LNG update

Current LNG initiatives and challenges

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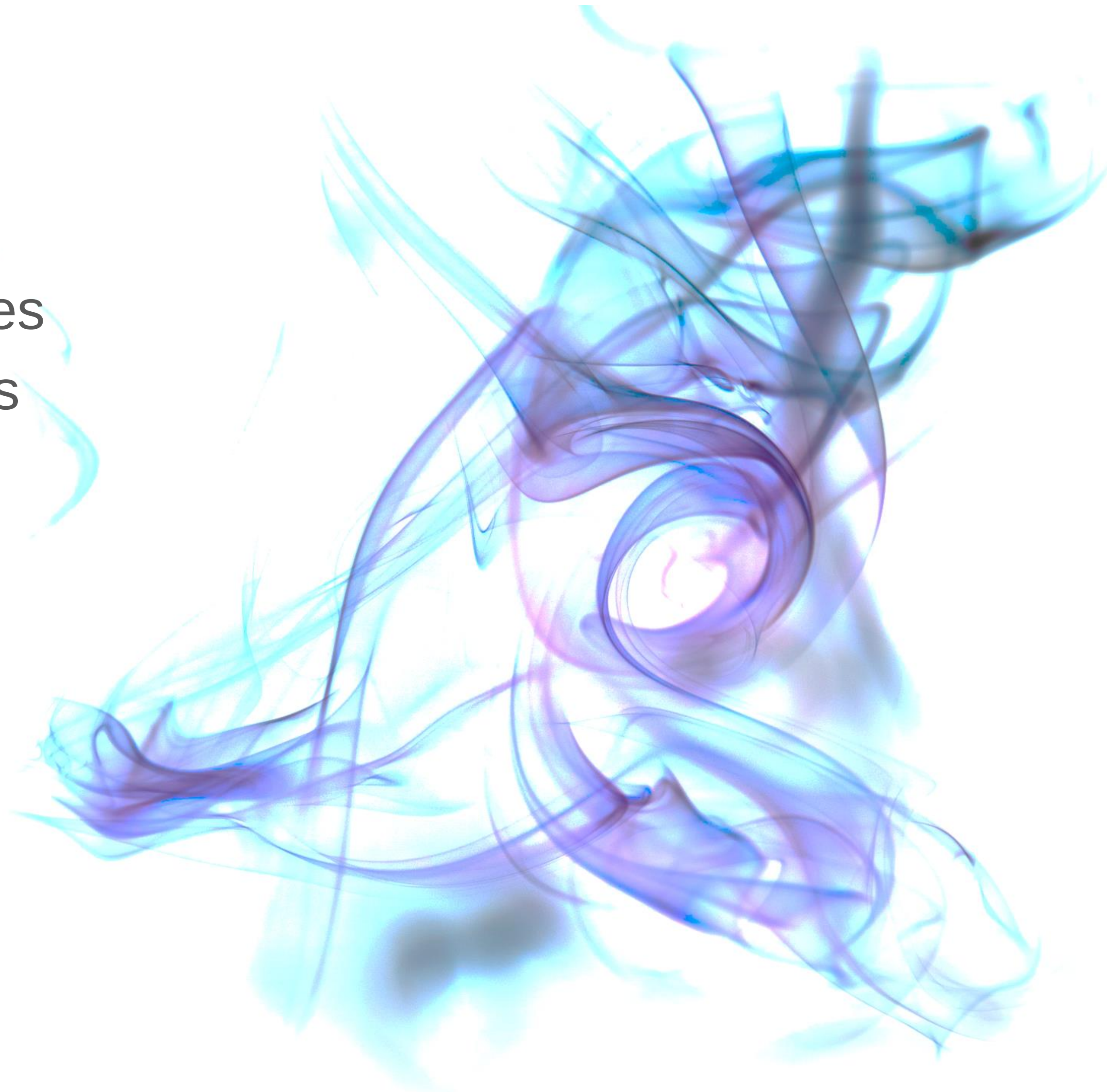
AGENDA

- Why LNG
- Current Activities
- Future Activities
- Challenges



WHY LNG?

- Ever increasing regulatory environment
- Exceeds any current or near term emissions regulations
- Satisfies stakeholder demands
- Potential cost advantages post 2020
- Improving availability
- IGF Code agreed
- Regional incentives and encouragement
- Ship built today will still be around in 30 years time
- Demonstrates innovation

CURRENT ACTIVITIES

- AIDAprima will arrive in 2016
  - 7 day itineraries out of Hamburg to Southampton and North Sea
  - Fitted with dual fuel generator to allow use of LNG in port
  - Truck to ship operation
  - Simultaneous operations must be allowed
  - Challenges include inconsistent port authority approval process, but can be overcome with close cooperation
- Investigations ongoing into potential retrofits of other vessels that are significantly exposed to ECA etc
- Truck to ship only really viable for small quantities or very regular schedules

NEXT STEPS

- 4 ships on order from Meyer Werft
- First in cruise industry to use LNG for normal propulsion
- 2 ships each for AIDA and Costa
- Largest from number of passengers
- 1st ship due to deliver end 2018 for AIDA
- All engines dual fuel and can use MGO in case of lack of LNG

CARNIVAL – NEW ORDERS

LNG AVAILABILITY AND INFRASTRUCTURE

- Gas available but not always where we need it or in the correct form (LNG)
- Ports very active and EU funding available
- Given the size of our ships and the capacity that we will need, ship to ship bunkering seems to be the only viable option (@3000m3 every 10 to 14 days)
- 70 LNG fueled ships in operation today and 80 confirmed newbuilds on order
  - Excludes LNG carriers
- 7 new dedicated LNG bunker vessels (capacity from 1,500 - 6,500m3) on order for delivery in the next two years
- LNG bunker infrastructure development
  - North Europe; Norway, Sweden, developing around the Baltic, and N Sea coast
  - West Europe; Rotterdam and Zeebrugge already underway
  - West Med; Gibraltar, Barcelona, Civitavecchia and Savona, plans being developed
  - Canaries; Tenerife actively pursuing bunker suppliers
  - Far East; Singapore, Korea, Taiwan and China already moving
  - North America; NW, Vancouver, Florida, Gulf Coast very active
  - Caribbean; significant interest being shown

LNG Challenges

- No standard set of rules or procedures for bunkering
  - ISO, IACS, SGMF working on this
- Differing local approval process – different risk acceptance criteria
  - Requires very close stakeholder engagement
- Cost models are inconsistent or non existent
- What happens in case of lack of supply or equipment downtime
- Typical port concession model will not work – at least initially
- Compatibility of bunker vessels and cruise ships may be challenging due to overhanging boats

Thank you !