UN R13 and Electro Mechanical Brakes
UN Regulation 13 defines:

- **Transmission** means the combination of components comprised between the control and the brake and linking them functionally. *The transmission may be mechanical, hydraulic, pneumatic, electric or mixed.*
- **Control Transmission** - means the combination of the components of the transmission which control the operation of the brakes, including the control function and the necessary reserve(s) of energy.
- **Energy Transmission** - means the combination of the components which supply to the brakes the necessary energy for their function, including the reserve(s) of energy necessary for the operation of the brakes.

> *The transmission may be mechanical, hydraulic, pneumatic, electric or mixed.*

UN R13 was updated in 1990s to account for an electronic “Control Transmission” but still assumes Pneumatic “Energy Transmission” in the service braking system.

- **Pneumatic Energy limitation is shown in two ways:**
  - Design Specifications – E.g. Where limits are in kPa.
  - Design Limitations – E.g. Where it is assumed air is the medium.
UN R13 and Electro Mechanical Brakes (EMB) Development steps comparison

Other architectures or different Energy storage strategy are possible (e.g. EHB - Electro-Hydraulic Brake, EMB double axle and double battery)
UN R13 and Electro Mechanical Brakes (EMB) Schematics of brake Systems

Pneumatic Energy

Compressor → E-APU → Air reservoir storage → EBS Modulator → Actuator → Caliper

EBS

Energy supply

Annex 7 part A

Energy storage

Actuation

EMB

Annex 7 new part D

New 5.2.1.34.

Electric Energy

DC/DC → Electric energy storage → Drive and Motor → Gears → Caliper
2. Definitions

New paragraphs defining **Electric Energy Transmission** (e.g. **Energy Source**, **Electrical Storage device**, **Electrical Supply device**)

5.1.4.6 Reference Braking forces

*New paragraph 5.1.4.6.2.*
Reference braking forces for electro-mechanical braking system using a roller brake tester shall be defined according to the following requirements.

5.2 Characteristics of Braking Systems.

*New paragraph 5.2.1.34.*
Special additional requirements for service braking systems with electric control and energy transmissions.

Annex 7, (provisions relating to energy supply and storage)

*New Part D*
Electro-mechanical Braking system
UN R13 and Electro Mechanical Brakes (EMB)  
Summary and outlook

Expected advantages by introducing Electric Energy Transmission to UN R13
- **Improved energy efficiency in EV’s (vs. air compressor).**
- **Improved braking control.**
- **Elimination of noise from pneumatics.**

A proposal for amending the text of UN R13 is in preparation by the Industry (brake system suppliers supported by vehicle manufacturers )
- **Initial focus on motor vehicles**
- **Inclusion of Electric Energy Transmission in service braking systems**

Comments from the delegates of GRVA are welcome before end of November
Industry will introduce an informal document for GRVA 05 in February 2020