



# Bombardier

Event: Standardization Panel IVEC 2014

Date: December 18, 2014

Presenter: Konrad Woronowicz



## STANDARDIZATION QUESTIONS

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# BOMBARDIER

## Overview

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**Bombardier is the world's only manufacturer of both planes and trains, with a worldwide workforce of 71,700\* people.**

**Bombardier is headquartered in Montréal, Canada. Our shares are traded on the Toronto Stock Exchange (BBD) and we are listed on the Dow Jones Sustainability World and North America indexes. In the fiscal year ended December 31, 2012, we posted revenues of \$16.8 billion USD.**

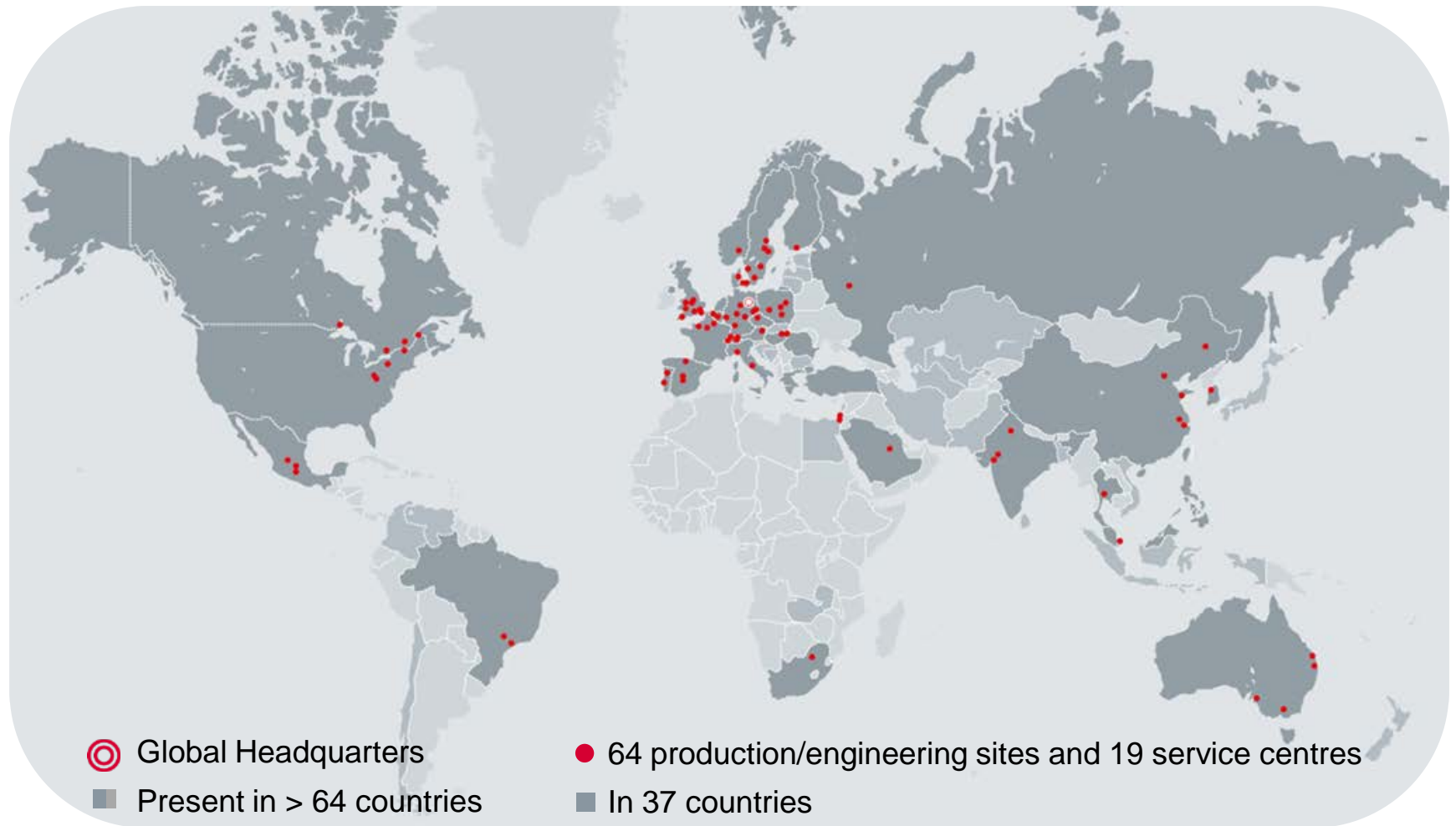
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\* as at December 31, 2012 (includes 200 employees at our corporate office in Canada)

# BOMBARDIER TRANSPORTATION

## Global expertise – local presence

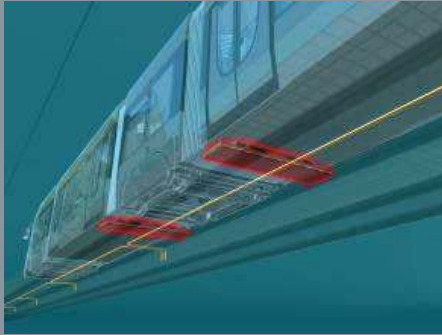
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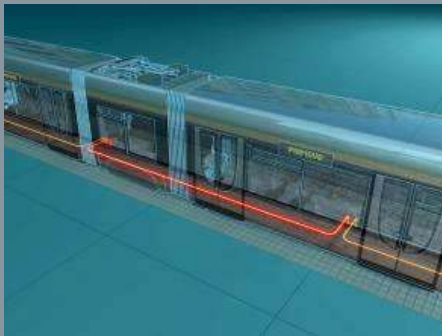
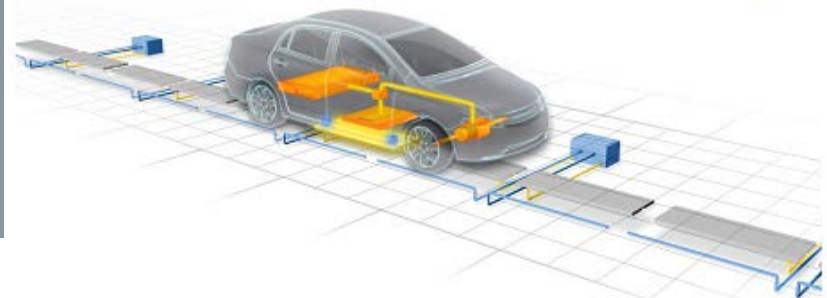
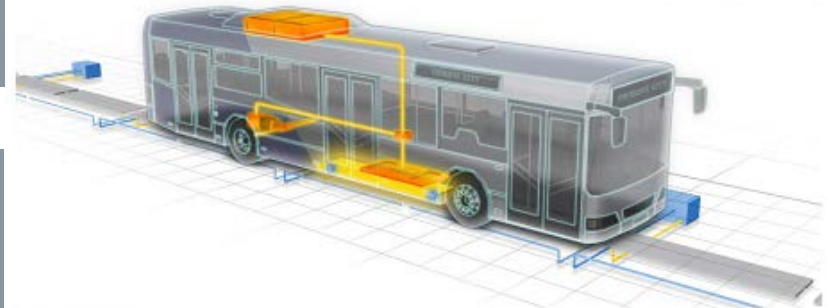
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# Bombardier *PRIMOVE*. From Low to high Power Catenary Free LRV, Bus, Passenger Car



LRV equipped with pick-up device mounted under the vehicle



Power cable invisible in the ground

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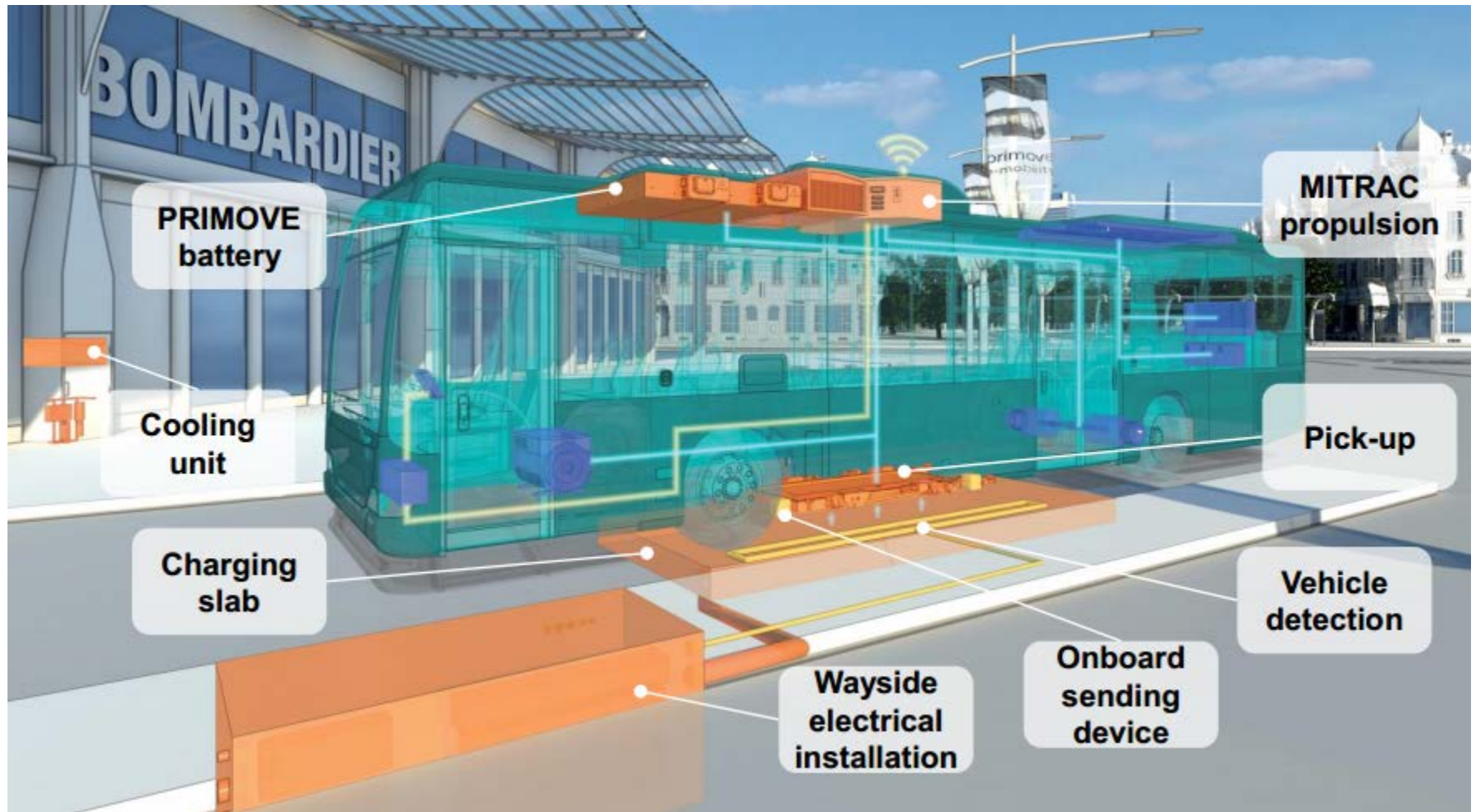
# Bombardier *PRIMOVE* Catenary - Free LRV pilot project Augsburg, Germany





# Bombardier *PRIMOVE*

## Fully integrated e-bus system in Braunschweig



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# Standardization workshop

## WPT System Standard VS Existing Standards

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- Is WPT System more difficult to regulate?
  - WPT System is NOT Self Contained
  - Should “Containment be standardized?





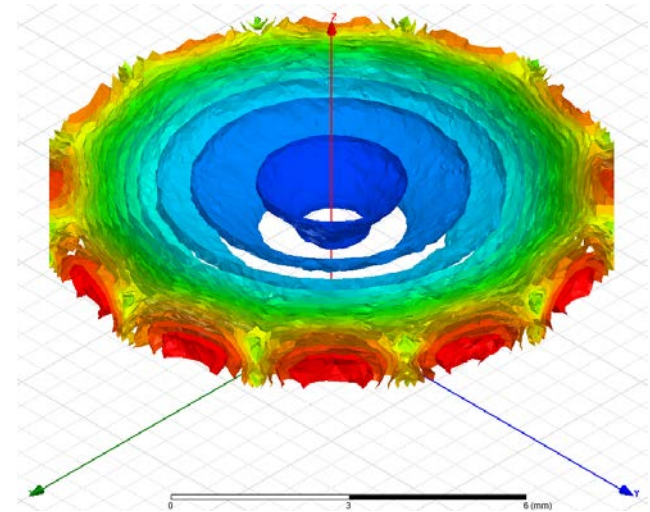
# Standardization workshop

## Questions

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### ■ What should standards do?

- Protect customer
  - > Consumer health
    - » Magnetic/Electric Field exposure
    - » Safety
  - > Consumer cost
    - » Reliability
    - » Operations
    - » Maintenance
- Simplify supply chain and contracts
- Manage interoperability with non-electric vehicles



### ■ What should standards not do?

- Stifle competition
- Limit invention

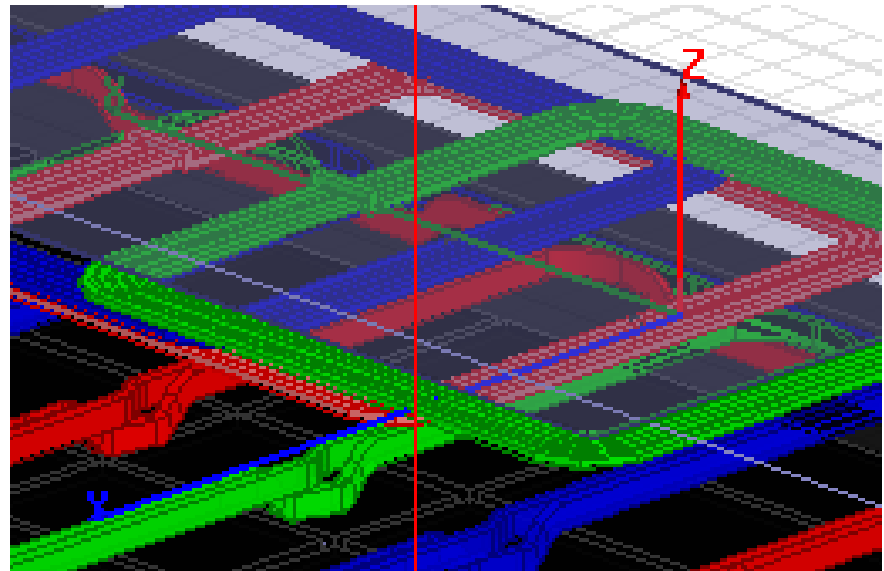
# Standardization workshop

## Questions

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### ■ What are we ready to standardize today?

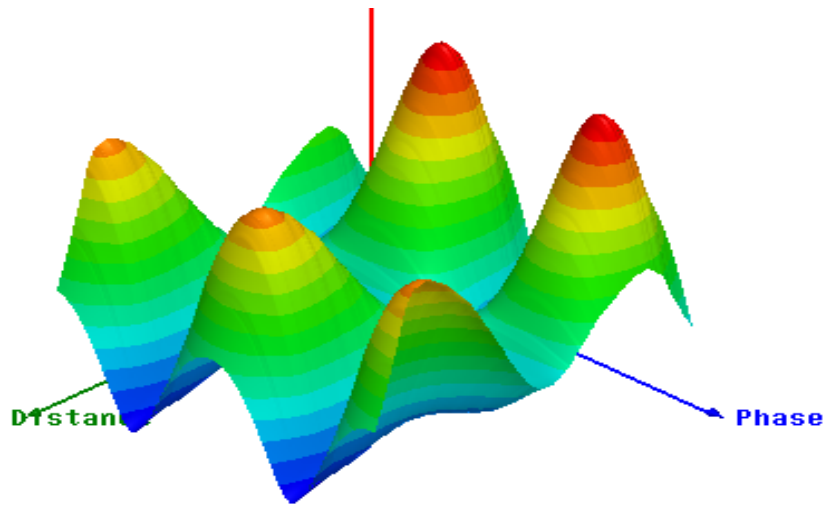
- Fare collection
- Field exposure and EMC
  - > Humans
  - > Objects
- Utilities electrical interface
- Car electrical interface
- Mechanical gap (plus variation)
- Mechanical displacement
- Efficiency
- ..... ?



### ■ How to divide the standards?

- Power level?
- Static vs dynamic?
- Home application vs commercial application?
- ..... ?

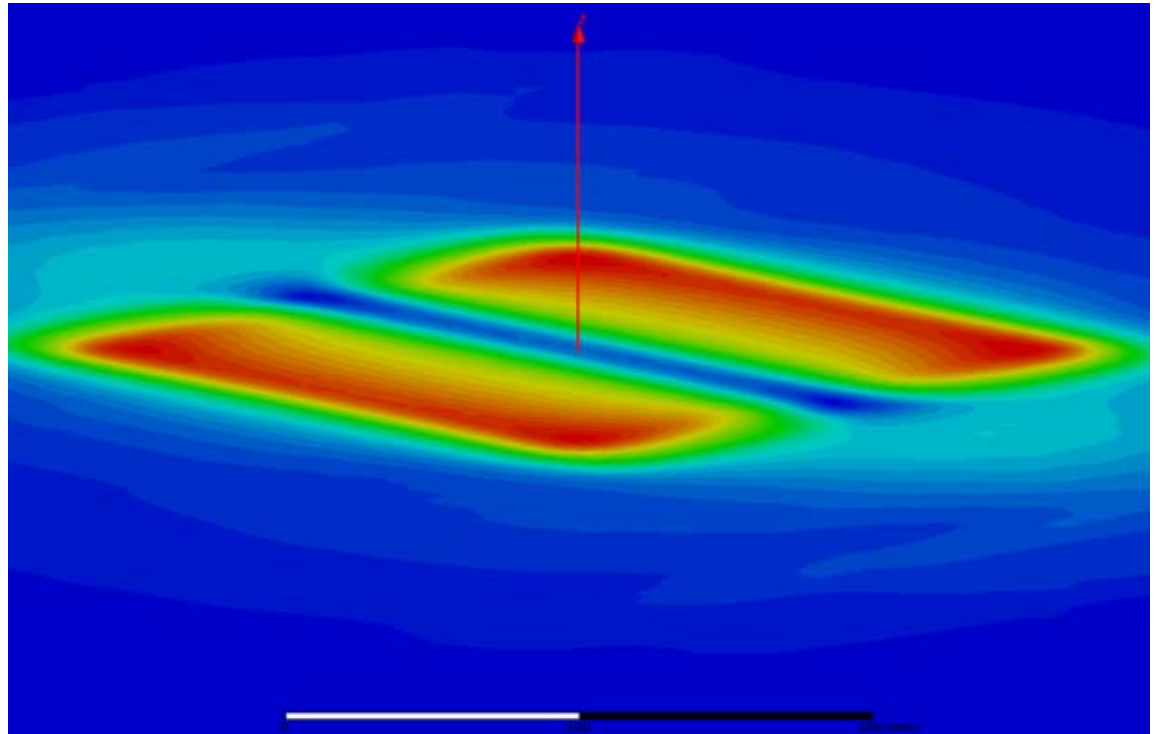
## ■ Work in progress



- Bigger involvement of car builders
- Bigger involvement of urban planners
- Bigger involvement of legal



# Thank You



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