1.1 SUEZ CANAL CONTAINER TERMINAL

1.1.1 BACKGROUND

This case study covers the transition from diesel tractors to electrical tractors in the Suez Canal Container Terminal (SCCT). SCCT is one of more than 70 container terminals of APM Terminals. This study was performed after Terberg's (one of the biggest special vehicles manufacturers) announcement of releasing its first electric tractor (Green tractor). At the time, APM Terminals had not yet released its project to go Green by 2030, and the fleet was around 130 terminal tractors.

1.1.2 FEASIBILITY STUDY

This feasibility study of the new tractor aims to show its advantages, disadvantages, capital investment, Return On Investment (ROI) and cost of transition.

Advantages:

- The major expected advantage was switching to green energy and taking a step forward to a more eco-friendly working environment

- Saving on maintenance and repair of engine-related parts

- Saving of fuel compared to kWh

- The two tractors from the same manufacturer have the same parts except that one replaces the engine with an electrical motor and a battery. This means new spares and new maintenance training are not required for the non-engine parts.

Disadvantages:

- The need for a higher number of electric tractors in comparison to the current fleet of diesel engines due to the long time required for recharging compared to refuelling. The complete cycle time of operation and refuelling/recharging was determined for both tractor types.

- The need for charging slots with the required facilities of power lines and transformers.

- The need to train the maintenance team on electrical motors and drives.

Investment

The required investment was divided into a capital cost and a running cost.

Capital cost: the cost of the new tractors, the charging ports and their installation.

Running cost: cost of electricity.

1.1.3 CONCLUSION

This investment of the new electric tractors will pay off in five years due to the reduction in fuel cost and engine maintenance. However, after these five years, another large investment is required to replace the batteries of the electric tractor fleet, which experience a large performance deterioration within five years. The cost of batteries is almost one-third of the cost of the electric tractor, which is about the price of a diesel tractor.

1.1.4 RECOMMENDATION

This upgrade to electric tractors is not economically feasible. However, it does have other benefits from an environmental perspective.

There is an option to proceed with purchasing two electric tractors only to be used for fuelling of the Rubber-Tyred Gantry cranes (RTGs). This will allow testing of this new technology without the risk of transforming the whole fleet to electric tractors, enabling exploration of its opportunities and limitations, training of the maintenance team to be prepared for this emerging technology, as its implementation will likely be mandatory in the near future.

This case study was kindly submitted by Ahmed Khattab, AM Consultant, Meta Sights