GREENPORT CRUISE CONFERENCE

10TH OF OCTOBER 2017

Titan LNG Artist impression of FlexFueler manoeuvring with pusher

TITAN LNG: PART OF LEADING GROUP

IVECO SCHOUTEN

Shipping & industrial
LNG Trading for group

TitanLNG

ROLANDE

Trucking sector
LNG filling stations
brand

10 Industrial customers

Signed 3 shipping companies

8 LNG Fuelling stations

Bio LNG R&D

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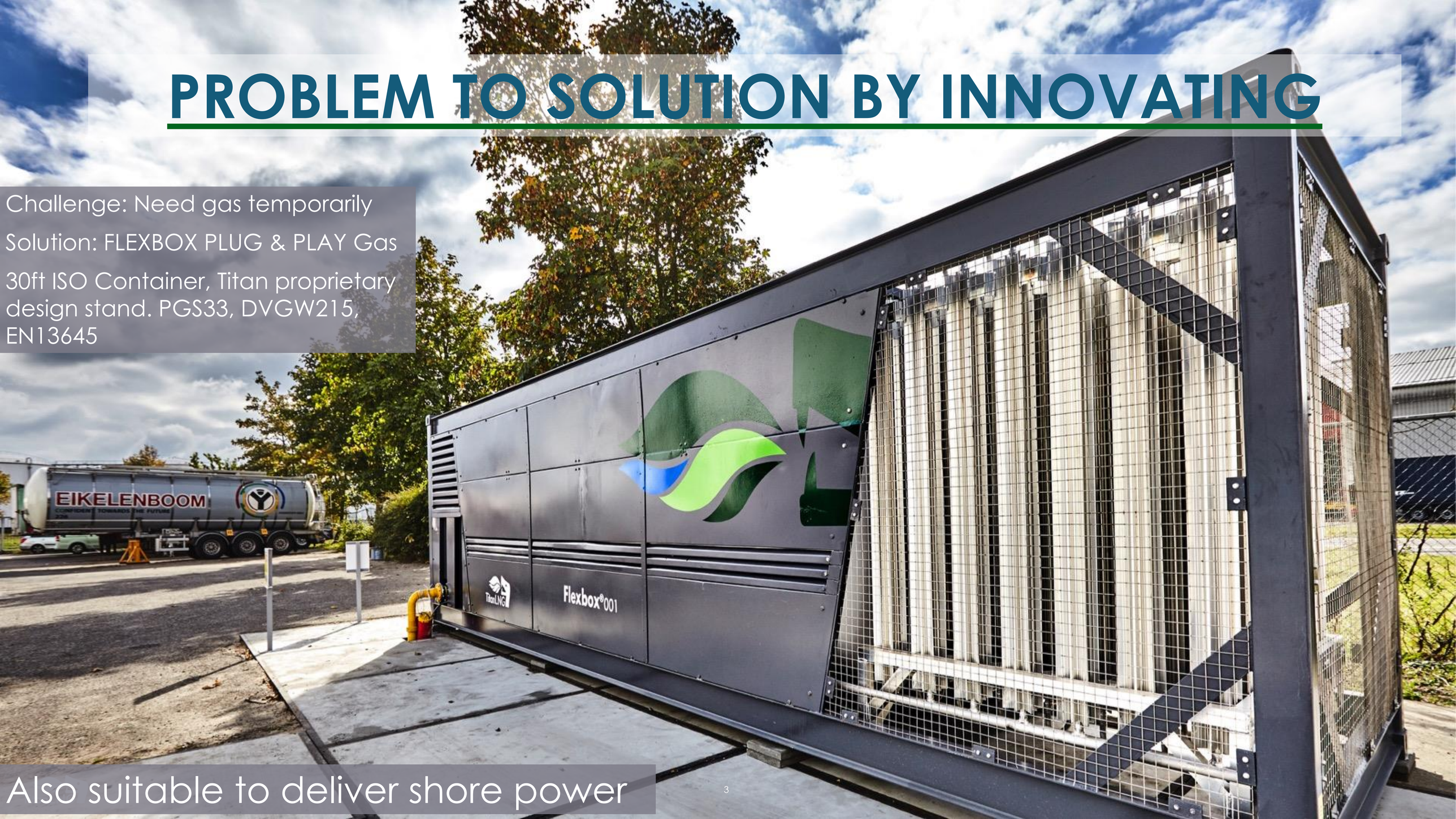
PROBLEM TO SOLUTION BY INNOVATING

Challenge: Need gas temporarily

Solution: FLEXBOX PLUG & PLAY Gas

30ft ISO Container, Titan proprietary design stand. PGS33, DVGW215, EN13645



Also suitable to deliver shore power

TITAN IMPROVES LNG BUNKERING STEP BY STEP

Results continuous Improvements

Bunkering of 2 trucks via T-piece Doubles discharge rate to 33 MT per hour. Volume of 400 m3 (170mt) was delivered in 7 hours

Titan LNG bunkering the Fure West in Amsterdam

ARTICLES BY THE GUARDIAN

Cruises

Air on board cruise ships 'is twice as bad as at Piccadilly Circus'

A C4 Dispatches investigation reveals tonight how ultra-fine particles emitted by cruise liners' engines are worrying both medical scientists and environmentalists

This article is 3 months old

9656 383

Will Coldwell

@will_coldwell

Monday 3 July 2017
17.08 BST

Breath of fresh air? Passengers on the sundeck of P&O's Oceana. Photograph: Greg Balfour Evans/Alamy

Articles may not be entirely right, but public opinion on cruising may be changing already

Cities are struggling between tourism benefits and what is good for residents

Pollution

The world's largest cruise ship and its supersized pollution problem

As Harmony of the Seas sets sail from Southampton docks on Sunday she will leave behind a trail of pollution – a toxic problem that is growing as the cruise industry and its ships get ever bigger

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PRESSURE INCREASING FOR OPERATORS TO ACT

PORTS CAN INFLUENCE LOCAL EMISSIONS

Promote cleaner shipping

Stimulate infrastructure developments

Provide shore power

Alternative fuels

Connecting stakeholders

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PORT OF AMSTERDAM & TITAN LNG

- Allocation of suitable location & quay for LNG transfe
- Favorable conditions
- Joint marketing & promotion
- PoA moved to the forefront of LNG bunkering in ARA region.

Port of Amsterdam
port of partnerships

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FLEXFUELER RATIONALE

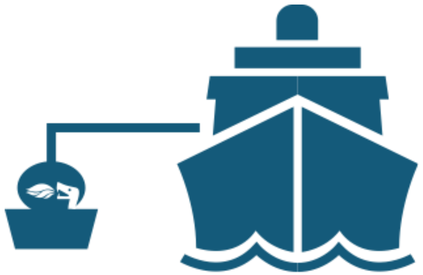
THE MISSING LINK IN THE LNG VALUE CHAIN

COST EFFICIENT

Low CAPEX and OPEX
High residual value
Scalable

PROVEN TECHNOLOGY

Usage of standard cryogenic equipment
Pontoon standard classification



SIMPLICITY & FLEXIBILITY

High safety standard
Filling by truck, ship-to-pontoon and ex-terminal possible
Fixed “home” location to serve Inland Water barges
Able to deliver concurrent cargo operations

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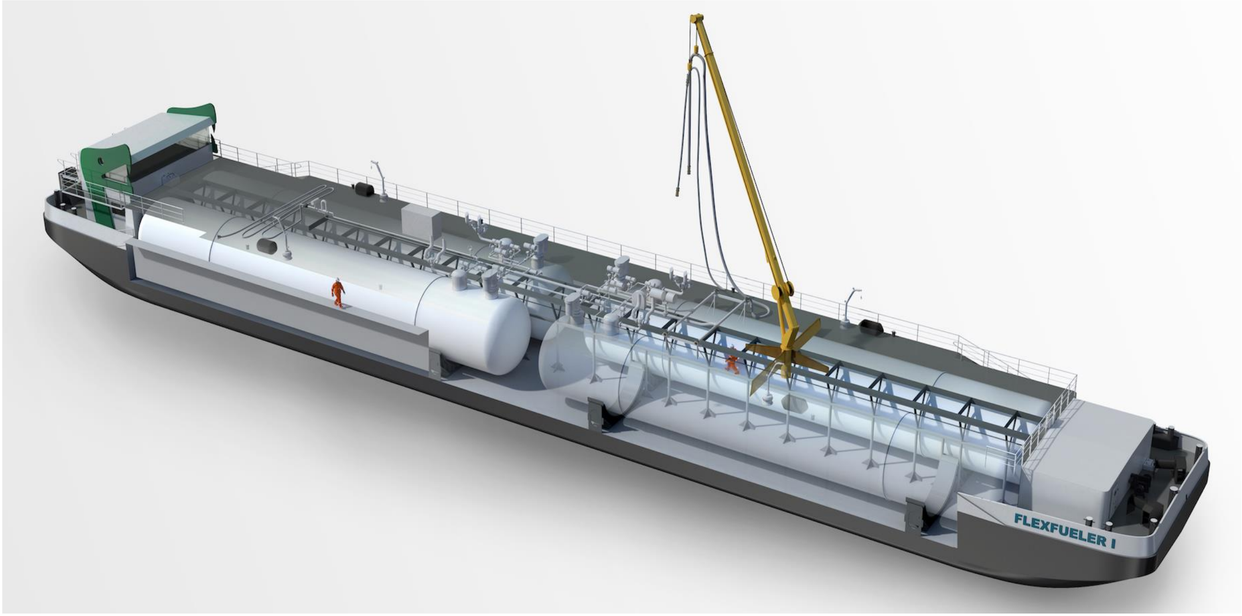
2018 ON THE WATER - FLEXFUELER

KEY FEATURES

FlexFueler Design



Specifications

- Measurements: length 76.50m, width 11.45m, height 3.80m
- Capacity: 1480 m3 (4*370 m^3 tanks);
- Bunkering rate: 30-600 m3/hr 4 tank version
- Max Allowable Working Pressure (MAWP): 4 barg
- Manifolds: centre: DN 200, aft DN65
- Design suitable for all European harbours and inland waters (Classification ADN type G tank pontoon)
- Classification society: Bureau Veritas
- Bilfinger/Tebodin permit lead for Amsterdam
- Operational: Q4 2018
- Possibility to add sub-cooling/liquefaction
- Crane reach 18 meters
- Transfer 2 way's -> de-bunkering possible

FLEXFUELER1 WILL BE STATIONED IN

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BUNKERING LNG TO CRUISE VESSELS

Cruise vessels have specific bunkering requirements:

- Passenger movements may influence bunkering window
- Restrictions on usage of balcony on-board
- Overhang of life boats
- High pumping rate required
- Need highest degree of reliability of supply
- Quality control
- Not allowed everywhere yet

Infrastructure not yet sufficient for cruising outside Europe

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FLEXFUELER: THE LOW COST SOLUTION TO ENABLE LNG BUNKERING FOR PORTS

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BACK UP SLIDES

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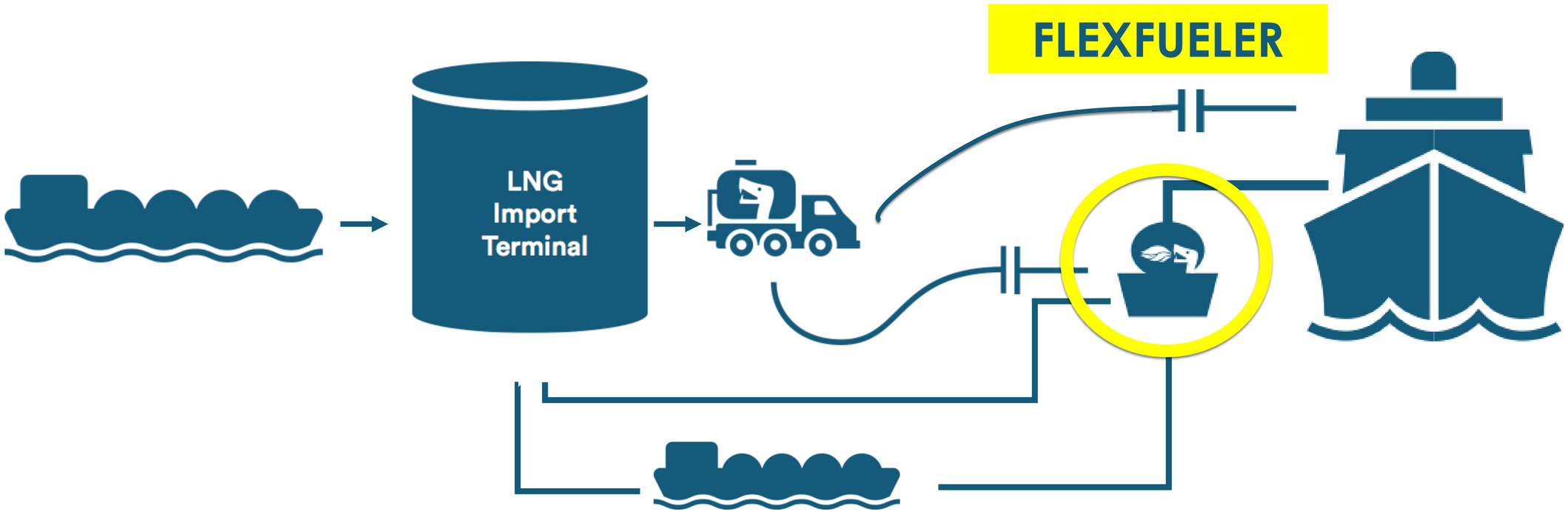
FLEX FUELER VALUE CHAIN

OPERATIONAL BENEFITS



LOADING FROM SHIP, TERMINALS OR TRUCK

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