

# STEPPING INTO AN ALTERNATE & ELECTRIFYING AGE FOR TOWAGE

Mauritius Maritime Week – 21-23 January, 2025

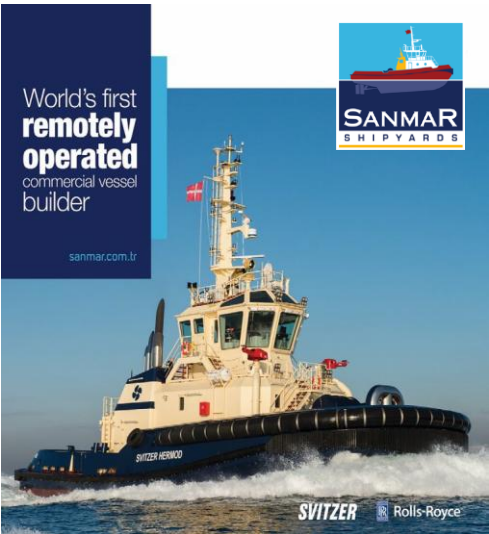


# Leading the way with world firsts and ITS awarded tugs



First LNG Fuelled

**TUGBOATS OF  
QUALITY**  
for every application





**Navigating Tomorrow,  
Preserving Today**



# RASTAR 4000DF – LNG Dual Fuel; 40m – 100 TBP



- Dual Fuel engines powered by natural gas
- **LOA: 40m & Bollard Pull: 100 tonnes**
- Full escort notation - Capable of generating indirect towing forces **up to 200 tons**
- Will perform almost all of their missions using **gas as primary fuel**
- Equipped for ship escort and assist, pollution response, oil spill recovery, fighting marine terminal fires, person overboard response and emergency vessel towage.

# RASALVOR 4400DFM – MeOH Dual Fuel; 44m – 120 TBP



- Dual Fuel engines powered by methanol
- **LOA: 44m & Bollard Pull: 120 tonnes**
- Most powerful escort tugs in Canada
- Mechanical cross link between propellers
- High quality onboard equipment includes heavy duty electric winches fit fore aft
- Equipped for ship escort and assist, pollution response, oil spill recovery, fighting marine terminal fires, person overboard response and emergency vessel towage.

# Breaking new ground – Methanol Fuelled (Escort) Tugs



- The *RAsalvor 4400-DFM* escort tugs (2) will measure 44 metres in length with over 120 tonnes of bollard pull. They'll be Canada's most powerful escort tugs to date and have been **customized to meet the demanding operational and environmental requirements for this project.**
- World's first large purpose-built high bollard pull methanol fuelled tugs when they enter service in 2025 and **will provide significant environmental benefits to further reduce greenhouse gas (GHG) emissions and underwater radiated noise.**
- Equipped with a mechanical cross link system between the azimuth thrusters to enable a single engine to drive both propellers. They will also be equipped with main engine driven shaft generators to satisfy the vessel's normal electrical needs. **These features will allow the crews to optimize engine loading and significantly reduce fuel consumption and running hours of the main engines and gensets – further reducing emissions.**
- Additionally, KOTUG is having the hulls of both tugs coated with a graphene paint to **reduce biofouling and enhance hull-smoothness which reduces underwater radiated noise and makes the vessels more fuel efficient.**



NB. Using conventional methanol as a marine fuel can **reduce SOx and particulate matter emissions** by more than **95%**, and **NOx** by up to **80%** compared to conventional marine fuels. Conventional methanol can reduce **CO<sub>2</sub> emissions** during combustion by up to **15 %** compared to conventional fuels. **The use of e-methanol and biomethanol can be carbon neutral on a lifecycle basis, providing a “future-proof” pathway to global and industry decarbonization goals.**



# ElectRA Series

## Partnering for sustainability - the next generation of harbour tugs



POWERED BY



Corvus Energy



ROBERT ALLAN



ElectRA 1900SX

ElectRA 2200SX

ElectRA 2300SX

ElectRA 2500SX

ElectRA 2800SX

**ElectRA**

**BATTERY ELECTRIC TUGS**

POWERED BY



SANMAR Corvus Energy

# ElectRA Series - Deliveries to Date



**ElectRA 2200 SX**  
BB Electra

Buksér og Berjing

**ElectRA 2300 SX**  
SAAM Volta  
Chief Dan George

SAAM Towage

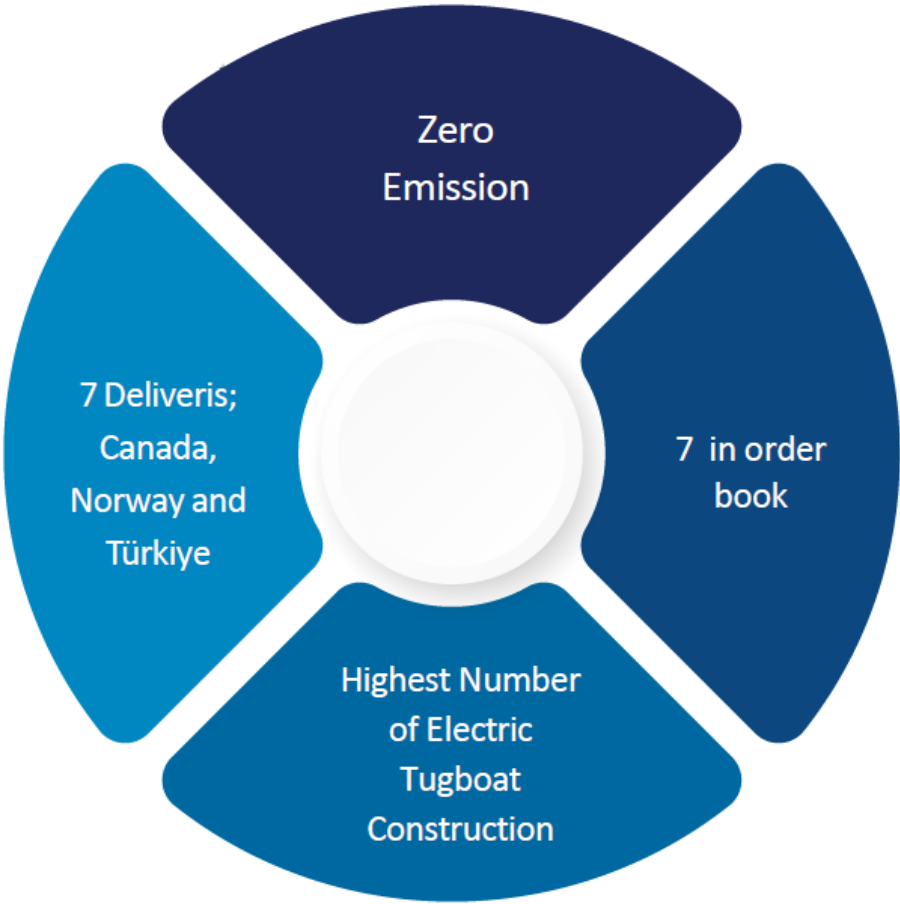
**ElectRA 2300 SX**  
DINAMO 2023

SANMAR Fleet in Türkiye

**ElectRA 2500 SX**  
7 under construction

**ElectRA 2800 SX**  
HalSea Brave  
HalSea Wee'git  
HalSea Wamis

HalSea Marine





# ElectRA 2300SX



Load profile

Route / Cycle description	Power (kw)	Duration (minutes)	Energy (kWh)	Cycles (per day)
	-	-	1082	2
Warm up at dock	86	10	14.3	
Transit to vessel 6 knots (Mob)	258	15	64.5	
Transit with vessel 6 knots	258	20	86	
Maneuvering average 20%	860	40	573.3	
Maneuvering average 50%	2150	5	179.2	
Maneuvering average 80%	3440	1	57.3	
Maneuvering full bollard 100%	4300	0.5	35.8	
Return to the dock 6 knots (Demob)	258	15	64.5	
Securing	86	5	7.2	

# ElectRA 2300SX on Job



DINAMO 2023	2024 Average	July	Aug.	Sept.	Oct.	2024 Total
Active Days/Month	30	29	31	30	30	120
DG+Battery Operations	43	54	15	60	43	172
DG+Battery Operation Hours	37	46	17	52	32	147
Pure Battery Operations	96	50	109	115	110	384
Pure Battery Operation Hours	87	47	96	106	97	346
Total Operations	139	104	124	175	153	556
Total Operation Hours	123	93	113	158	129	493
Average Energy kWh	233	220	255	236	219	930

## Notes

Corvus profile battery capacity (Between 23-85% SOC) =1120 kWh, 1 Cycle
Low Load Profile Job (117 kWh/Operation) : 10 Operations
Average Load Profile Job (233 kWh/Operation) : 4 Operations
High Load Profile (586 kWh/Operation) : 2 Operations

- With a half battery capacity and as per the preliminary calculations, 70% of total operations with pure battery; 30% of total operations performed with the support of DGs due to the unexpected back to back operations.
- Energy & fuel consumption, comparing to diesel mechanic tugboat with the same bollard pull capacity Ramparts 2400SX 70tbp, DINAMO 2023 provides 65% saving as per our operations and prices given below calculations.

• Ramparts 2400SX 70tbp, in 1 hour  
 $140 \text{ l/h} \times 0,58 \text{ €/lt} = \text{€ } 81,20$

• DINAMO 2023 70tbp, in 1 hour  
 $233 \text{ kWh} \times 0,12 \text{ €/kWh} = \text{€ } 27,96$  ; 66% saving on OPEX



# Dinamo 2023 at work







Thanks for your time



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