Mateo Jaramillo – Global Director, Tesla Energy
NASEO Annual Meeting
14 September 2015
Safe Harbor Statement

Certain statements in this presentation, including statements relating to Model S production in 2014; manufacturing in general and manufacturing and timing of stationary storage products in particular; Gigafactory timing, site location, plans and output expectations; and statements regarding future vehicles such as Model X and Model 3 are “forward-looking statements” that are subject to risks and uncertainties. These forward-looking statements are based on management’s current expectations, and as a result of certain risks and uncertainties, actual results may differ materially from those projected.

The following important factors, without limitation, could cause actual results to differ materially from those in the forward-looking statements: delays in the ramping of production capacity and delivery of Model S, including the ability of suppliers to supply parts at desired quality levels and quantities; market acceptance of electric vehicles in general and new Tesla vehicle models, specifically Model X and Model 3; delays in the manufacture and launch of Model X; problems or delays in developing the stationary storage products; problems or delays in bringing the Gigafactory online and operating it in line with expectations; Tesla’s ability to establish, maintain and strengthen the Tesla brand; Tesla’s ability to execute on its manufacturing expansion as well as the risks and uncertainties identified under the section captioned “Risk Factors” in our quarterly report on Form 10-Q filed with the SEC on August 8, 2014. Except as required by law, Tesla disclaims any obligation to update information contained in these forward-looking statements.
Mission

“To accelerate the world’s transition to sustainable energy.”

Elon Musk | CEO
Corporate Overview

2003  Company Founded
2006  Roadster Prototype
2008  Roadster Introduction
2010  IPO Raises $226MM
      Purchase Tesla Factory
2012  NA Model S Introduction
2013  EU Model S Introduction
      APAC Model S Introduction
      RHD Model S Introduction
      50,000+ Vehicles Delivered
2015  Tesla Energy Introduction

Headquarters Palo Alto, CA
Tesla Factory Fremont, CA
Design Studio Hawthorne, CA
EU Assembly Tilburg, NL
Automotive Products

Low Volume
Roadster

Mid Volume
Model S | Model X

High Volume
Model III
Superchargers 2015 (Tesla web site)

>500 Worldwide stations
>3,000 Stalls
>350MW load
Distributed, Connected Vehicle Fleet

2015: 70,000+ cumulative Model S sold
- 5GWh of deployed energy storage
- 21GW bi-directional 3-phase AC inverters
- 1 Billion miles driven

1,000,000 Vehicles x 10kW On-Board Charger = 10GW Controllable Load
An Electronics and Software Culture

• Core focus and Tesla DNA
• Battery voltage management
• Motor Control
• Diagnostics
• Touchscreen
• Mobile App
• Traction and Stability Control

• Complete Over the Air Updates
Architecture

Cylindrical Cells

Battery Packs

Products

Modules
Battery Energy Density Trend

Doubling energy density in ten years!

- Tesla Roadster
- GM EV1
- Model S
- Model 3
Tesla Battery Gigafactory

Global cell supply growing, but almost entirely in Asia

GWh/Year Production

- Gigafactory
- Others
- Lishen
- BYD
- BAK
- ATL
- Maxell
- Sony
- Panasonic
- LG Chem
- SDI

© Copyright 2015 Tesla Motors, Inc. All rights reserved.
Gigafactory

50 GWh in annual battery production by 2020
Enough for 500,000 Tesla cars
Powered by renewable energy
Net zero energy factory
Gigafactory Process Flow

1. Raw Materials
   - Cathode Manufacturing
     - Aluminum Foil
   - Cathode Electrode
   - Separator Manufacturing
     - Separator
   - Anode Manufacturing
     - Copper Foil
     - Anode Electrode

2. Winding
   - Electrolyte Manufacturing
   - Cell Assembly
     - Cell
     - Module
   - Can & Cap

3. Pack
   - Pack
     - Module
     - Pack

4. Battery Pack Recycling
   - Battery Pack Lifetime Usage

5. Vehicle Assembly and Stationary Storage
   (Fremont, CA or final dest.)
Find True Materials Cost

- **CoCO₃**
- **Ni metal**
- **H₂SO₄**
- **NiSO₄**
- **NaAlO₂**
- **NaOH**

**Smelter**

**NiCoAlO₃ (precursor)**

**Calcining**

**Li₂CO₃**

**LiOH**

**Chemical conversion**

**Smelter**

**LiNiCoAlO₂**

**Calcining**

**O₂**

**Pulverizing**

**Classifying**
Energy Products

- **Model S**
  - 70kWh and 85kWh

- **Powerwall**
  - TESLA HOME BATTERY
  - 7kWh and 10kWh

- **Powerpack**
  - TESLA COMMERCIAL BATTERY
  - 100kWh+
POWERWALL
TESLA HOME BATTERY
POWERWALL
TESLA HOME BATTERY
**POWERWALL**

**TESLA HOME BATTERY**

**Technology**
Wall mounted, rechargeable lithium ion battery with liquid thermal control.

**Models**
- 10 kWh $3,500
  For backup applications
- 7 kWh $3,000
  For daily cycle applications

**Compatibility**
Single phase and three phase utility grid compatible.

**Operating Temperature**
-4°F to 110°F / -20°C to 43°C

**Enclosure**
Rated for indoor and outdoor installation.

**Installation**
Requires installation by a trained electrician. DC-AC inverter not included.

**Weight**
220 lbs / 100 kg

**Dimensions**
51.2" x 33.9" x 7.1"
1300 mm x 860 mm x 180 mm

**Certifications**
UL listed

**Efficiency**
92% round-trip DC efficiency

**Power**
2.0 kW continuous, 3.3 kW peak

**Voltage**
350 – 450 volts

**Current**
5.8 amp nominal, 8.6 amp peak output
Scalable “Pod” Design
POWERPACK
TESLA COMMERCIAL BATTERY

- PEAK SHAVING
- LOAD SHIFTING
- DEMAND RESPONSE
- GRID SERVICES
- CAPACITY FIRMING
POWER PACK
TESLA COMMERCIAL BATTERY

Powerpacks  DC Combiner Panel  Spare Bays (Capacity Maintenance)

30' – 4”

Bi-Directional PCS (Inverter)

9’ – 1”

23’ – 11”
Utility Scale Projects

10MW / 20 MWh

- Modular
- Scalable (10s of MW+)
- AC Parallel Connections
  - High Reliability
  - Simplified Construction
Utility Scale Projects

25MW / 100 MWh
<2 acres
CPP and Storage

• Storage can be a key component of an efficient, reliable, low cost electric grid
  – Projects underway now

• Should be evaluated with all option sets, considered as a technology option for planning and funding
Questions