

# Trolleybuses

... a key element  
of the STM's  
electrification  
plan



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# Société de transport de Montréal\* (STM)



**759 metro cars** (100 % electric since 1966) (64 % of daily passenger-kilometers)



**1705 busses** (209 lines - 1 600 km)



**84 paratransit minibuses**

**= 11.2 M passenger-kilometers / day**

(\*2011 statistics)



# STM's surface transportation electrification plan?

## Objective

### **Provide a surface public transportation service:**

Without GHG and pollutant emissions

Quiet and comfortable

Reliable



# Why trolleybuses?

## The trolleybus:

Operated in over 350 cities in the world; 10 000 trolleybuses in Europe

Passenger capacity from 85 to 155 passengers (12m - 18m - 24m)

Quiet, «0» emissions, powerful hill climbing, comfortable – no vibrations...

**Proven technology capable of electrifying part of our surface network until wireless systems are proven reliable and made commercially available at reasonable cost... 202X?**

**Predisposition for eventual electrical infrastructure conversion to opportunity charge system infrastructures**



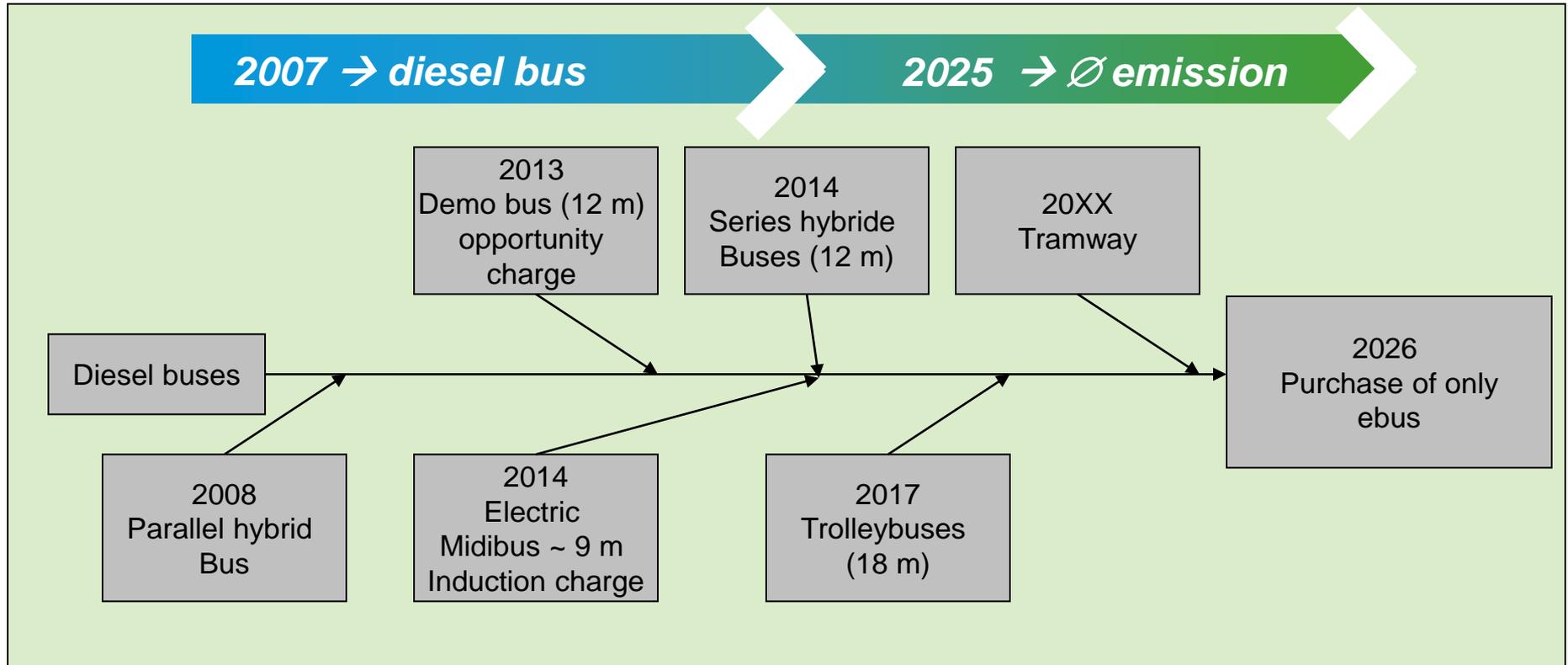
# Production of electricity in Quebec



- Hydroélectrique ● Hydroelectricity
- Nucléaire ● Nuclear
- Gaz naturel ● Natural gas
- Pétrole ● Petrol
- Charbon ● Coal



# The approach



# Why not batteries buses?

## Technologies currently under development

### Current battery capacities are limited

Relatively low energy density = increased weight

Relatively long battery recharge times

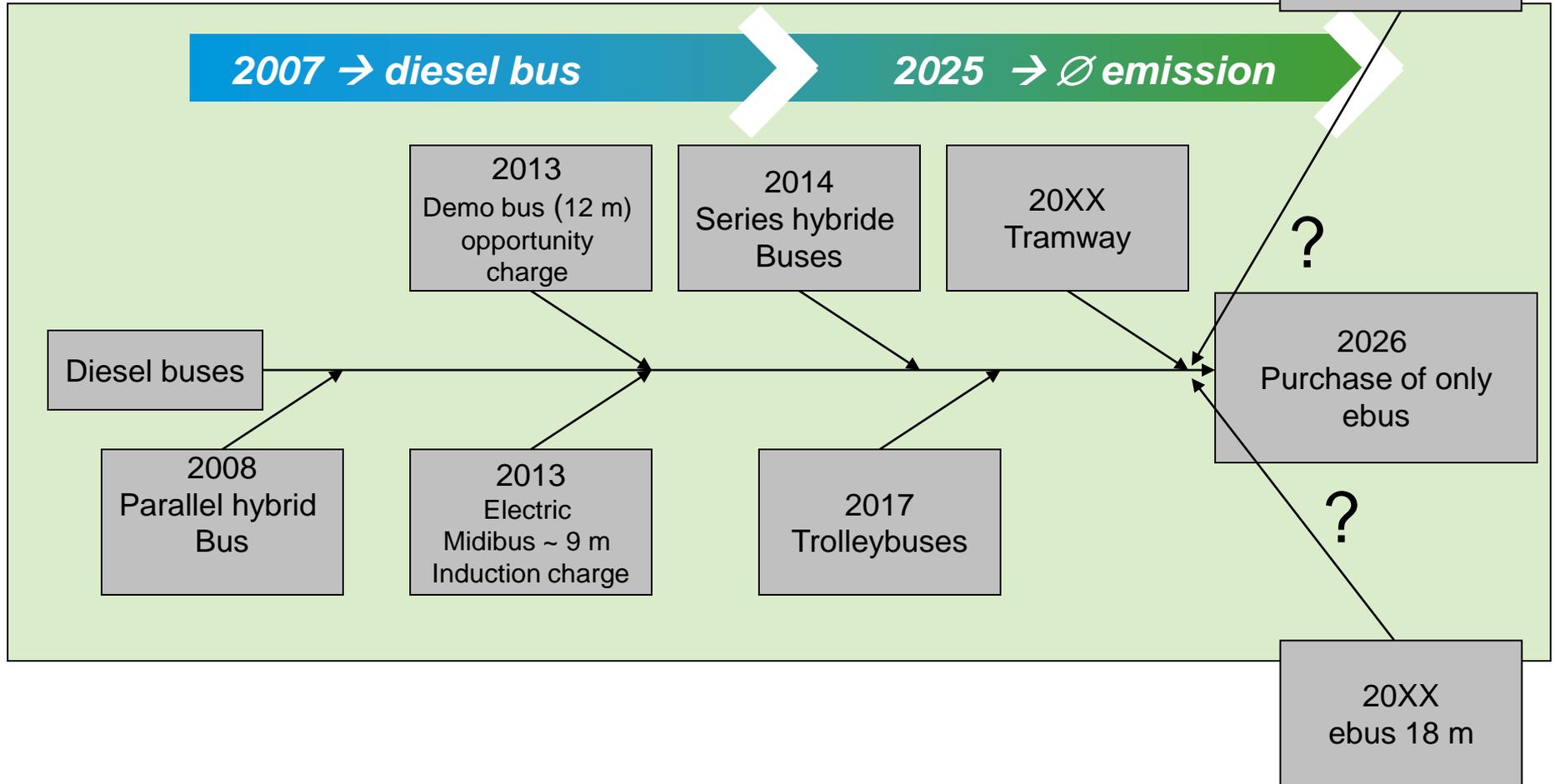
Opportunity charges = delays at bus stops = increased travel time = more buses and drivers

Current operational requirements: 500 km – 26 hours in customer service

Relatively high acquisition and operations costs negatively impact the return on investment



# The approach



# The scope of the study

Prepare a positioning paper on the technological migration of part of our diesel bus fleet to an all electric mode - trolleybus

Assess the viability of implementing, starting in 2017, a network of ~ 100 trolleybuses



# Two major issues

Preconceived ideas and notions:

solution: demystification

Project cost appraisal:

solution: clarification of the scope of the project,  
objectivity and rigor



# Preconceived ideas...



of what the network  
will look like...



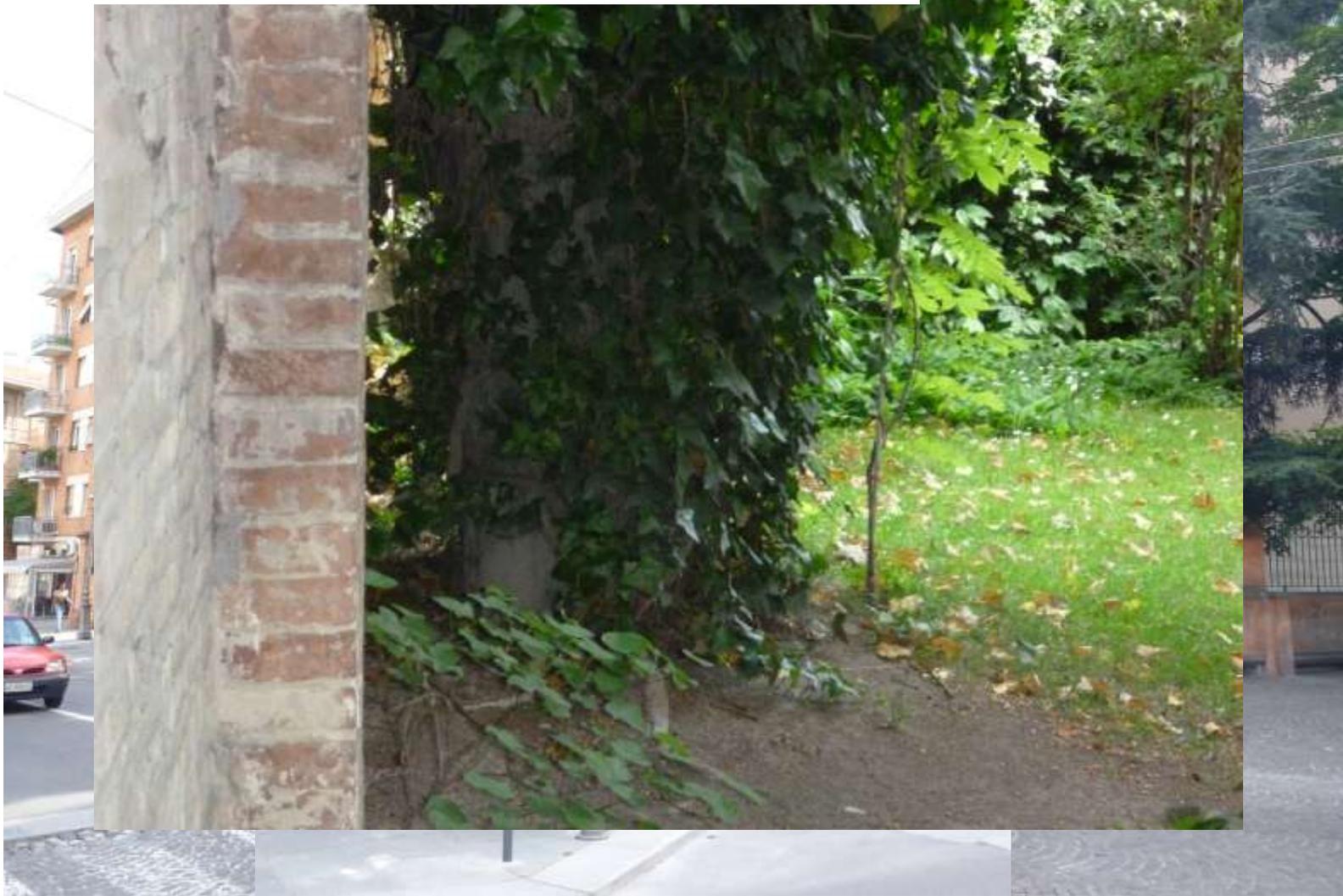


**Rather than what it  
could look like...**



# Where is ~~Charlie~~ the post ?...

Somewhere in Parma...



# Other preconceived ideas...

Trolleybus technology is out-dated... off wire operation is not recommended...

Availability of full battery electric buses for regular customer service just around the corner!



# Project costs

Project must be clearly scoped. For example, includes / does not include

urban revitalisation

public transit network layout improvements



