

All electric subsea – A game changing technology going forward

Teknologidag, Oljedirektoratet

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Glenn-Roar Halvorsen, Project Manager All Electric Subsea



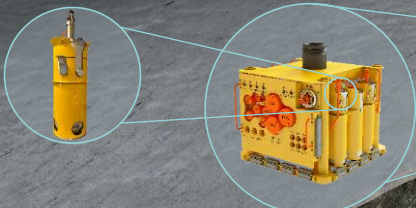
All Electric Subsea Technologies for future fields



Servicelineless Subsea System

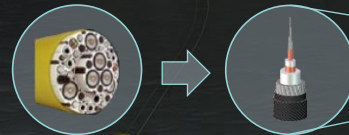


Subsea HPU:
SCSSV, ASV &
ICV

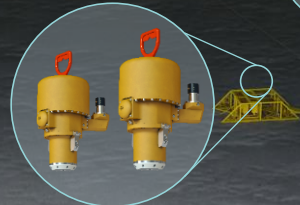


eVXT - Electric XMTs

DCFO - Removal of Umbilical
(combined with subsea storage)



Standard eActuators
Cl. 4 & 7



eSSIV

Chemical
Storage &
Injection



eHIPPS



EFS*



eCompletion*
- eSCSSV
- eICV

All Electric Subsea

eVXT – electric Vertical Xmas Tree

- ✓ Always safe
- ✓ High value
- ✓ Low carbon



Improved safety system through continuous monitoring of well barriers.
Improved environmental footprint with limited discharge to sea.

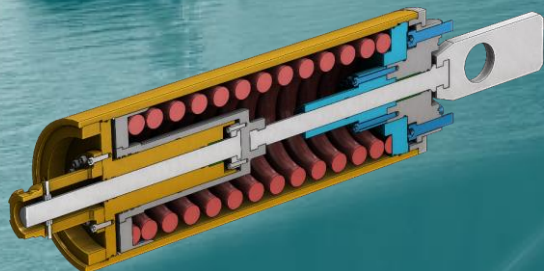


Facilitates longer step outs and marginal fields
Simplified subsea and topside infrastructure
Enabler for standardization across water depth, fields and operators



Improved energy efficiency, scheduled interventions and less logistics

From hydraulic-spring based to battery-motor based shutdown



Condition not monitored

- 100 % more force on pinch close than required @ all water depths



- Fully redundant system
- Autonomous condition-based shutdowns
- Fully retrievable components



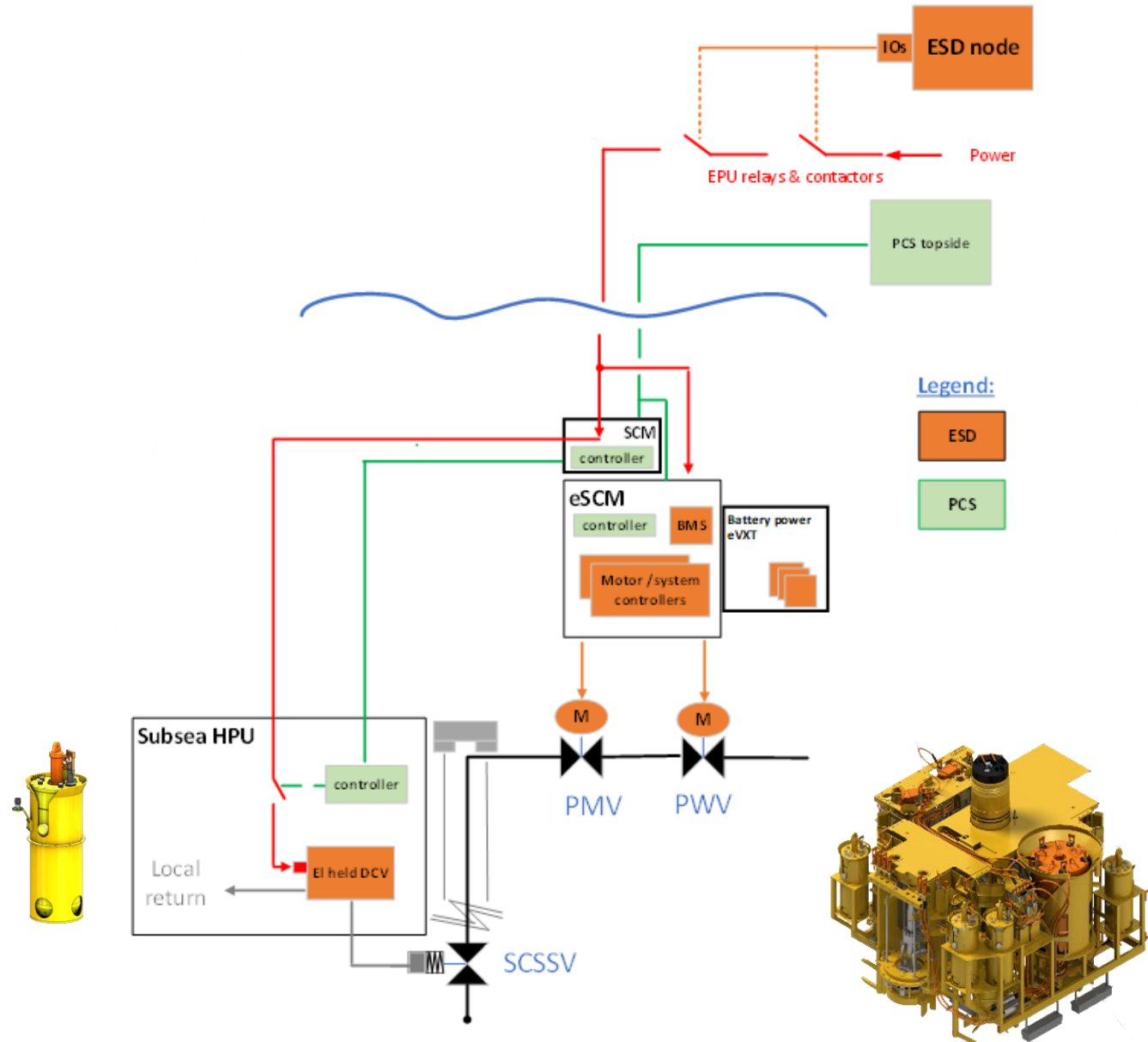
Condition continuously monitored

eVXT/SHPU

Safety circuits

eVXT, SIL 2
SCSSV, SIL 1

Diverse technology for closure of primary and secondary well barrier



Long-term experience with eActuation in Equinor

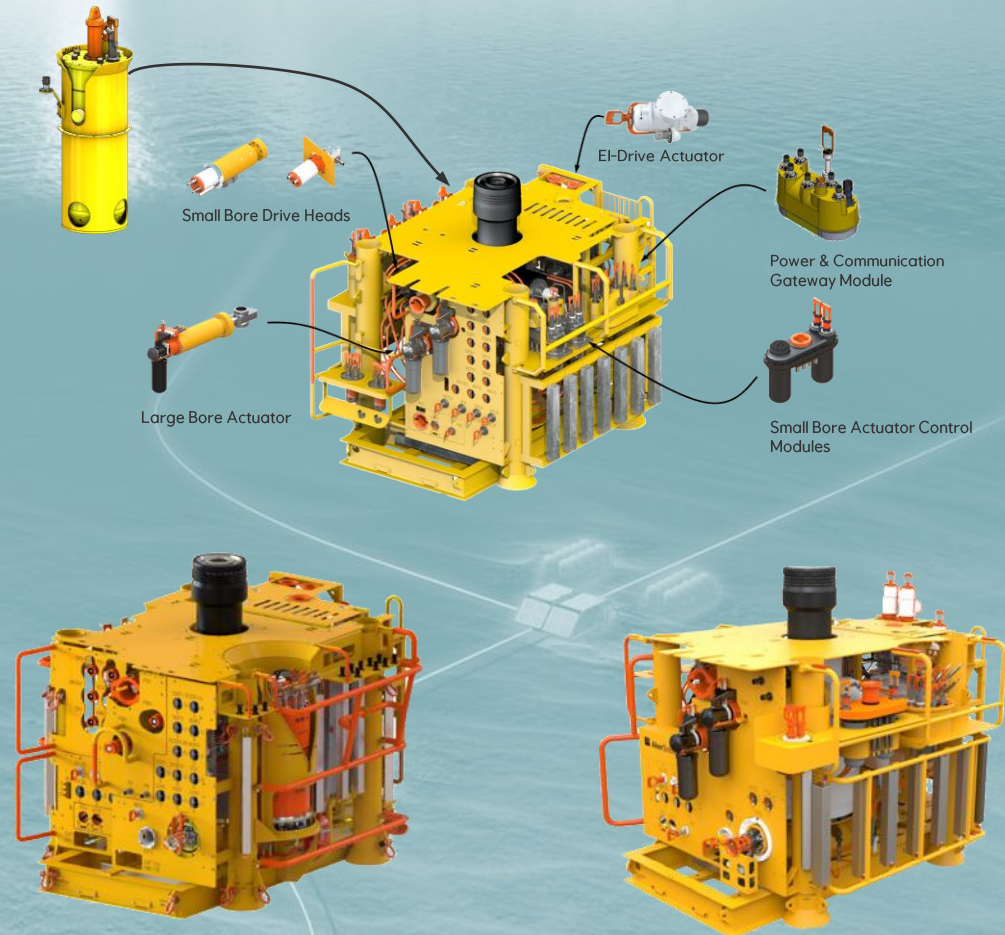
- Equinor has utilized Electric Actuators since 2001
- Accumulated running time Electric Actuators above 10.000.000 hours
- Work ongoing to retrieve data from all installed units in order to document reliability data

Type	Number	Field	Year	Supplier
eActuator	16	Statfjord	2001	TFMC/Wittenstein
eActuator	2	Åsgard	2006	TFMC/Wittenstein
eActuator	21	Norne K	2006	TFMC/Wittenstein
eActuator	6	Gjøa	2009	TFMC/Wittenstein
eActuator	2	Norne M	2009	TFMC/Wittenstein
eActuator	2	Smørbukk	2011	TFMC
eActuator	79	Åsgard Gas Compression	2011	TFMC
eActuator	43	Johan Sverdrup	2017	TFMC
eActuator	6	Trestakk	2018	TFMC
eActuator	27	Snorre Extension	2019	TFMC
eActuator	16	Snorre Bundle	2019	OSS/Wittenstein
eActuator	99	Snorre	2019	TFMC
eActuator	8	Vigdis Booster Station	2019	OSS/Wittenstein
eActuator	24	Askeladd	2019	AkerSolutions
eActuator	6	Njord	2021	AkerSolutions
eActuator	80	Johan Sverdrup PH2	2021	TFMC
Sum	437			



Standardization and Industrialization of NCS 2017+ eVXT

XT Components	VXT	eVXT
Stalk including, Spool, PMV, PWV.AVB, XOV and Isolation Sleeve Penetrator	✓	✓
Valves 2-1/16" & 5-1/8" & 7"	✓	✓
Wellhead Connector	✓	✓
Penetrators EFS & HFS	✓	✓
Flow loop, Gas Lift, Service Line 2"	✓	✓
Tubing Hanger	✓	✓
Flow Control Module	✓	✓
XT frame structure	✓	✓
Outboard Connection System	✓	✓
MQC Plate interface	✓	✓
eVXT Pressure CAP	✓	✓
ROV Panel / Roof Design / Support Structure	✓	Modification
SCM Hydraulic	✓	
SCM Electric		New
PT/TT & PTSand detector intrusive & Acoustic	✓	✓
Chemical Distribution	✓	✓
LP Hydraulic Distribution	✓	
2 1/16" / 5 1/8" / 7" Actuator Hydraulic Spring Based	✓	
Electrical Distrubution routing jumpers to EI-Actuator		Modification
2 1/16" / 5 1/8" / 7" Actuator / RLM / Drive Unit		New
HP Hydraulic Distribution to SCM	✓	
SHPU / Support structure/w electrical jumper routing		New
HP distribution from (SCM / SHPU) to DHSV	✓	Modification



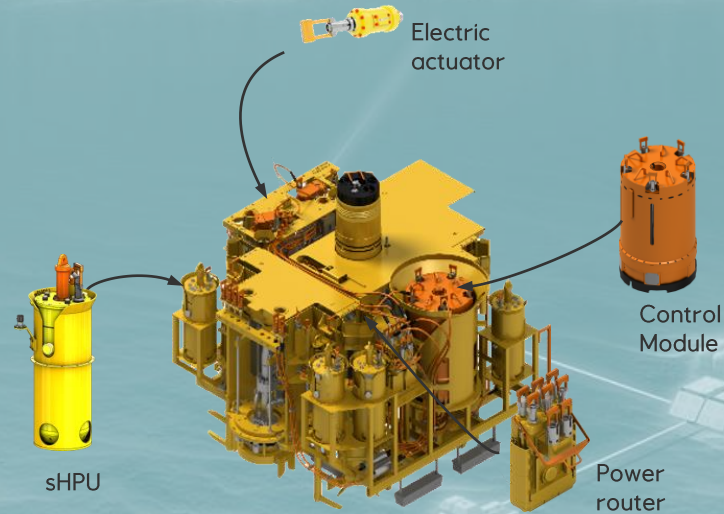
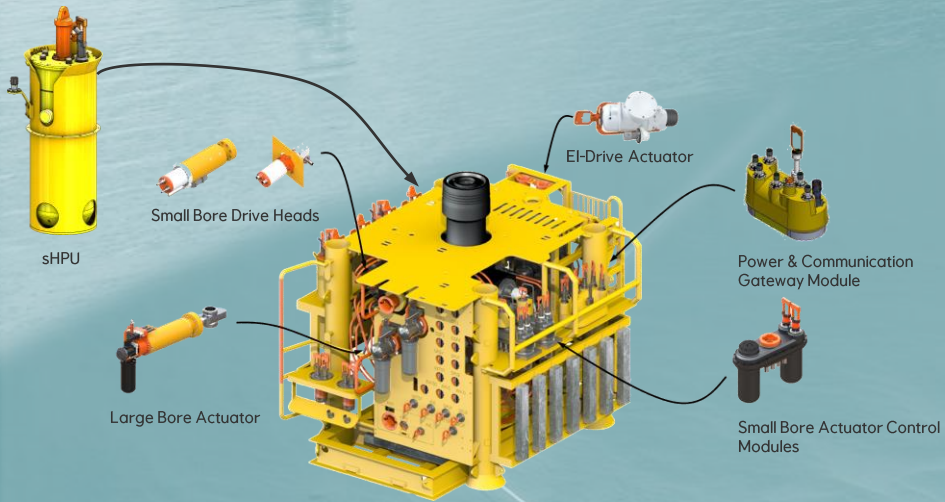
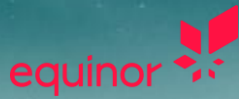
NCS 2017+ VXT
AkerSolutions



NCS 2017+ eVXT
AkerSolutions

- NCS 2017+ eVXT/VXT**
- Fully backward compatible
 - Equal mechanical interfaces

All Electric Strategic Partnership





All Electric Subsea

- A game changing technology going forward -



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