# Process Safety Next in Palm Oil Processing Industry

**8th Regional Process Safety Seminar**
19-20 March 2019, Kuala Lumpur

**Hong Wai Onn**

# Session outline

1. Palm oil industry
2. Process safety in palm oil processing industry
3. Process Safety Next framework

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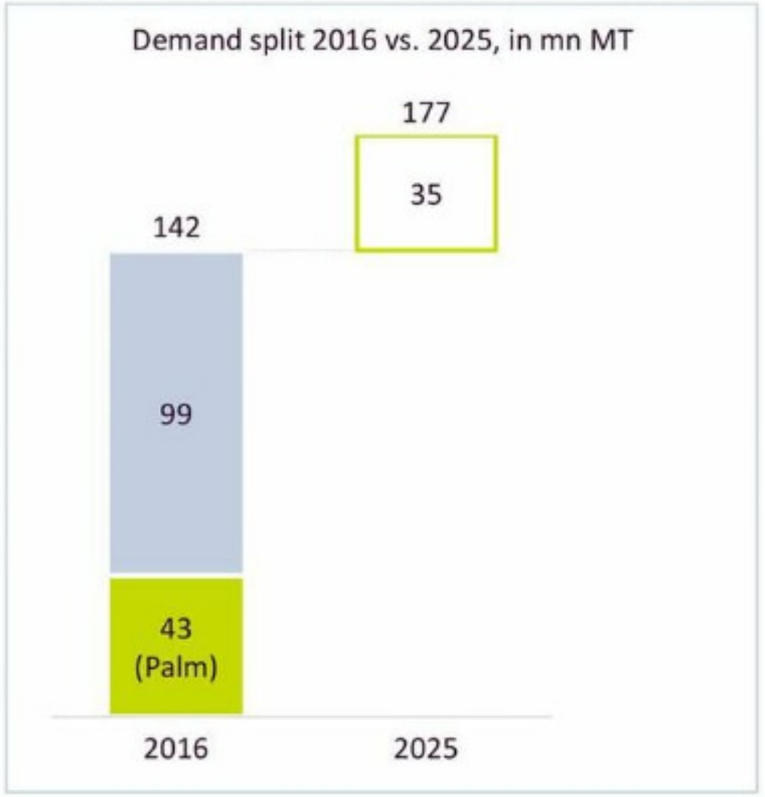
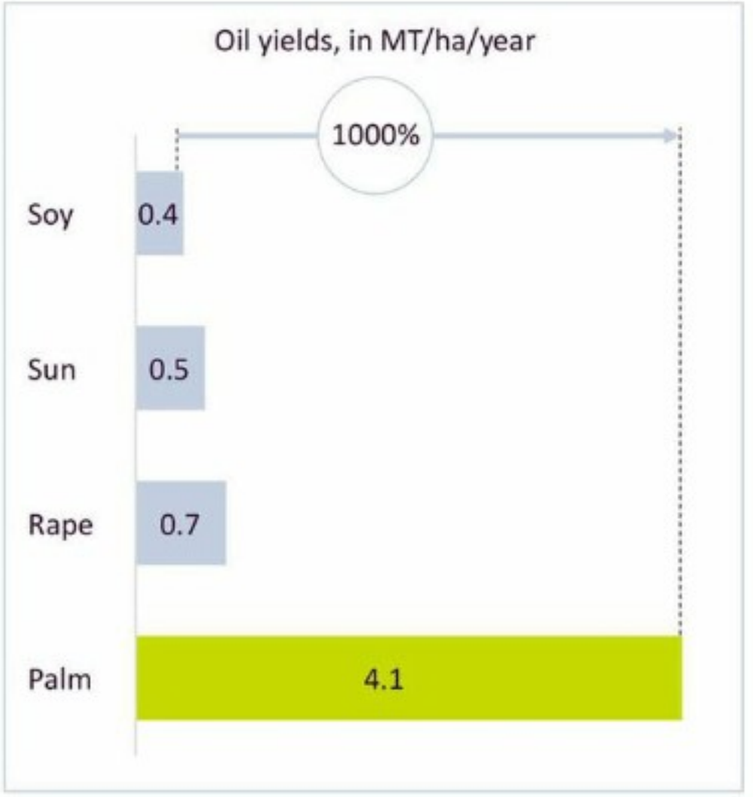
# By 2025, the world will need 35 mn MT additional vegetable oils

Palm is the most efficient oil crop, Indonesia & Malaysia are the top two producing countries

**Global demand for veg. oil for food will reach 177 mn MT by 2025**




**Palm is today the most efficient oil crop, yielding 10x more than soy**

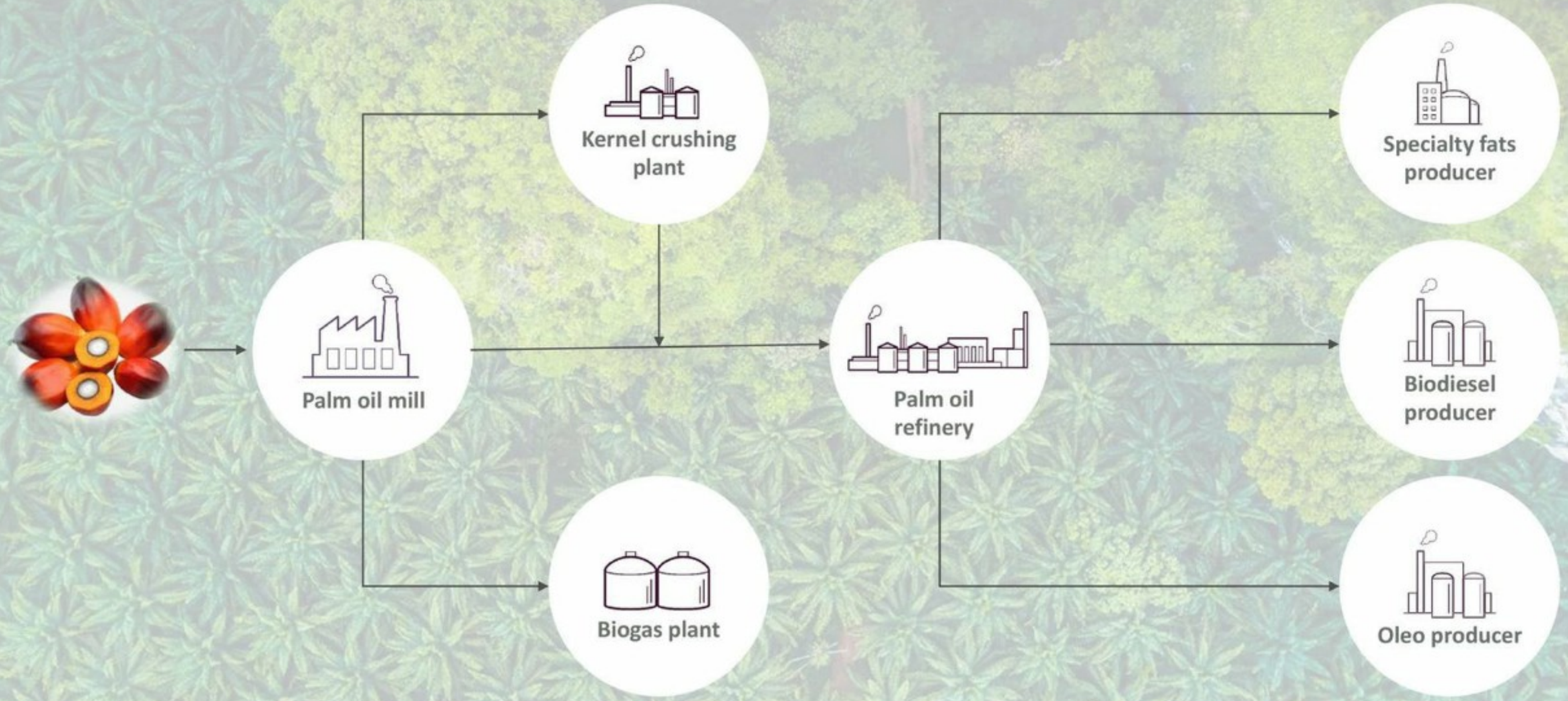



**Oil palm tree grows in equator regions, and its production is dominated by Indonesia & Malaysia**


Note(s): 177 mn MT veg. oil demand derived from 8.1 bn. population estimate and 22 kg/capita/year veg. oil consumption in 2025 Source(s): OECD–FAO, Oil World

# Palm oil processing value chain

In some ways it is not different from oil & gas industry. There is an upstream, midstream and downstream

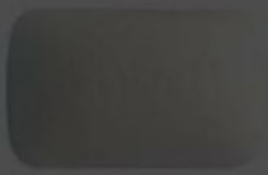


# Palm oil in Malaysia at a glace

- 2nd largest producer and exporter of palm oil worldwide
- 5.8 million hectares of land (17.5% of our land mass)
- Top 10 largest export earner for Malaysia in the last decade
- 600,000 people employed directly
- 2017 saw the centennial celebration of commercial oil palm planting

Source(s): Oil World, MPOB, MATRADE

# What comes to mind when you think about products containing palm oil?



# It’s not unrealistic to claim more than half the products on sale in supermarkets are made with palm oil

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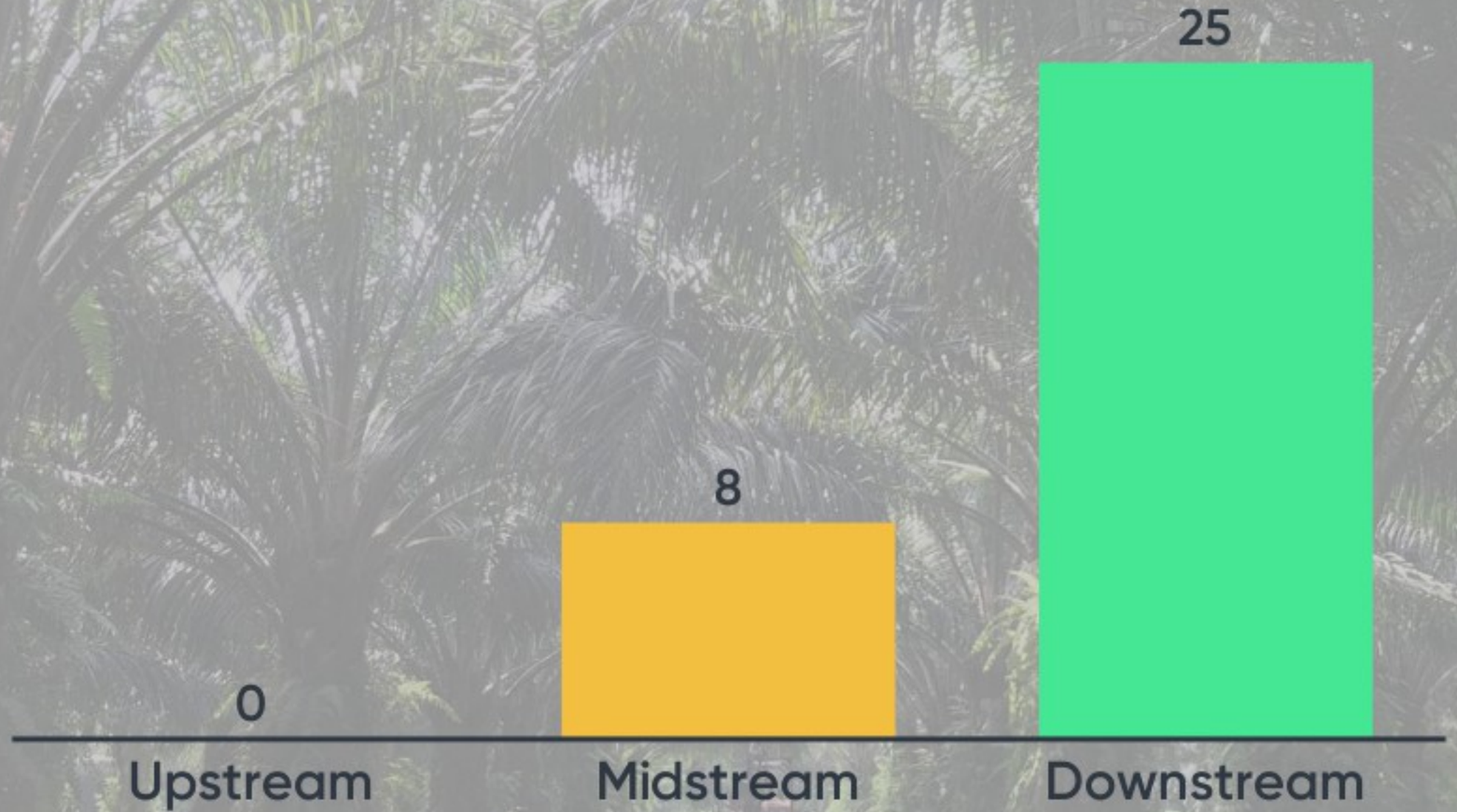
# Which segment do you think has higher process safety standard across the palm oil processing industry?

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# The industry is heading to right direction, with personal safety as foundation

Midstream and downstream is ahead of upstream segment in process safety

**Palm oil processing industry**

- OHSAS 18001 / ISO 45001 certification
- Roundtable on Sustainable Palm Oil (RSPO)
- Malaysian Sustainable Palm Oil (MSPO)

- Occupational safety-oriented
- Hazard Identification, Risk Assessment and Risk Control

**Upstream**

- Implemented process safety management
- Process hazard analysis
- ASEAN Oleochemical Manufacturers Group (AOMG) annual process safety workshop

**Midstream & downstream**

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# … and, the industry is striving for continuous improvement to uplift process safety standard

## Upstream

- From manual to automated sterilization system: ensure process safety e.g. steam can't be admitted if doors are not properly closed, and doors can't be opened if vessel is still under pressure
- From laborious capstan and bollard to indexer system: safeguard operators from injury (wedged between fresh fruit bunch cages)
- From hoisting crane to tipper system: safeguard operators from injury caused by failure of crane and/or wire rope

## Midstream and downstream

- From chemical to enzymatic biodiesel production: eliminate the use of hazardous catalyst e.g. sodium methoxide




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What’s on in our backyard after lessons learned from other incidents?

**Oleochemical plant, Nilai, Negeri Sembilan**

- 19 February 2011
- Fire caused by hexane leakage
- 5 injuries

Source(s): Bernama, The Star

**Palm oil mill, Bukit Kepah, Terengganu**

- 16 January 2013
- Explosion of pressure vessel
- 4 fatalities

Source(s): DOSH Malaysia

**Oleochemical plant, Prai, Penang**

- 25 March 2013
- Dust explosion fire
- 2 fatalities, 3 injuries

Source(s): DOSH Malaysia

**Refinery, Pulau Indah, Selangor**

- 7 Jun 2018
- Fire
- No casualties

Source(s): Port Klang Fire and Rescue Station

**Palm oil mill, Bera, Pahang**

- 11 January 2019
- Fire
- No casualties


Source(s): Internal

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"… there are no new accidents. Rather there are old accidents repeated by new people …"

Judith Hackitt, chair of Health and Safety Executive, UK

June 2013

# Why still happens?

Principle of $C^3$ !

## Condition

Physical facilities that are poorly maintained, changed without analysis and without adequate procedures

## Competency

Employees who are unqualified, incompetent and complement

## Commitment

Leadership teams who are inflexible, denial of potential risk, and not supportive

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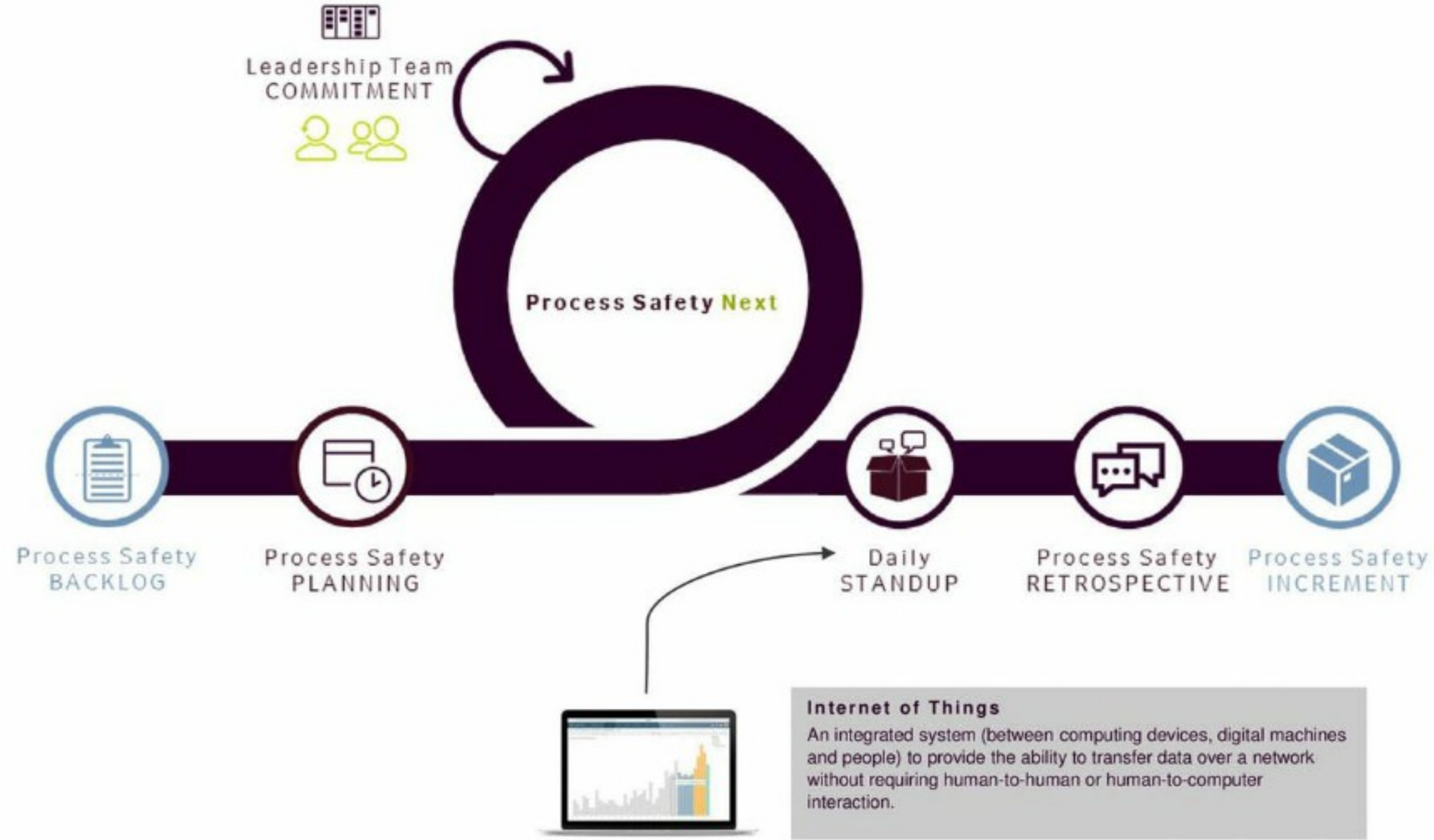
# Process Safety Next could help the industry to develop and excel

## Process Safety Next should enable processors stay agile, and put process safety front and center




**Internet of Things**

An integrated system (between computing devices, digital machines and people) to provide the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

**Process safety backlog**

The process safety backlog holds all prioritised tasks, which are requirements defined from the perspective of process safety. It contains areas of improvement or task items to be completed during the retrospective.

**Process safety increment**

A process safety increment represents task completed during the retrospective that is potentially address process safety issues.

**Leadership team commitment**

Leadership team to provide a positive process safety climate, and to demonstrate value of and commitment to process safety.

**Process safety planning**

The process safety plan is a plan for what the team will deliver in the retrospective

**Process Safety Next**

Consistent iteration of time to review and address process safety issues.

**Daily standup**

The daily (or frequent) standups are 15-minute meetings where the team members list any impediments and present what they did yesterday and what they are doing today.

**Process safety retrospective**

The team demonstrates completed work and reflects the effectiveness and how the process safety can be improved.

# IoT system starts with a clear need of process safety value

Three segments to understand the requirements and specify the operational model

## 1 Process Safety Value


**Understand process safety value and criticality**

## 2 Service Strategy


**Define required services**

## 3 Operational Model

**Specify service operation**

# Competency in process safety is a vital

Understanding and mapping the competency required is vital to develop action plans for competency development

**Definition of competencies**: Knowledge and competency, engineering and design, systems and procedures, assurance, human factors and culture.

Level of competence

| | |
|---|---|
| Mastery or expert | Advanced experience in the particular skill. Applies creative solutions to complex problems. Defines and drives critical business opportunities and needs. Represents the organisation internally and externally on critical issues. Sets standards within the organisation. Recognised as a subject matter expert. |
| Skilled application or proficiency | Independent contributor. Integrates work with other disciplines. Frequently mentors or coaches others. Assesses and compares alternative options. |
| Basic application | Performs fundamental and routine tasks. Requires occasional supervision. Increased functional expertise and ability. Works with others. |
| Awareness | Has knowledge of the theory and displays conceptual understanding. Actively participates in discussions regarding the skill. Performs routine tasks with significant supervision. Learns how to do things. |

**Scope:**
Cover not only a range of traditional competencies, such as hazard identification and risk assessment, but also look at safety in design and process, and operational status monitoring.

Source(s): Process Safety Competency Guidance by IChemE Safety Centre

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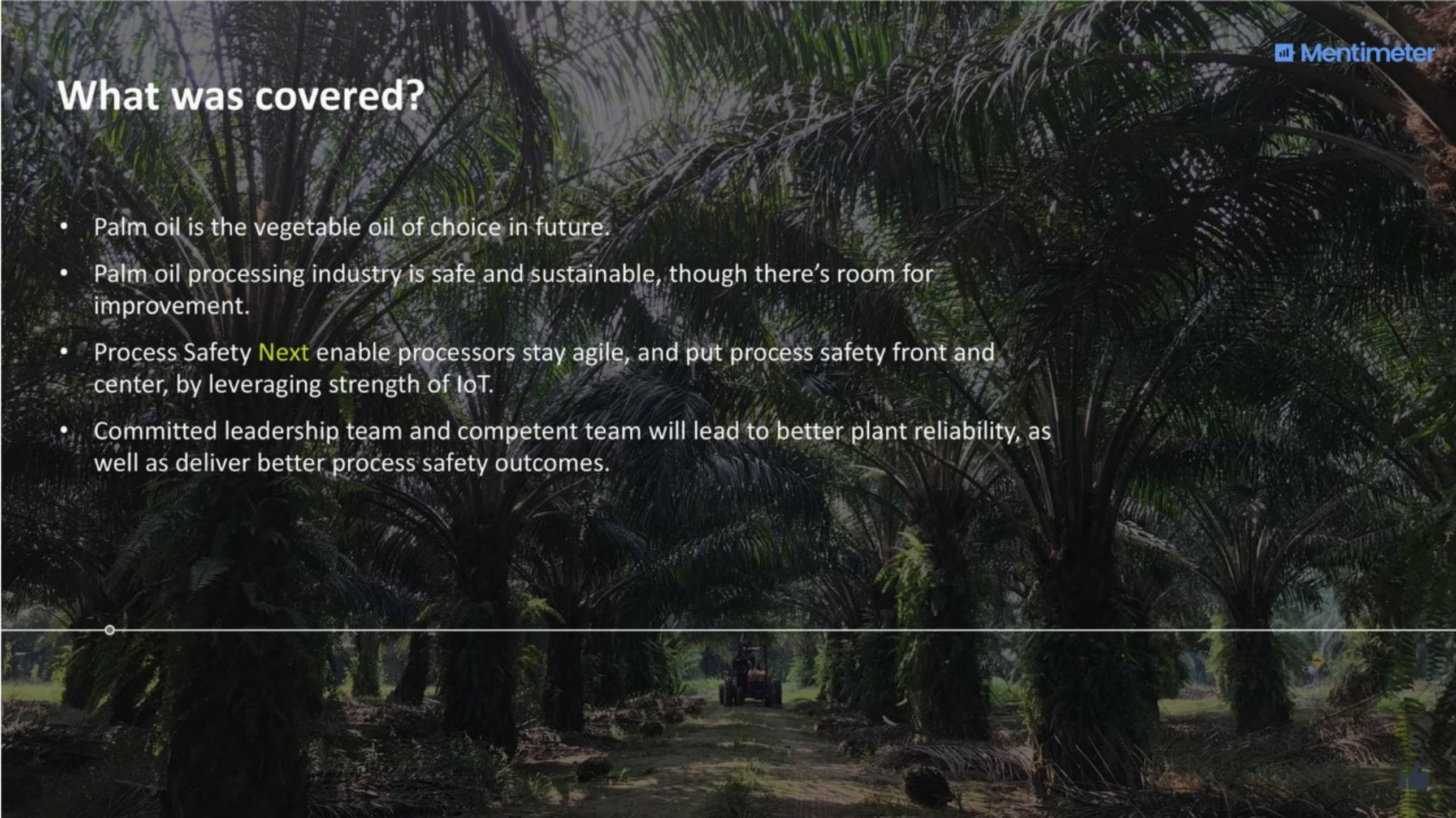
# Leaderships team commitment in process safety is a vital, but…

- … don’t understand risk
- … don’t want to discuss incidents
- … trust absolutely the system design
- … have a strong bias towards messages about success
- … make business decisions without understanding impact on process safety management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What was covered?
• Palm oil is the vegetable oil of choice in future.
• Palm oil processing industry is safe and sustainable, though there's room for improvement.
• Process Safety Next enable processors stay agile, and put process safety front and center, by leveraging strength of IoT.
• Committed leadership team and competent team will lead to better plant reliability, as well as deliver better process safety outcomes.

I don’t know where to start?

Worry-free support: IChemE Safety Center
https://www.icheme.org/knowledge/safety-centre/

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# Thank you