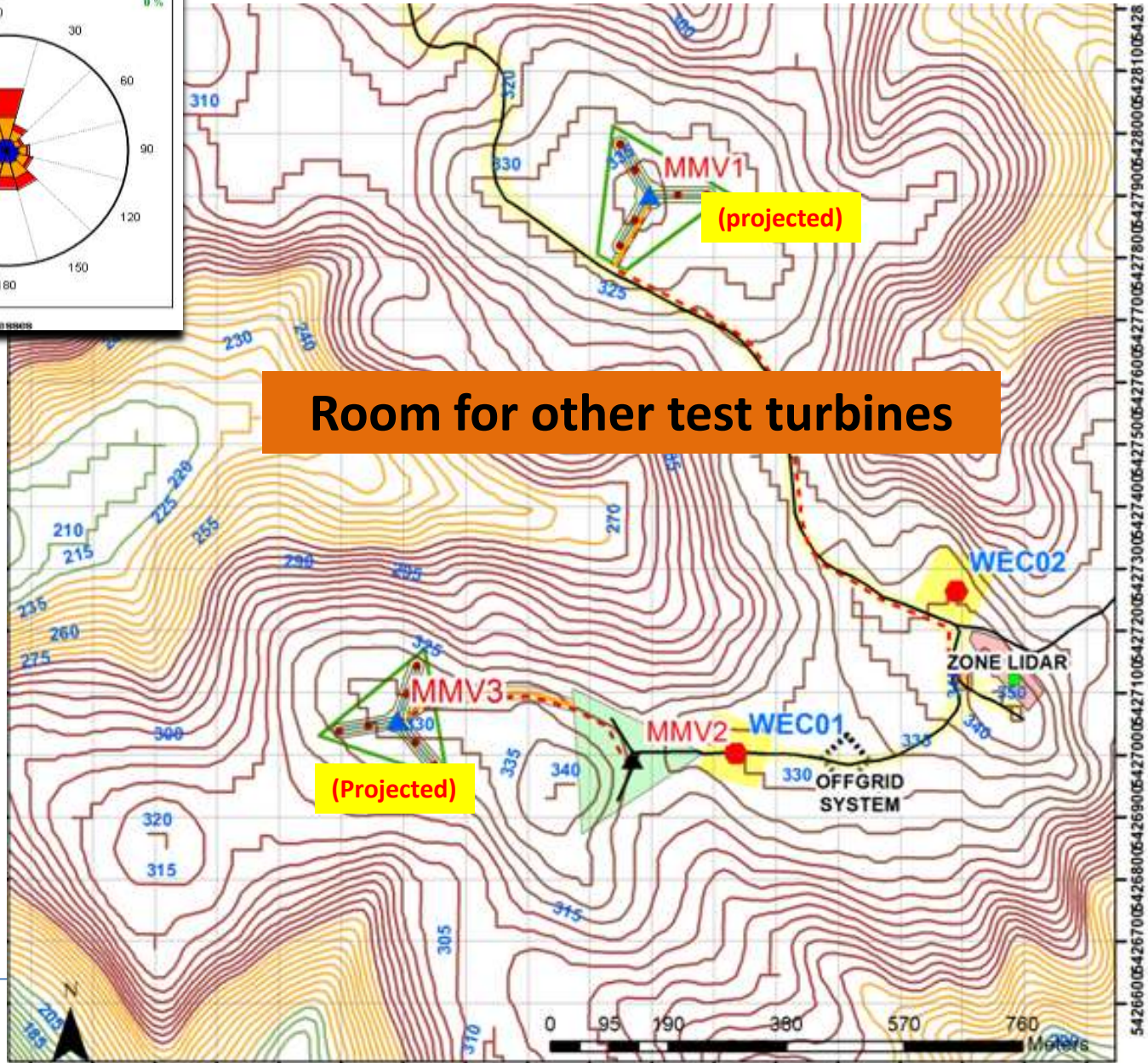
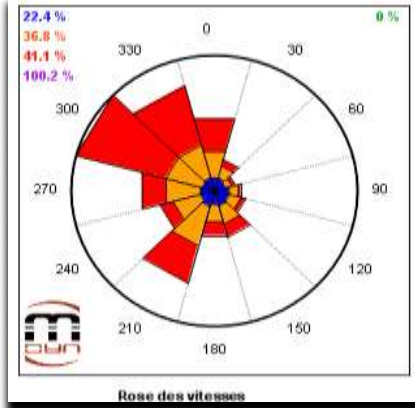


57, 5 kW wind
100 kW diesel
5kW solar
AC & DC buses

Off-grid
Batteries
Compressed air
energy storage

Commissioning completion: March 2013

Infrastructure topographic layout



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Active projects scorecard

	Nb of projects
Applied research	11
Technical assistance to businesses and organizations	12
Information activities	6
Infrastructures	2
Others	4
Total	36

Types of clients/partners: wind farms operators, measurement instrument manufacturer, wind turbine OEMs, utility, research institutes



Research projects : exemples

- Ice measurement campaign (ice accretion, ice throw)
- Technology development (ice detection, system optimization, repowering , energy storage)
- Resource assessment with remote sensing in complex terrain

Technological assistance projects :

exemples

- Technologies assessment
 - De-icing
 - remote sensing
 - measurement instruments
 - O&M tools & equipments
- Product development (components, software)
- Technological showcase



Partnership with research institutes



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How to do business

- Plusieurs modèles
- Complexité dans l'opération (ministère, universités, cégep)
- Costly infrastructures
- Inviter à la complémentarité
- Inviter à venir travailler chez nous

Concluding remarks

- Not easy to deploy!
- “Buy a turbine” model = importance of relationship with your turbine supplier
- Need for strong “firewalls”
 - Intellectual property
 - Industrial secrets

Concluding remarks

- High operating and maintenance costs... Need to be taken into account in the project's economics
 - Importance of having a PPA
- Balanced approach between business and research mindsets
- Opportunity to collaborate and develop common standards... Lots of issues related to cold climate!
- TechnoCentre éolien's site is open for business with international partners

Thanks, Tack, Merci

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