

**ZERO EMISSION. PERFECT SLOPES.**

Martin Kirchmair, Technical Director - PRINOTH

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*Prinotti*

# PRINOTH – who we are

Tracked Utility Vehicles – Snow Groomers – Vegetation Management



# snow grooming business

## Extreme conditions

Ambient temperature during operation -40°F to 104°F (freeze start capability -4°F without external assistance) / storage -22°F to 104°F

Vibration up to 10g peak loads

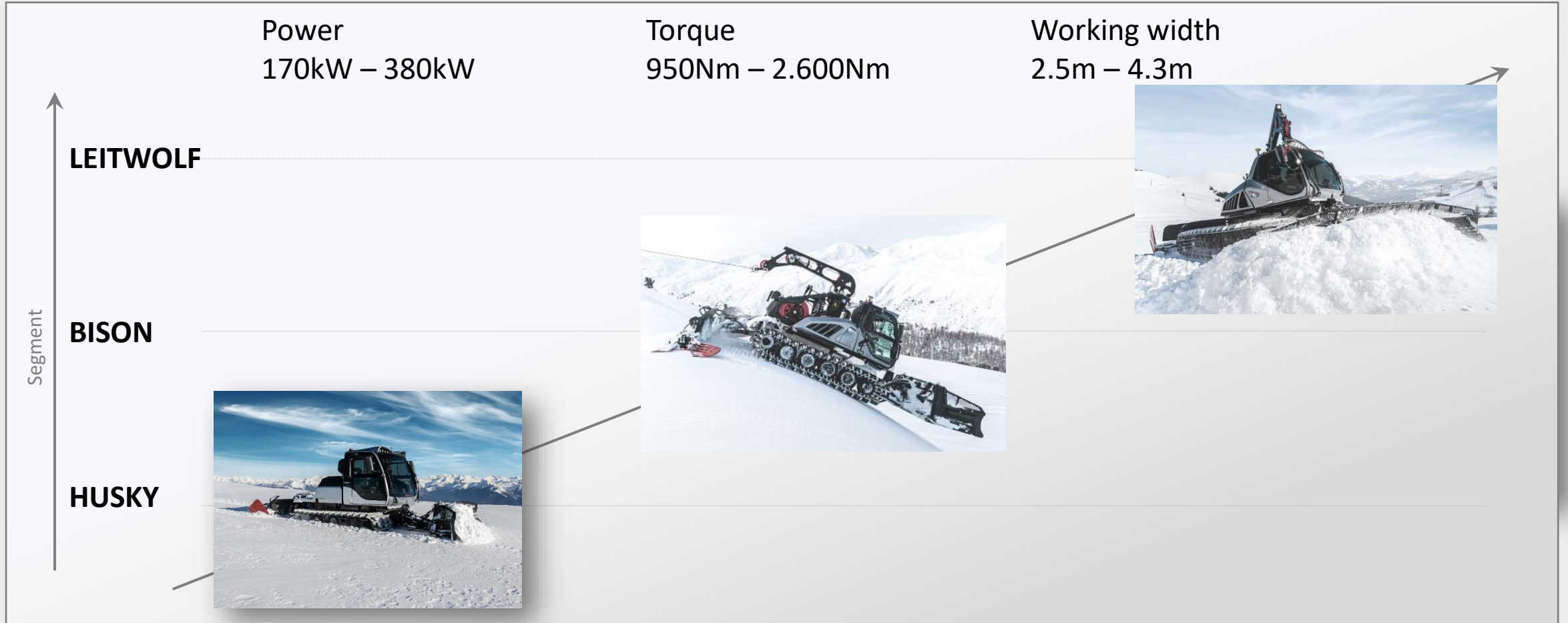
Altitude 0 to 14.800 feet above sea level

Inclination 45° slope inclination in all directions

Operation 6 months per year operation – 6 months stand still



# snow grooming product portfolio



# zero emission in two segments

Hydrogen or battery electric vehicle

0-emission concepts considering key criteria:

- ✓ APPLICATION
- ✓ POWER DEMAND
- ✓ RUN TIME DURATION

1

## SMALL SEGMENT - Battery electric vehicle

- Lower running hours ~ 3h
- Less power requirement
- Focus on in-door, small ski hills, cross country

**HUSKY**  
eMOTION

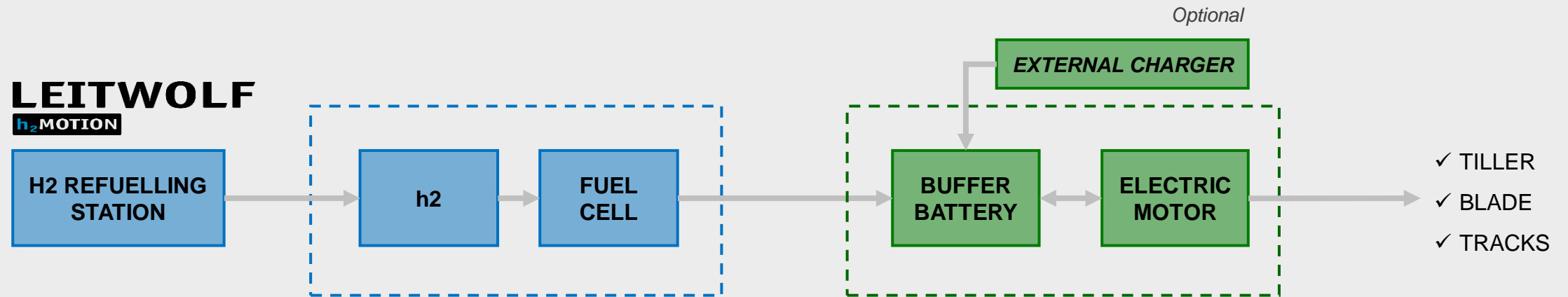
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## BIG SEGMENT - H2 fuel cell electric vehicle

- Full shift requirement ~ 8h
- Big power demand
- Re-fueling concept during shift

**LEITWOLF**  
h<sub>2</sub>MOTION

## H2 Fuel Cell Electric Vehicle



## Battery Electric Vehicle



# LEITWOLF h<sub>2</sub>MOTION

Proof of concept vehicle



# LEITWOLF h<sub>2</sub>MOTION

Proof of Concept

- ✓ electric motor 400kW / 2.300Nm
- ✓ ~115kWh battery / ~120kW FC
- ✓ ~22kg H<sub>2</sub> onboard
- ✓ 700bar H<sub>2</sub> & 700V system
- ✓ autonomy target for series >4h





# challenges

## System & Infrastructure

### 1 System

- Lifetime 10 years / 10,000 hours of operation (considering TCO similar diesel engine version)
- TCO in off road machinery
- H2 storage space on the vehicle
- Balance between FC & battery
- System / component availability for small volumes
- Fast changing technology and hard to follow all news
- Development invest for small companies
- Standards missing for installation & application

### 2 Infrastructure

- Green H2 supply in remote areas @ needed cost
- Snow groomer garages in remote areas without winter road access
- Infrastructure upgrade at customers
- Approx. 10kg H2 / hour of operation
  - 10 vehicle fleet with 8h / day operation = ~600kg
- Standards missing
- Huge technology change for industry & customer – trainings, experts... missing

# opportunities

Tracked vehicle application

## 3 Tracked vehicles

- snow groomers are one of the hardest applications for tracked drivetrains and interesting to develop & test new technology (as well special environment conditions)
- PRINOTH, including all 3 business units is producing more than 1,200 tracked vehicles / year
- tracked vehicle drivetrains could be aligned between different businesses to use same components (excavators, dozers, snow groomers, tanks...)

**Thank you very much!**



*Pinotti*