

December 5-6, 2018

Norris Conference Centers -  
City Centre, Houston, Texas  
[ShaleTechConference.com](http://ShaleTechConference.com)

# SHALETECH™



# Supporting Sustainability Objectives in Pressure Pumping

Shane McElroy

Director, Global Sales, Unconventional  
Oil & Gas Business

Siemens

SHALETECH™



# Electrification and Digitalization: Proven in multiple industries

## Coastal transportation & Marine

Zero emission ferry "MF Ampere"

Capacity Distance Fuel Cost savings

120 6 km  
360 (in 20 min) **60%**

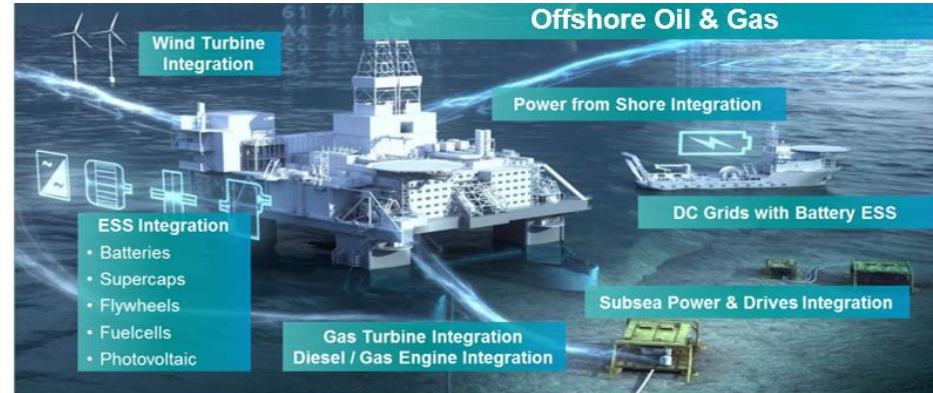
Operation since March 2015



## Mining



## Offshore Oil & Gas



## Mobility



**Remote diagnosis**  
facilitates predictive maintenance



**Shift**  
from corrective to preventive measures



**Increased availability**  
and avoidance of unplanned downtimes

**99.9% availability**

**High-speed train service**  
Barcelona – Madrid

**Full reimbursement**  
of ticket prices for passengers when a train is >15 minutes late

**Only ONE of 2,300 trips**  
is really late



**Remote monitoring facilitates** expert center support



**Reduced cost**  
for commissioning and operation



**Increased availability**  
and avoidance of unplanned downtimes

**10 years** of providing operations intelligence for upstream

**Unified central data hub**  
All multi-discipline design data accessible in one data base

**Siemens technical experts**  
support analysis of critical rotating equipment

**Predictive maintenance –**  
Schedule maintenance to optimize plant availability

**SHALETECH™**

# Addressable challenges



- Segment Challenges**
- More proppant per well (6-10M lbs. per well)... and growing
  - Complex logistics (100s of suppliers)
  - More & longer wells (>10k ft. in most basins)
  - Shortage of qualified labor
  - Large kit/ equipment on well-site
  - Low reliability → High TCO

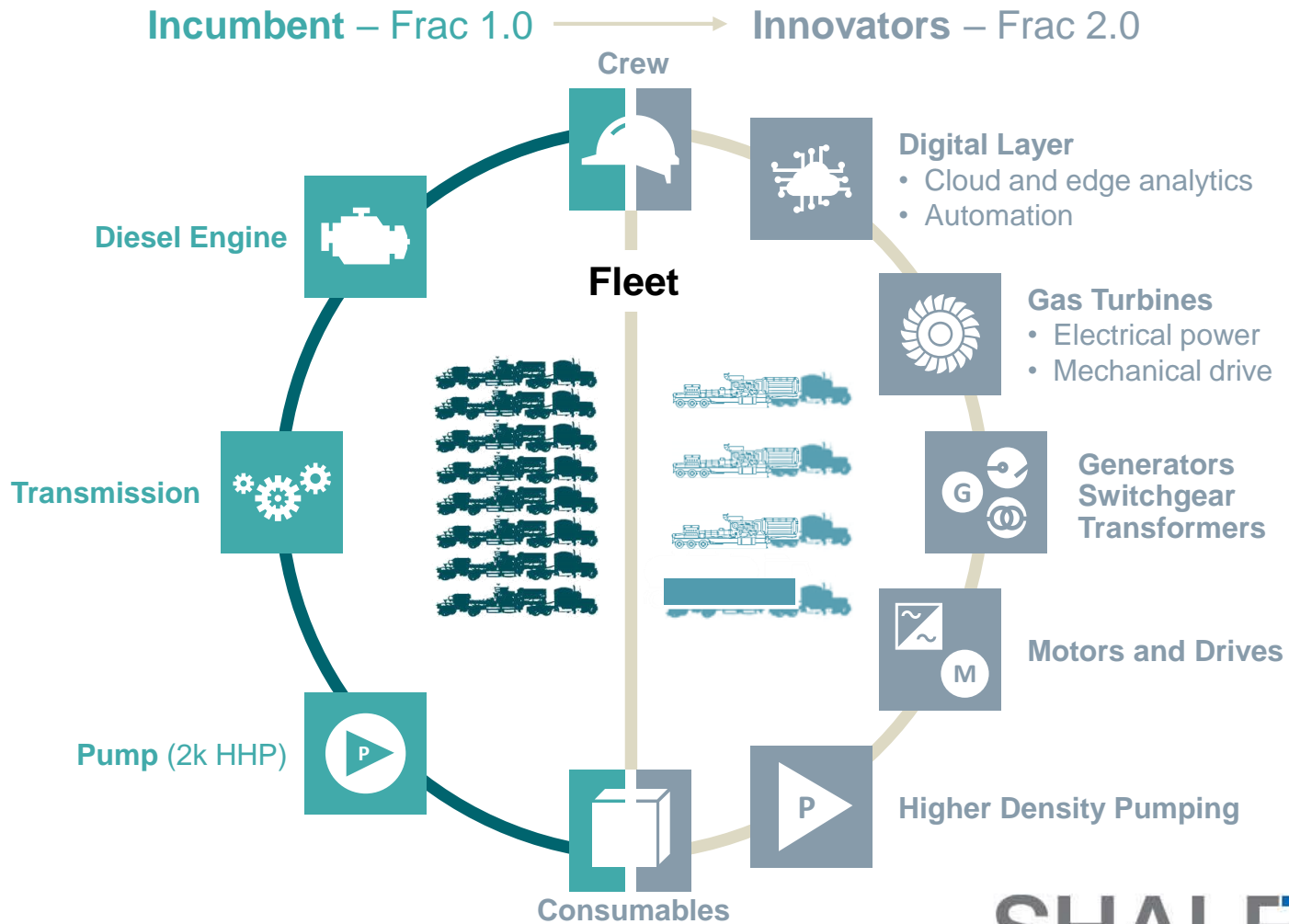
- Value Drivers**
- Supply chain planning
  - Vertical integration
  - Lower fuel cost

- Asset utilization
- Crew size reduction
- Lower footprint

- Lower CAPEX
- Reliability / reduce maintenance
- Reduce emissions & noise (Tier 4)

1. 2014 – 2018 (5 year analysis)  
Source: Spears. ASE analysis

# Where are we going?



# Economic values



CAPEX per HHP utilized



Fuel costs



Improved reliability,  
Redundancy and NPT



Process optimization  
through data analytics  
and better control



Capital efficiency and  
asset availability



OPEX –  
maintenance costs



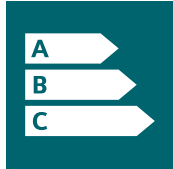
Site footprint cost  
and impact



Manpower requirements



# Environmental benefits



Energy efficiency



Pollution emissions to air



Traffic pressure



Noise levels



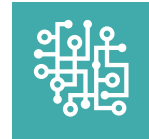
SHALETECH™

# Flexible Products & Turn-key Solutions

**Grid Power and Distribution Solutions**



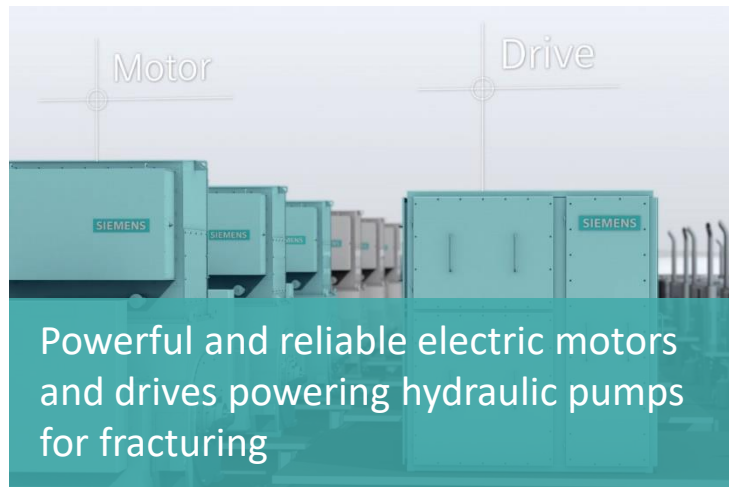
**Digital Solutions**



**Motors and Drives**



**Power Generation**





# Opportunities



## **Lower Capex and increase reliability**

- High density machines and integrated systems
- New distribution architectures

## **Improve environmental performance**

- Energy efficiency and low carbon intensity
  - Hybrid systems
  - Reduced wastage
  - Grid connections
- Emissions
  - Cleaner burning systems

## **Reduce Operational costs**

- Digital strategies for fleet management
- Intelligent process controls and learning systems
- On edge and cloud diagnostics
- Remote operation
- Use of wellhead gas

Thank you!

SHALETECH™