



# A Green Future in Scotland – An Electric Future

# The Green Future in Scotland is Electric...

- Optare delivered Scotland's first EV buses in 2013
- Firmly committed to an EV future
  - 100+ vehicles in service
  - EV Offer across the single deck range
- Continued investment & improvement
  - 200 miles range in 2018
  - Electric double deck into service in July
- Scotland well placed to leverage EVs in a green future



# Scotland - The Best Ingredients for a Green Future

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- High penetration of renewable energy
- Planned renewable surplus
- An urban bus market
- Long established & consistent Green Bus Funding



# Scottish Renewable Energy

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- **Concern about EV's green credentials outdated**
- **>50% of 2016 consumption via Scottish renewables**
- **43% of production. Almost twice UK average**
- **153% of 2016 Christmas day demand via wind....**
- **60% capacity increase in development**
- **Scotland self sufficient in renewables in next decade**



# Electricity Supply Surplus

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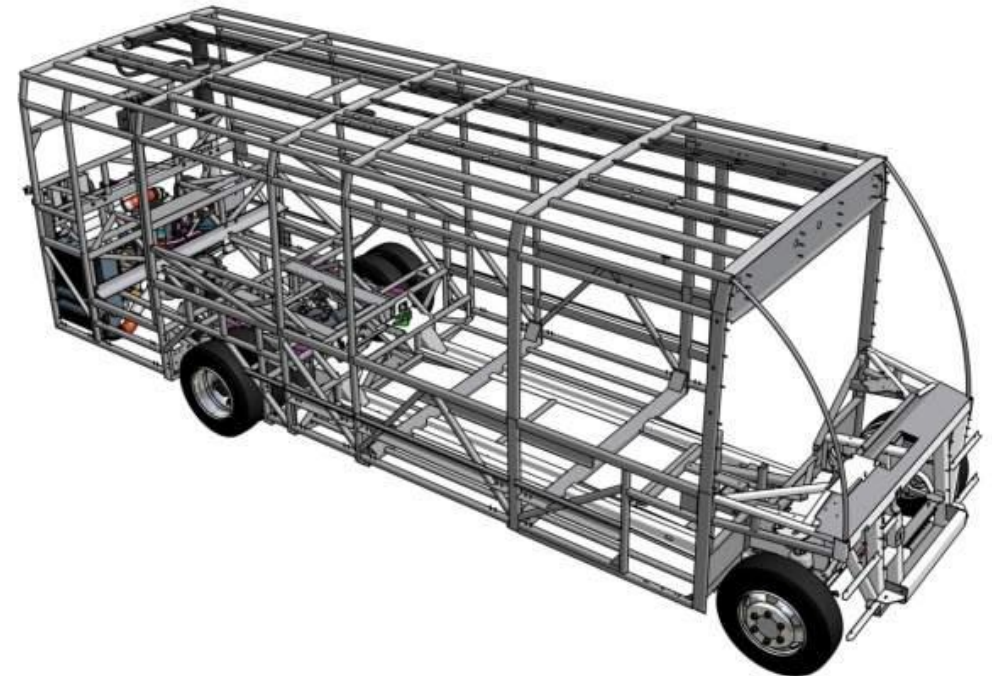
- Lack of supply could halt EV expansion to the medium term
- Scotland has 2GW supply surplus over demand at night
- Entire Scottish bus fleet as EVs would require <10% of surplus
- EV supply challenge likely to be limited to older sites only



# EVs Ideal for Urban Bus Applications

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- Optare Electric future based on a lightweight, efficient platform
- Minimum batteries to do the job
- Capacity not a constraint on current operations
- Operating cost per mile one sixth of diesel



# EVs Ideal for Urban Bus Applications

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- Average Scottish daily bus mileage 135 miles
- >150 miles achievable on a single charge today
- Optare EV will deliver a day's service with zero emission heating in 2018
- No need for expensive & inflexible opportunity charging solutions



# EVs Ideal for Urban Bus Application

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- Optare EVs based on existing diesel platform
- Reliable drive technology. 95% Availability
- Batteries capable of >8 years operation. 7 year warranty today
- Real time telematics have revolutionised vehicle management
- 5 year bumper to bumper warranties offered today





## Green Bus funding important in the short term

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- Without subsidies, biggest barrier to EV growth is cost
- 75-100% vehicle premium electric Vs diesel today. Infrastructure 50% of vehicle cost
- Optare will seek to reduce premiums by 3 routes
  - Minimum batteries & infrastructure through maximum efficiency
  - Partnership with energy storage providers
  - Exploit battery leasing as it develops
- Rise of renewables will drive battery second life & leasing. Leasing an option in 2017
- Green bus funding in Scotland provides a bridge to EVs now



# Summary

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- EV Buses are a green solution today in Scotland
- Renewables deliver near zero emission solution
- Reliable, all day service with no need for opportunity charging
- Today's premiums bridged by funding
- The Green future is here...

