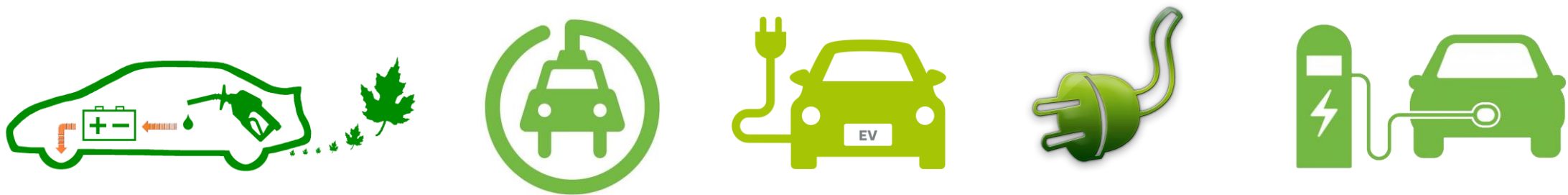


Actions for Safe Carriage of Alternative Fuelled Vehicles

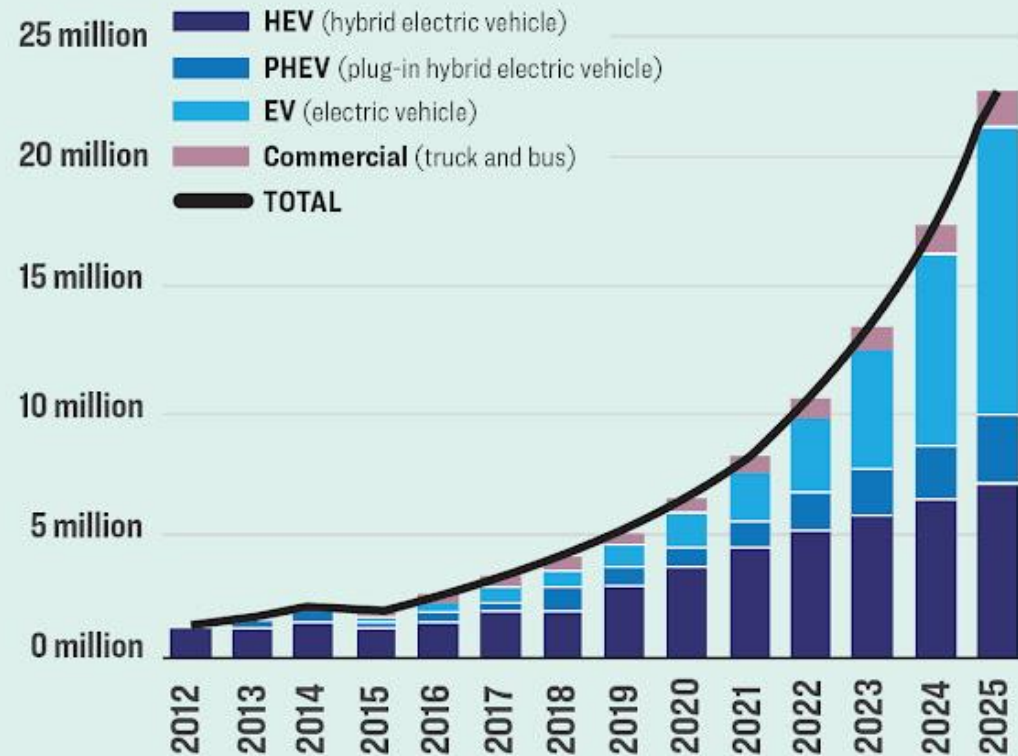


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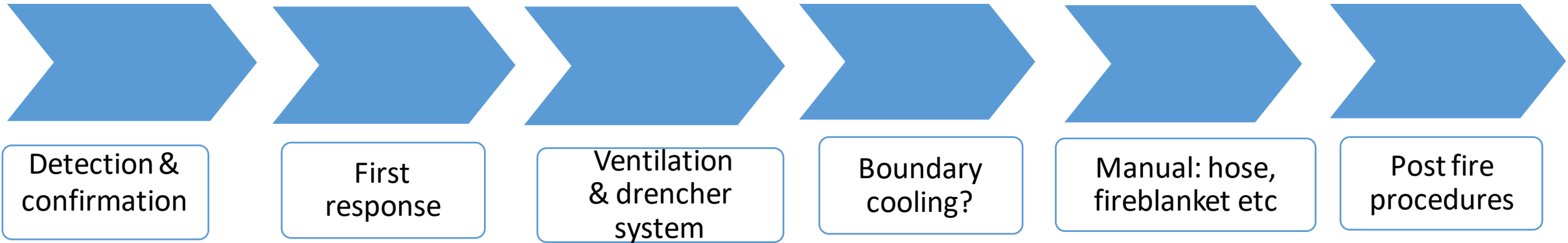


EXPECTED GROWTH OF ELECTRIC VEHICLE SALES

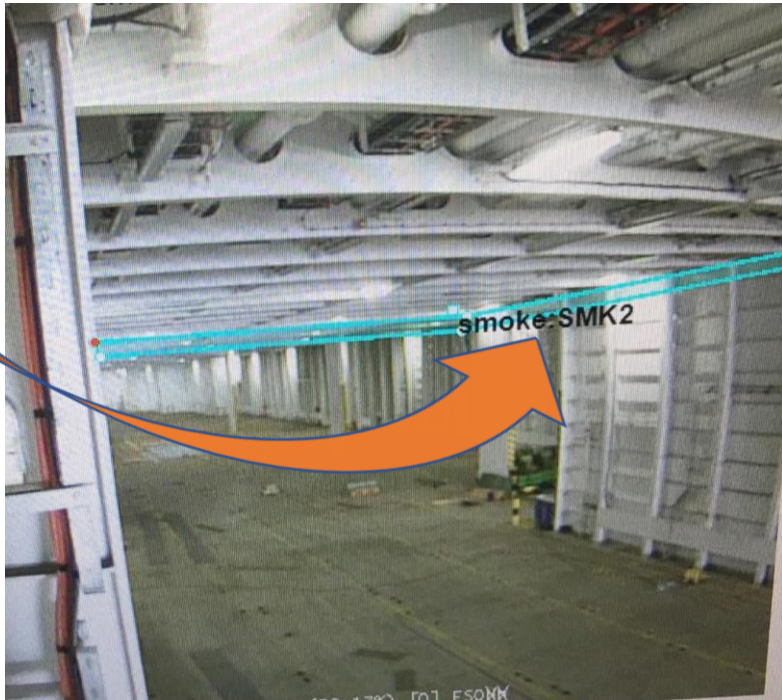


SOURCE: ROSKILL & UBS ESTIMATES

- There is an expected growth in APV's
- Electric cars do not burn more often than a regular petrol car
- The fire is different and more challenging



Early detection



Installation of cameras Heat/Smoke/IR

Installation of Linear Heat Detection Cable

Fire Patrols as soon as vessel leave the port

Training of crew in basic characteristics and safety aspects AFV

Reject damaged AFV

Fixed system fire suppression



- Fast activation can suppress the fire
- Reducing the presence of airborne Hydrogen Fluoride (HF)
- Prohibit the fire from spreading to adjacent vehicles
- All crew members who have designated tasks with the drencher system should be able to activate the system

Manual firefighting of AFVs

- For direct or indirect lifesaving
- Proactive measure at elevated risk but no fire
- If clearly safe and most reasonable firefighting alternative
- If needed for measures in addition to fixed system or if fixed system does not work as intended
- At stable post fire conditions

	<u>Fire development stage</u>				
<u>Deck type</u>	Early	Developing	Full car	Spread	Partial deck
Weather deck	Green	Green	Green	Yellow	Orange
Open RoRo	Green	Green	Yellow	Yellow	Red
Closed RoRo	Green	Yellow	Orange	Orange	Red

Boundary cooling

Portable sprinkler unit



Effect of boundary cooling devices



Actions for safe carriage of Alternative Fuelled Vehicles (AFV)

Manual fire hose intervention



Safe position for firefighters is within 45° degrees of either side of the center-line.

Fire blanket



- A fire blanket will not be able to extinguish the fire but can limit flames and contain the smoke.
- Cover a vehicle that is burning or as a preventive measure if signs of malfunction are showing.
- Cover nearby, yet unignited, vehicles/items to prevent spread of fire.
- Hung as a curtain from the ceiling to contain radiant heat.

Undressing Procedure
for
firefighters who been in contact
with **Hydrogen Fluoride gasses** from
lithium-ion batteries fires





Operators actions

- Registration of fuel type for vehicles, available onboard
- Fire patrol EV instructions
- Fire suit upgrade, hood and 2nd layer
- EV fire fighting training
- Additional gear (boundary cooling device, fire blankets)
- Safe post fire, undressing and gear handling procedures
- Water monitors on weather deck
- "100%" CCTV coverage of all decks
- Minor electric devices strategy
- **Continue to learn!!!**

Thank you!

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