

Transferring Learning from Geared to Direct Drive Wind Turbine Powertrains

Supergen ORE Flex funding project:
“A hybrid and scalable digital twin for intelligent direct drive powertrain condition monitoring”



THE UNIVERSITY
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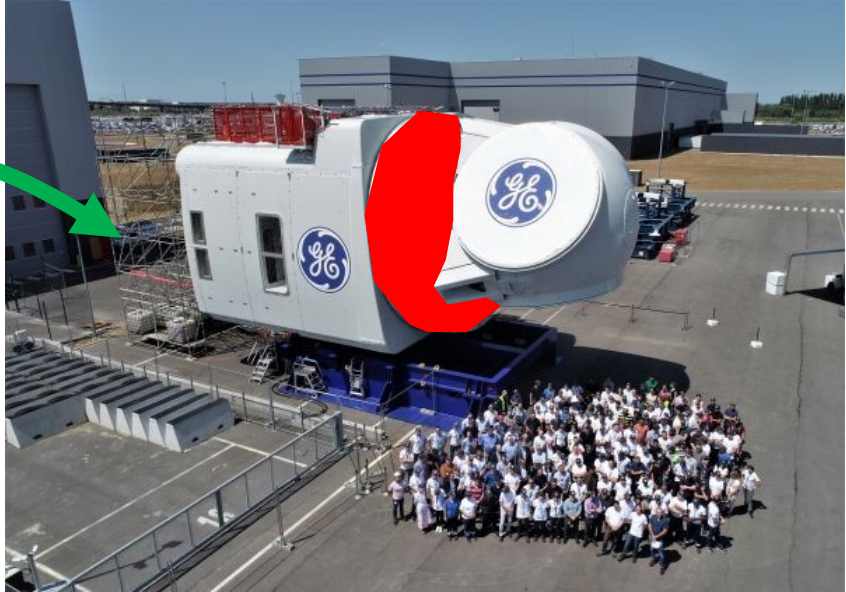


James Carroll
Alan Turnbull

From Geared to Direct Drive Powertrains

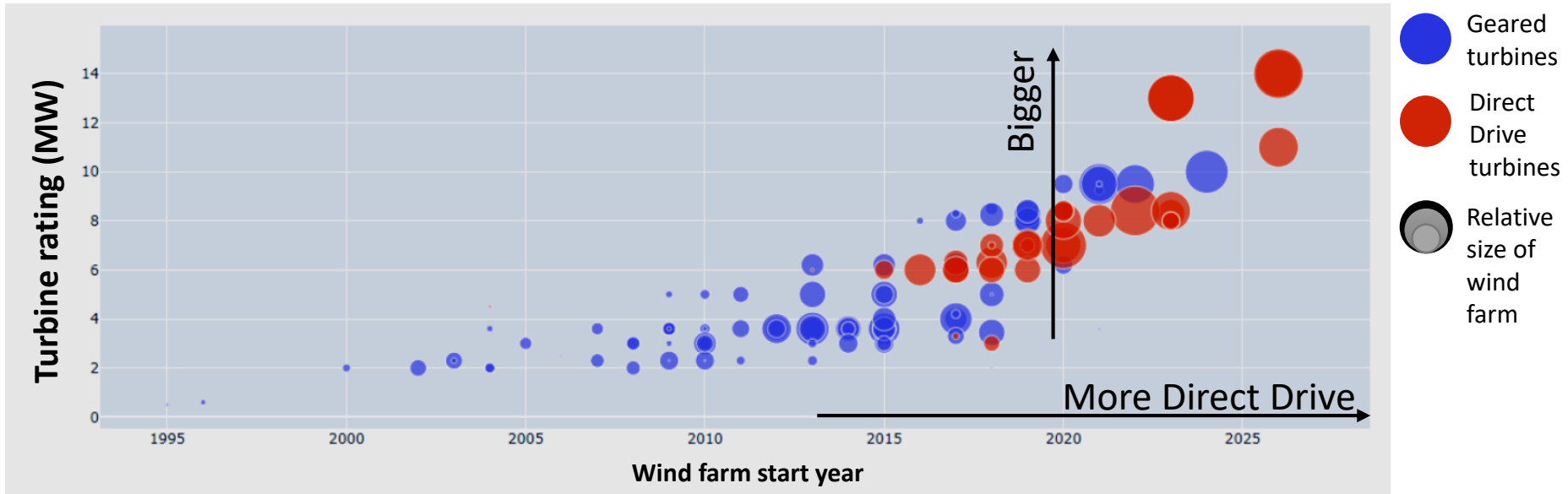


Source: MHI Vestas



Source: GE

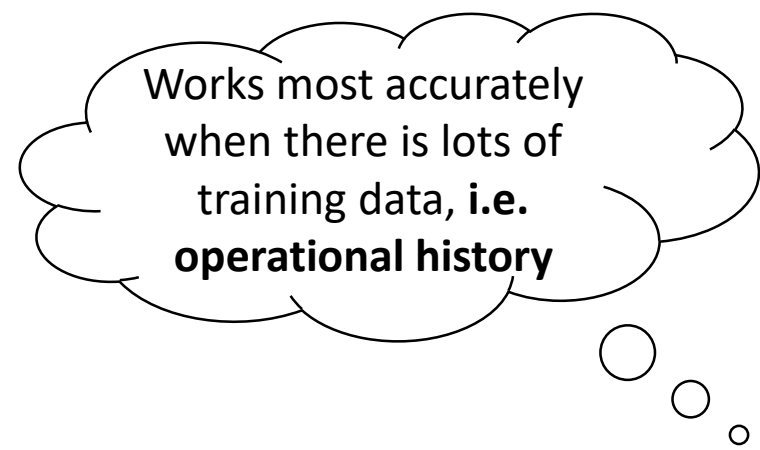
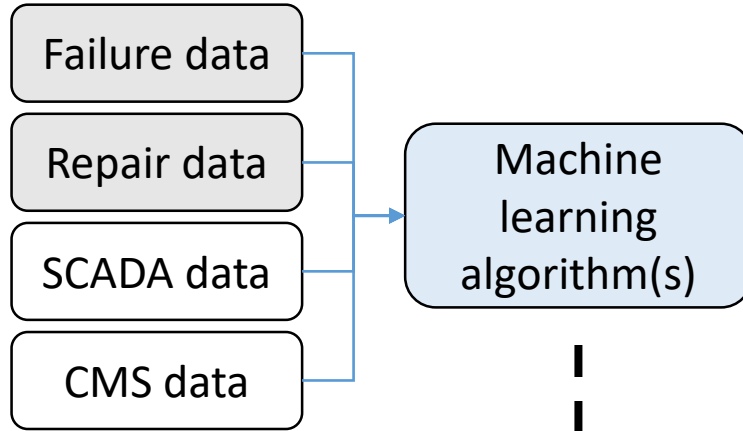
From Geared to Direct Drive Powertrains



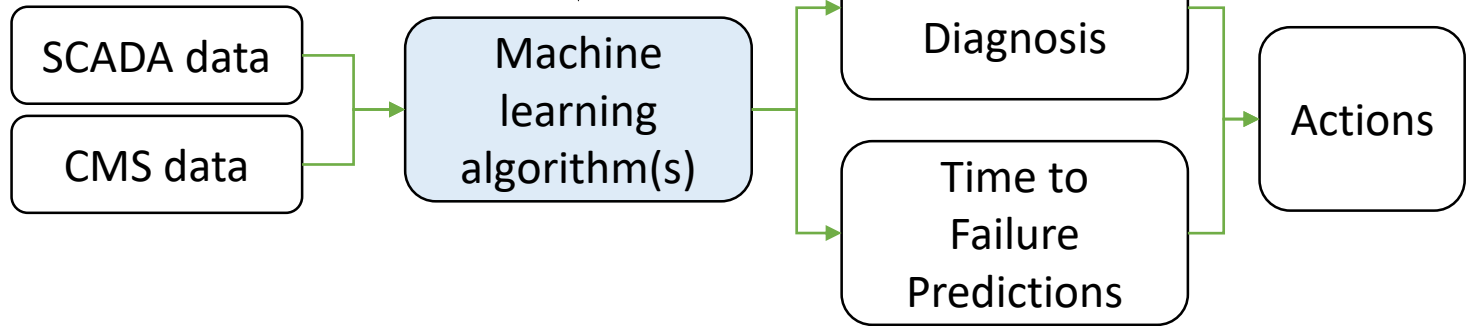
Source: Dr Alan Turnbull

Why transfer learning?

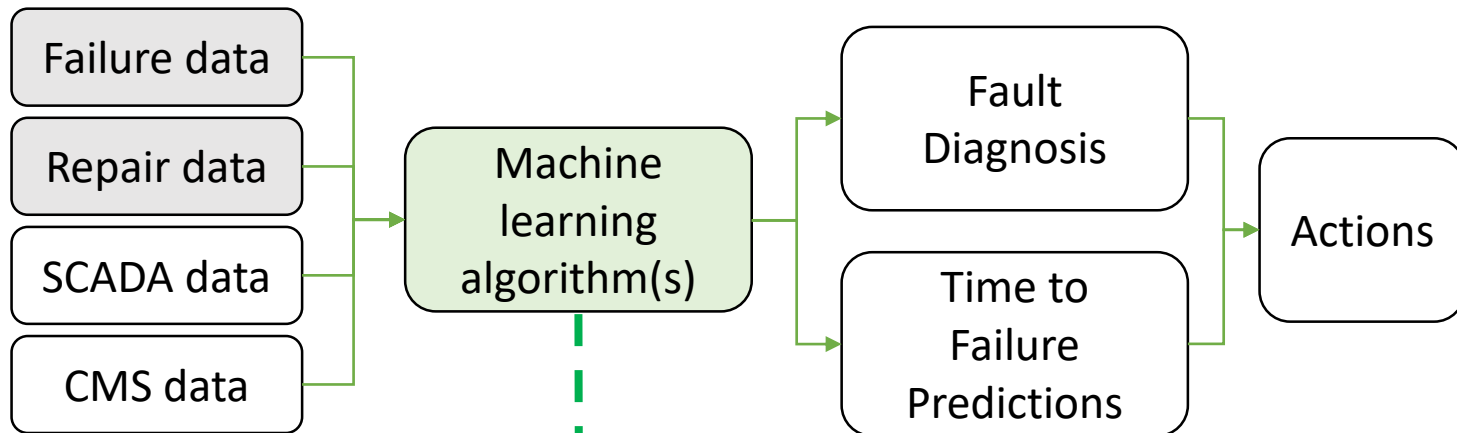
Training phase



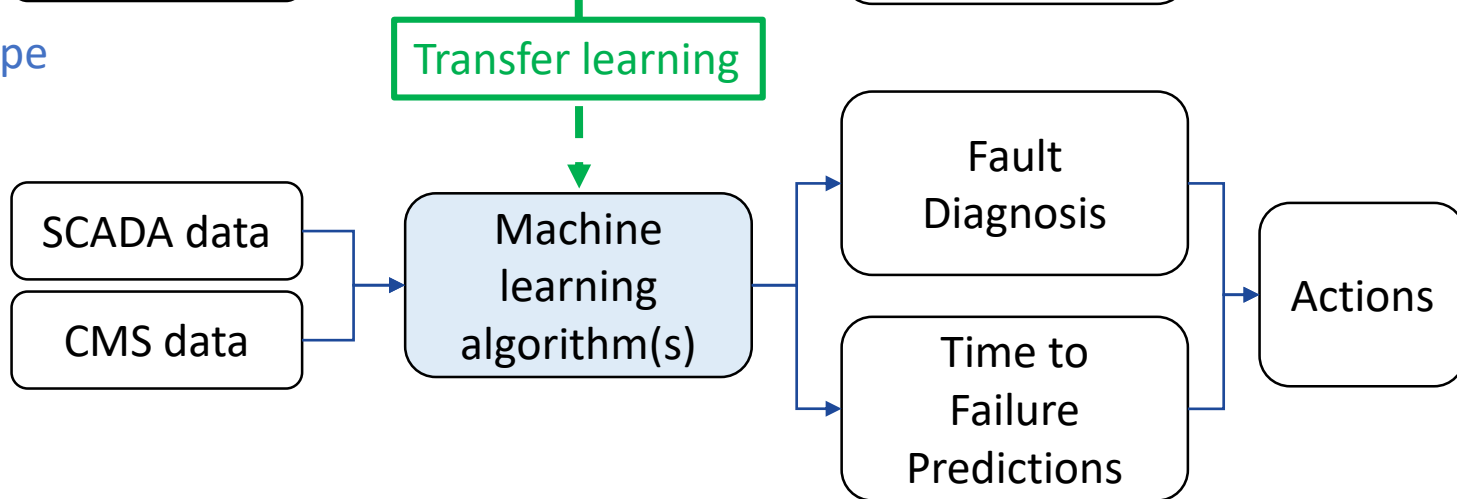
Operational phase



Old turbine type



New turbine type



Transfer learning

Can we use transfer learning between geared and direct drive wind turbines?

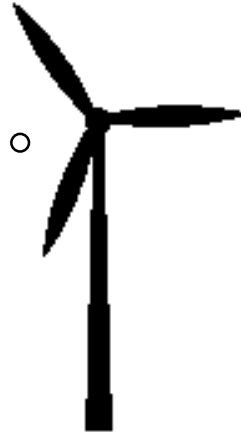
How are failure **modes** different?

How are failure **rates** and **down times** different?

How are data **channels** different?

How is the powertrain **technology** different?

How are data **features** different?



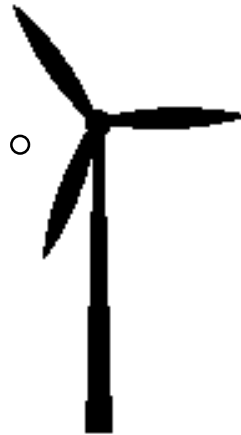
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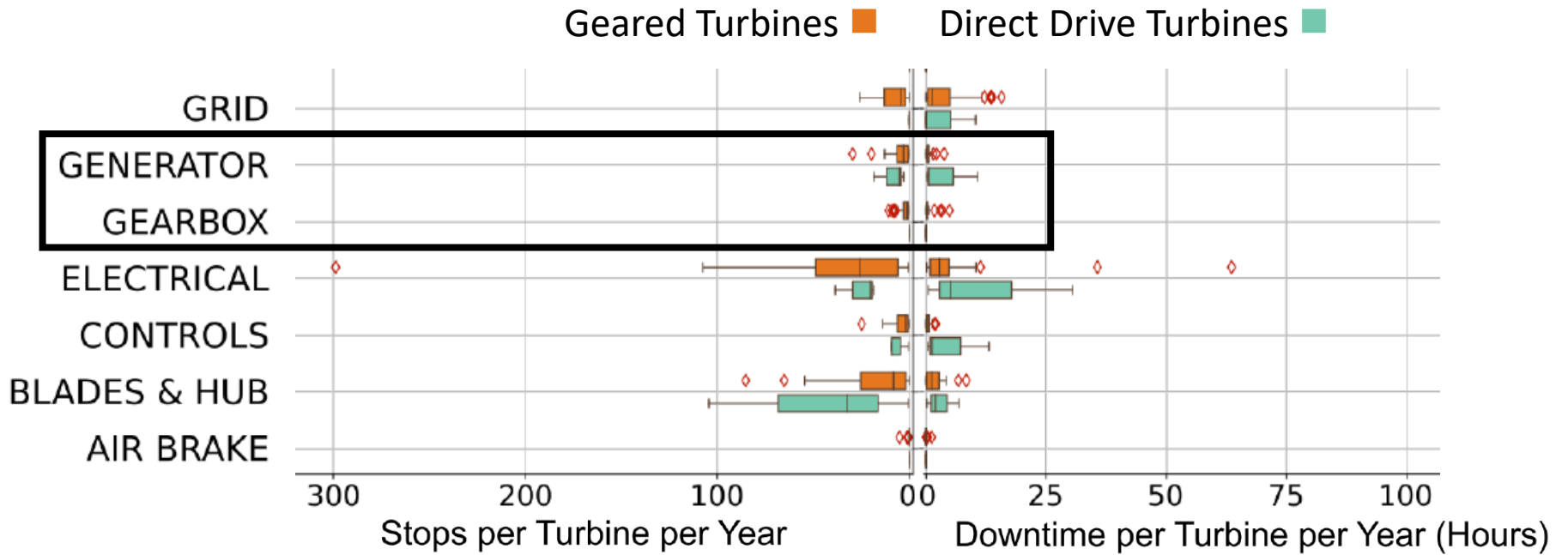
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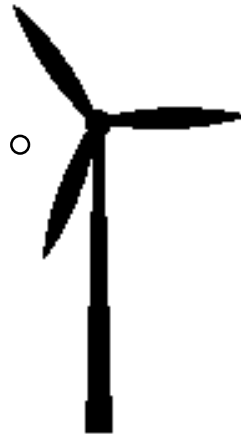
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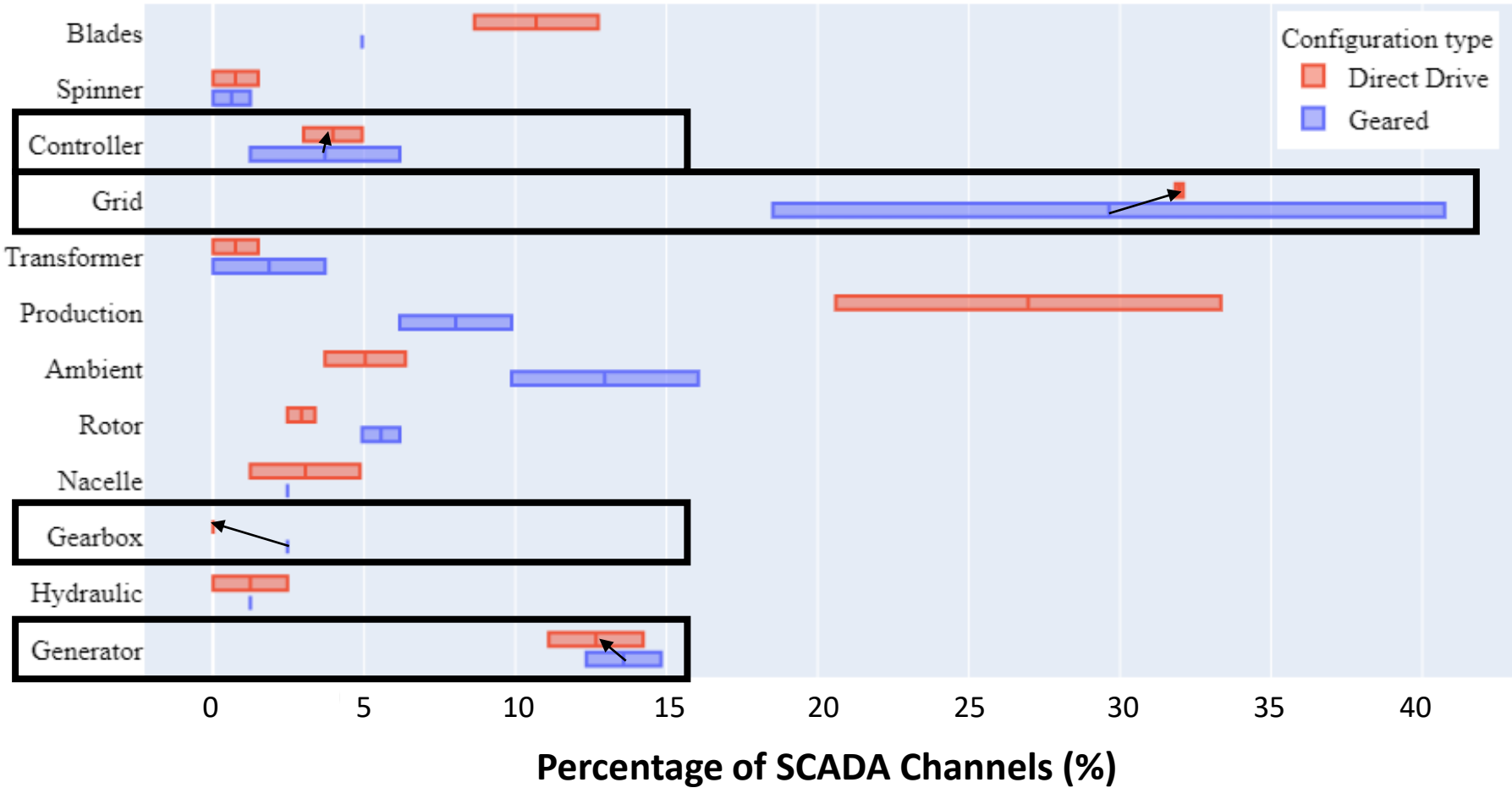
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Turbine Subsystem



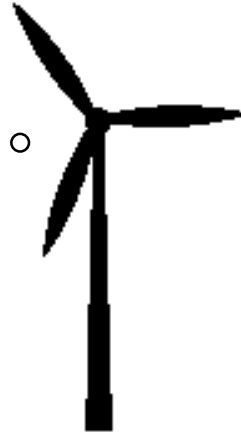
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What are the next steps?