

Transformation of Palm Oil Industry – The New Oil and Gas

Palm Oil Processing Special Interest Group

**Malaysian Launch Event
Kuala Lumpur, 3 August 2015**



- History of the Palm Oil Industry
- Overview of Malaysia PO Industry
- Past, Present and Future of Malaysia PO Industry
- Are You Ready?

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History and Origin

- Oil palm (*Elaeis guineensis*) originated from West Africa.
- The main belt runs through the southern latitudes and equatorial region.



- Human use of oil palms may date as far back as 5,000 years in West Africa.
- In the late 1800s, archaeologists discovered palm oil in a tomb at Abydos, Egypt dating back to 3,000 BCE.

- Europeans discovered palm tree when they reached Africa to explore the continent in the 15th century.
- The use of palm oil in the international market expanded significantly as a result of the British Industrial Revolution.
- Opportunity for commercial palm oil production to produce soaps, lubricants and edible oils lead to a expansion of oil palm plantations.

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- Oil palm tree was first introduced to Malaya by British as an decorative plant in 1875.
- The first commercial scale plantation in Malaysia was founded in 1917 and established in Tennamaran Estate in Selangor.

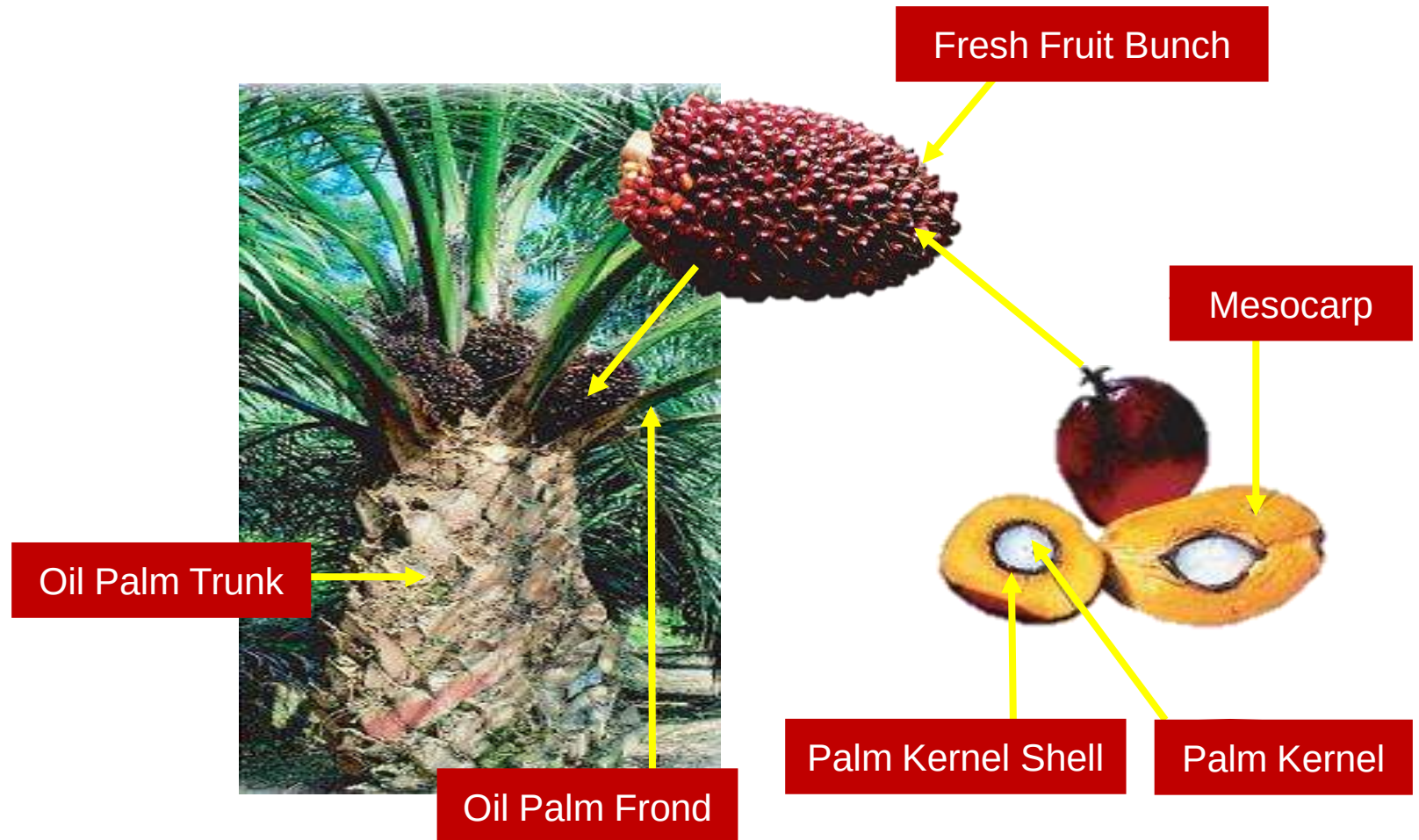


- Cultivation of oil palm increased at a fast pace in early 1960s under the government's agricultural diversification programme.
- Malaysia currently contributing 34% of world palm oil production & 29% of world exports.
- In 2014, Malaysia palm oil export reached RM 46.95 billion and accounted for 6% of the total exports.

- Palm oil and related products are identified as one of the 12 National Key Economic Areas (NKEAs) in 10th Malaysia Plan.
- Palm Oil NKEA is targeted to increase Malaysia's GNI to RM178 billion by 2020.

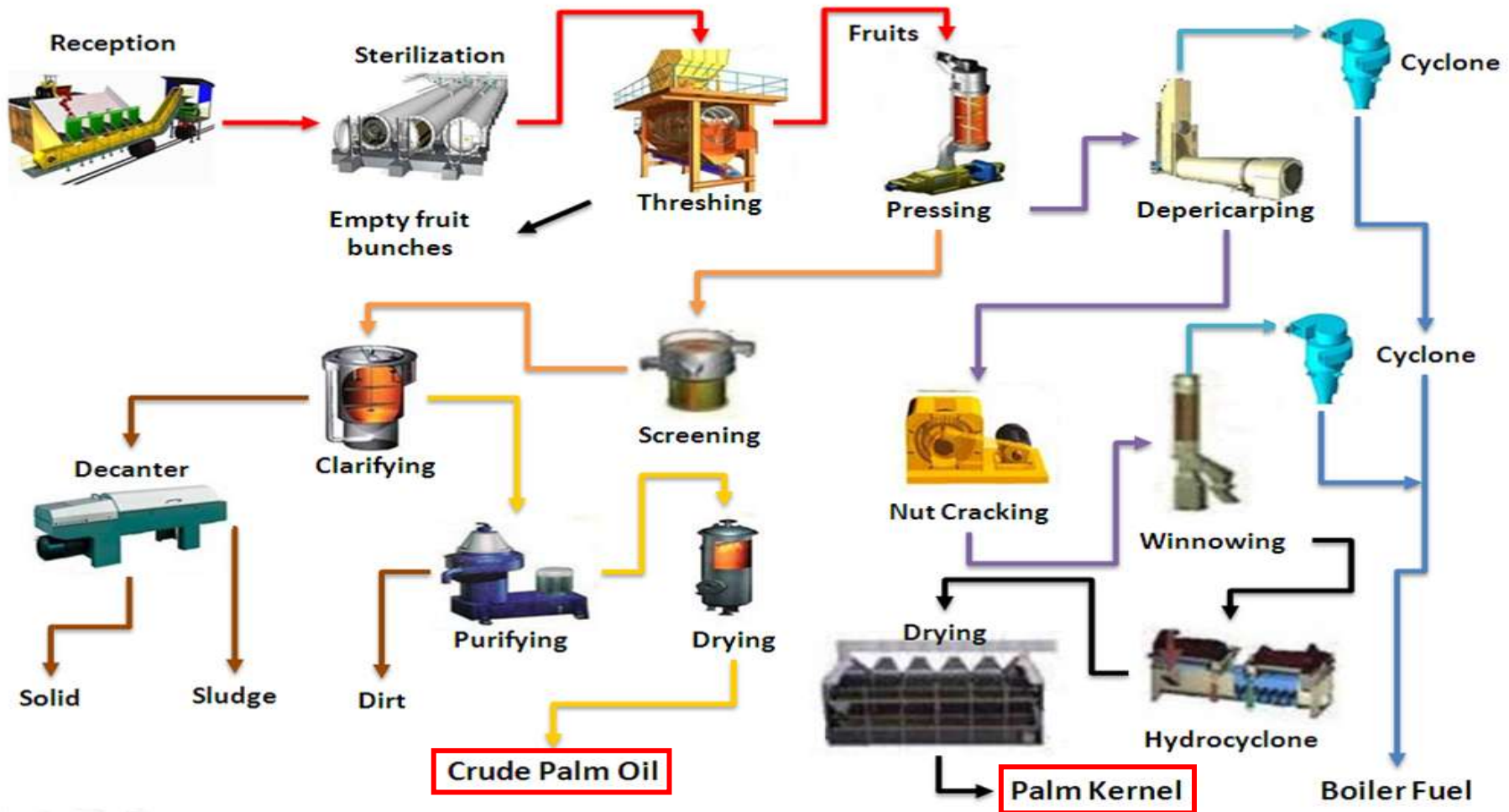
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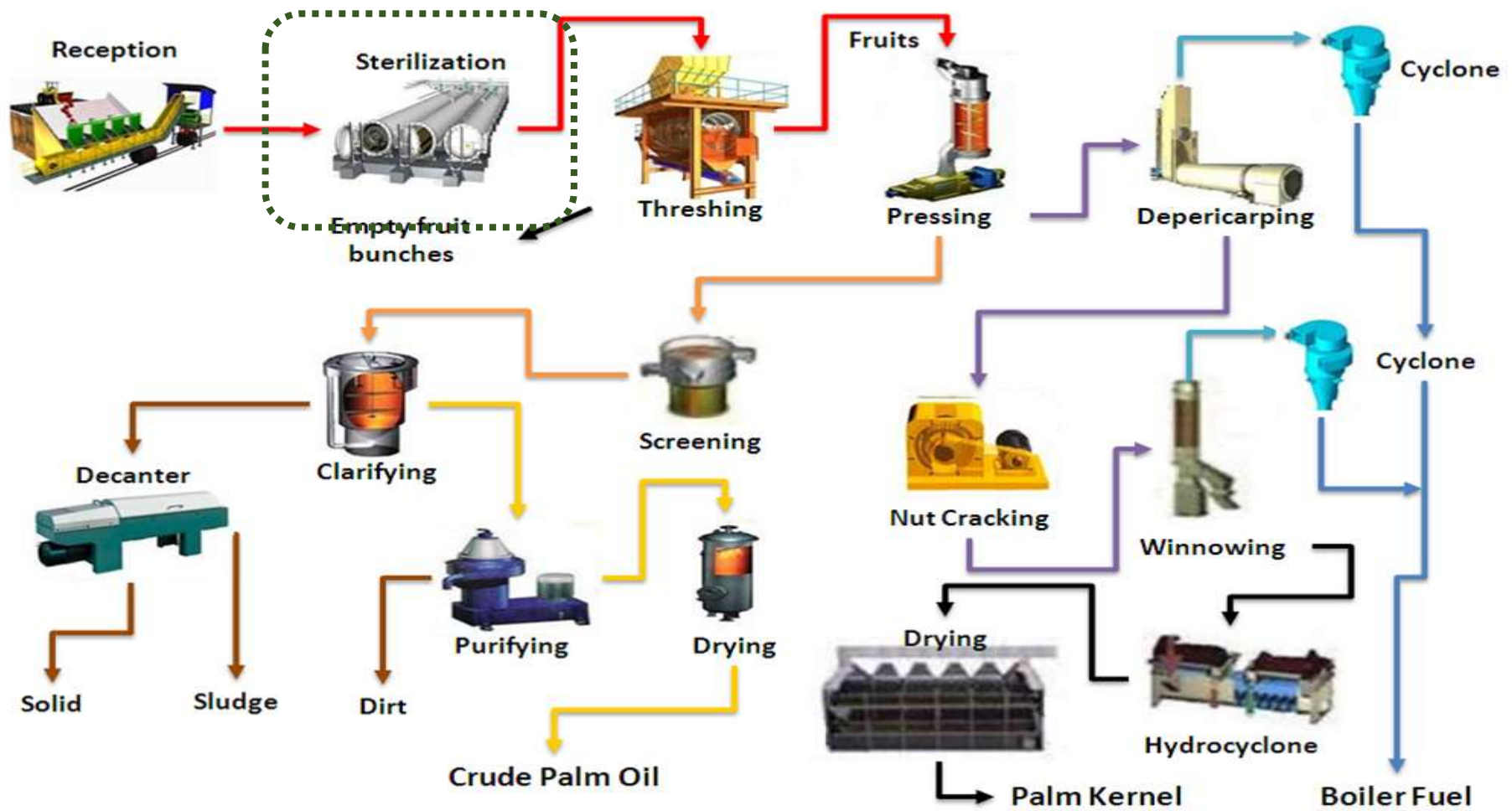
Oil Palm Tree



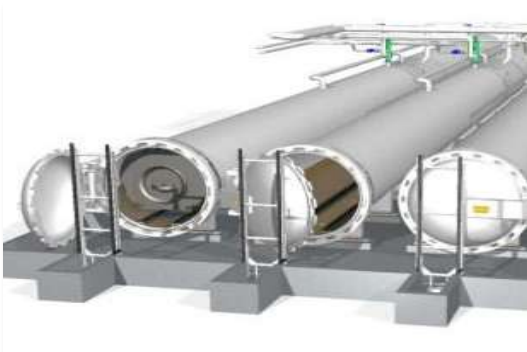
Typical Palm Oil Process Flow

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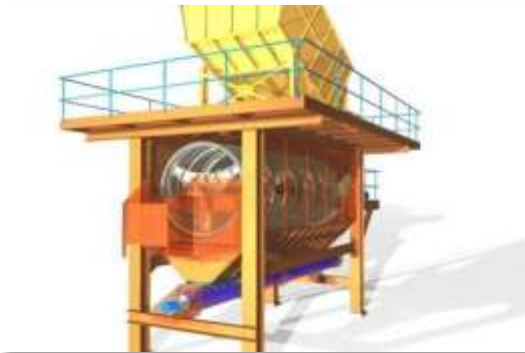


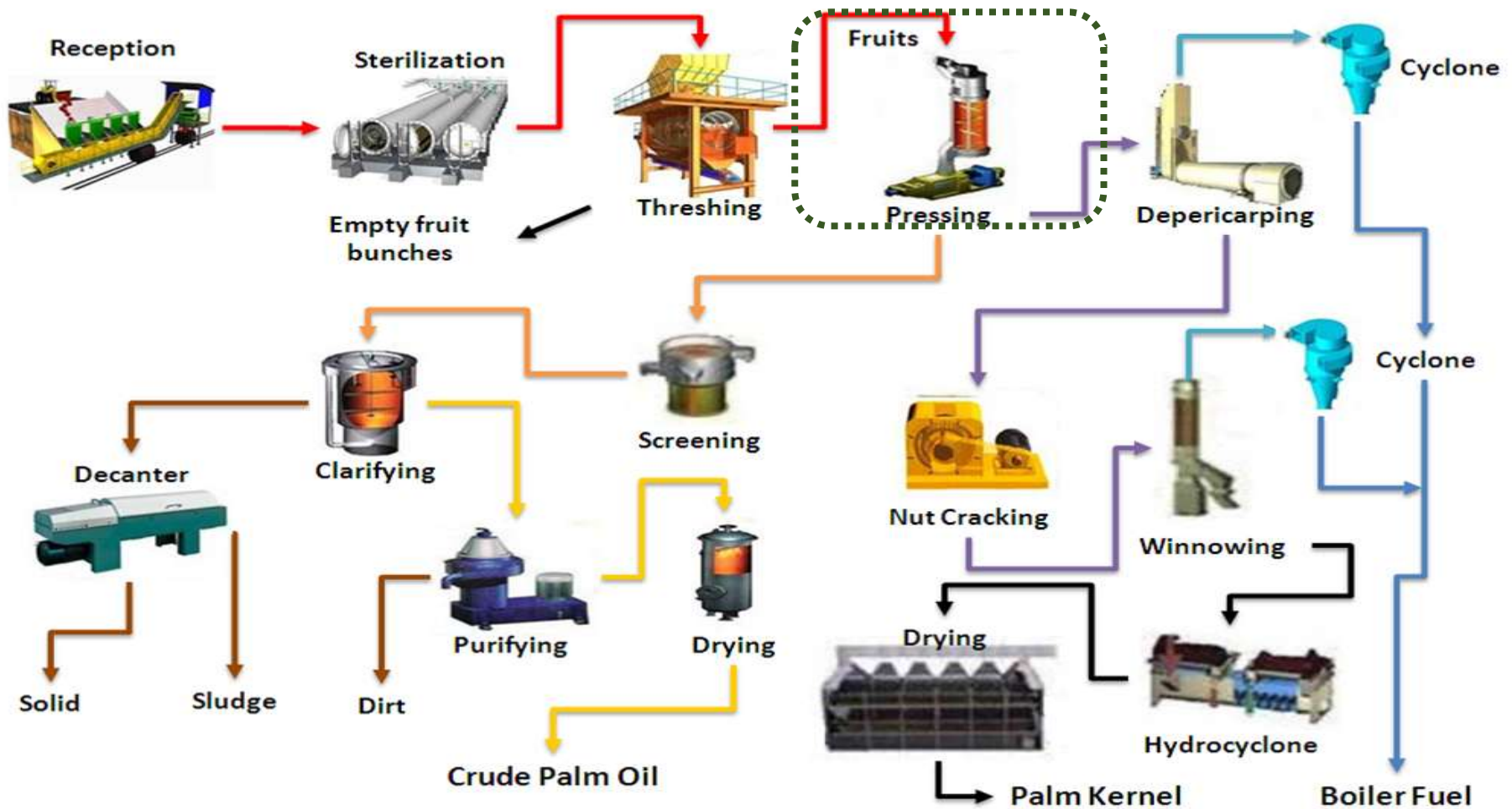


- Steam-heated treatment in horizontal vessel.
- Facilitate stripping of the fruits from spikelets.
- Prevent further formation of free fatty acids.
- Soften the mesocarp for optimum oil recovery.



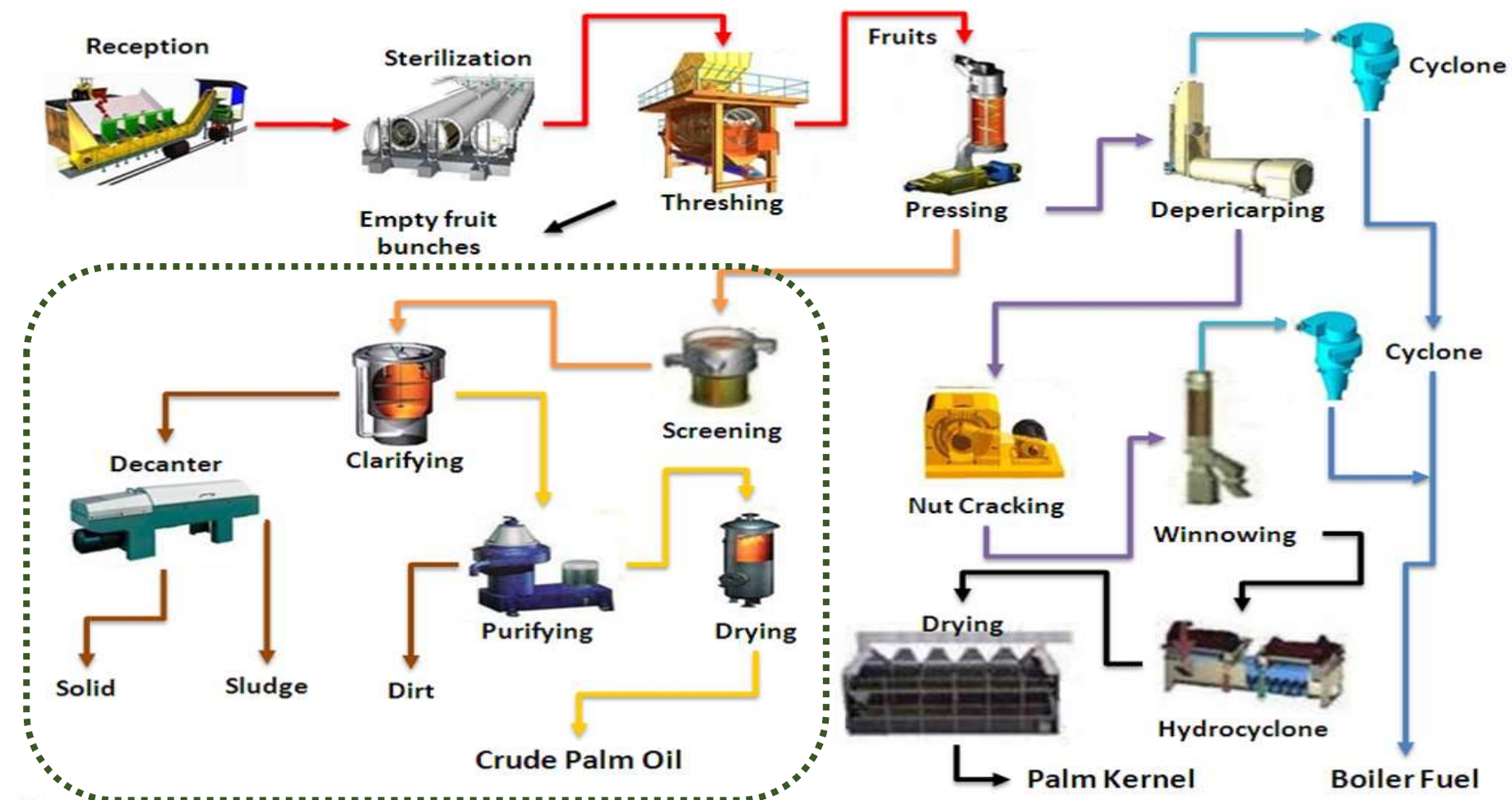
- Drum-stripper separating fruits from spikelets or bunch stalks via rotating mechanism.
- Bunches lifted up and then dropped again repeatedly causing fruits knocked off.





- Mashing of palm fruits by rotating arms under steam-heated condition to break the oil-bearing cells of mesocarp.
- Digested mash fruits pressed under high pressure for the extraction of crude palm oil (CPO).

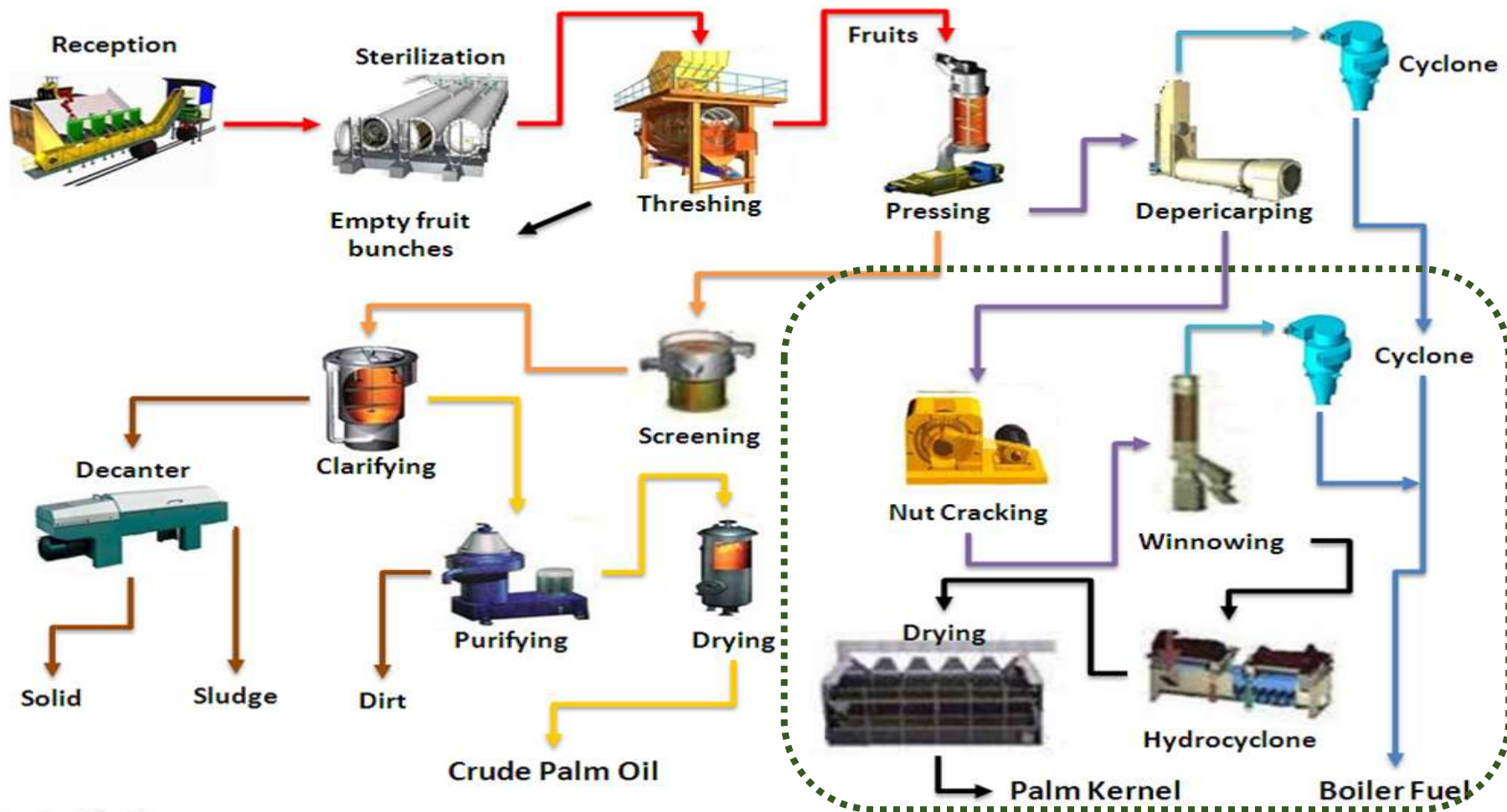




Clarification & Purification ... Past and Present pg. 21

- Separation of fibrous materials, water and non-oil solid from CPO.
- Clarified oil will pass through purifier and vacuum dryer for further impurities removal and drying before being pumped into CPO storage tank.





- Nut and fibre separated from press cake by means of pneumatic separation.
- Cracking of separated nuts using ripper mill to reveal kernels.
- Mixture of shell and kernel are separated in hydrocyclone based on the difference in SG.
- Wet kernel are then dried in kernel silo under steam-heated condition.

Present & Future...

Transformation of PO Industry

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... Present and Future

• Frond End Processing Line

Challenges:

- Relying on low-skilled labor.
- Exposure to unsafe working condition.
- Inconsistent throughput.



Evolution:

- New systems are incorporated to replace winch, bollard and overhead hoist found in the marshalling yards of conventional mills.
- Smaller foot print.
- Automated system
- Safe working environment



- Total Steam Management

Challenges:

- Inefficient of steam utilization.
- Inconsistent process throughput.



Evolution:

- Automated system to ensure consistent and sufficient steam supply for milling process, particular in sterilization.
- Efficient steam usage
- Consistent sterilizing process
- Automatic steam back up system

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... Present and Future

• Process Synchronization and Automation

Challenges:

- Relying on high-skilled labor.
- Inconsistent process throughput.
- Inconsistent process losses.



Evolution:

- Fully integrated data from all input devices to provide details for process control and monitoring.
- Less human intervention
- Improve process losses
- Accurate mass balance
- Consistent throughput



• Handling of Palm Oil Mill Effluent (POME)

Challenges:

- Inconsistent BOD at final discharge.
- Difficulty to meet stringent effluent discharge limit imposed by authority.



Evolution:

- Introducing of continuously desludging system, advanced treatment system and total waste management system.
- Lower BOD at final discharge / no waste water discharge
- Environmental friendly



- Optimizing the Use of Biomass

Challenges:

- Delay in empty fruit bunch (EFB) evacuation especially during peak crop month.



Evolution:

- Introducing of EFB pressing and shredding system and fibre production plant.
- Address EFB evacuation issue
- Overcome environmental issue on leachate
- Generate new revenue



The New Oil & Gas Industry – Biofuel & Biogas

- The depletion of fossil fuels has led to escalating efforts in search of renewable energy sources.
- Palm biodiesel is one of the solution!
- It derived from palm oil and can be used in diesel engines.
- It is renewable, biodegradable, non-toxic, safe to handle and essentially free of Sulphur.

- POME has high content of organic substances, releasing CH_4 that pollutes the environment.
- Anaerobic digestion is the best suited technology for treating POME.
- Biogas can be harvested during digestion.

- Biogas harvested can be used to generate power through gas turbines or gas-fired engines.
- Deployment of biogas technology would furthermore lead to reduction of GHG emission, and also generate “Green” electricity.



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Thank You