

# BP PTA +

## Advantaged Proven Technology

Timothy Keyes | BP Petrochemicals Engineering Director



29 July 2017



---

# Disclaimer

---

Copyright 2017 BP Amoco Chemical Company. All rights reserved. Contents of this presentation do not necessarily reflect the Company's views.

This presentation and its contents have been provided to you for informational purposes only. This information is not advice on or a recommendation of any of the matters described herein or any related commercial transactions.

BP is not responsible for any inaccuracies in the information contained herein. BP makes no representations or warranties, express or implied, regarding the accuracy, adequacy, reasonableness or completeness of the information, assumptions or analysis contained herein or in any supplemental materials, and BP accepts no liability in connection therewith. BP deals and trades in energy related products and may have positions consistent with or different from those implied or suggested by this presentation.

This presentation also contains forward-looking statements. Any statements that are not historical facts, including statements about BP's beliefs or expectations, are forward-looking statements. These statements are based mostly on publicly available information, estimates and projections and you should not place undue reliance on them. These statements are not guarantees of future performance and involve certain risks and uncertainties, which are difficult to predict. Therefore, actual future results and trends may differ materially from what is forecast, suggested or implied in any forward-looking statements in this presentation due to a variety of factors. Factors which could cause actual results to differ from these forward-looking statements may include, without limitation, general economic conditions; conditions in the markets; behaviour of customers, suppliers, and competitors; technological developments; the implementation and execution of new processes; and changes to legal, tax, and regulatory rules. The foregoing list of factors should not be construed as exhaustive. BP disclaims any intention or obligation to publicly or privately update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise.

Participants should seek their own advice and guidance from appropriate legal, tax, financial and trading professionals when making decisions as to positions to take in the market.



# BP PTA

## Advantaged Proven Technology

- BP PTA technology
  - Lowest total cost of ownership
  - Commercially proven
  - Distinctive environmental performance
- BP /TechnipFMC Alliance



# BP PTA

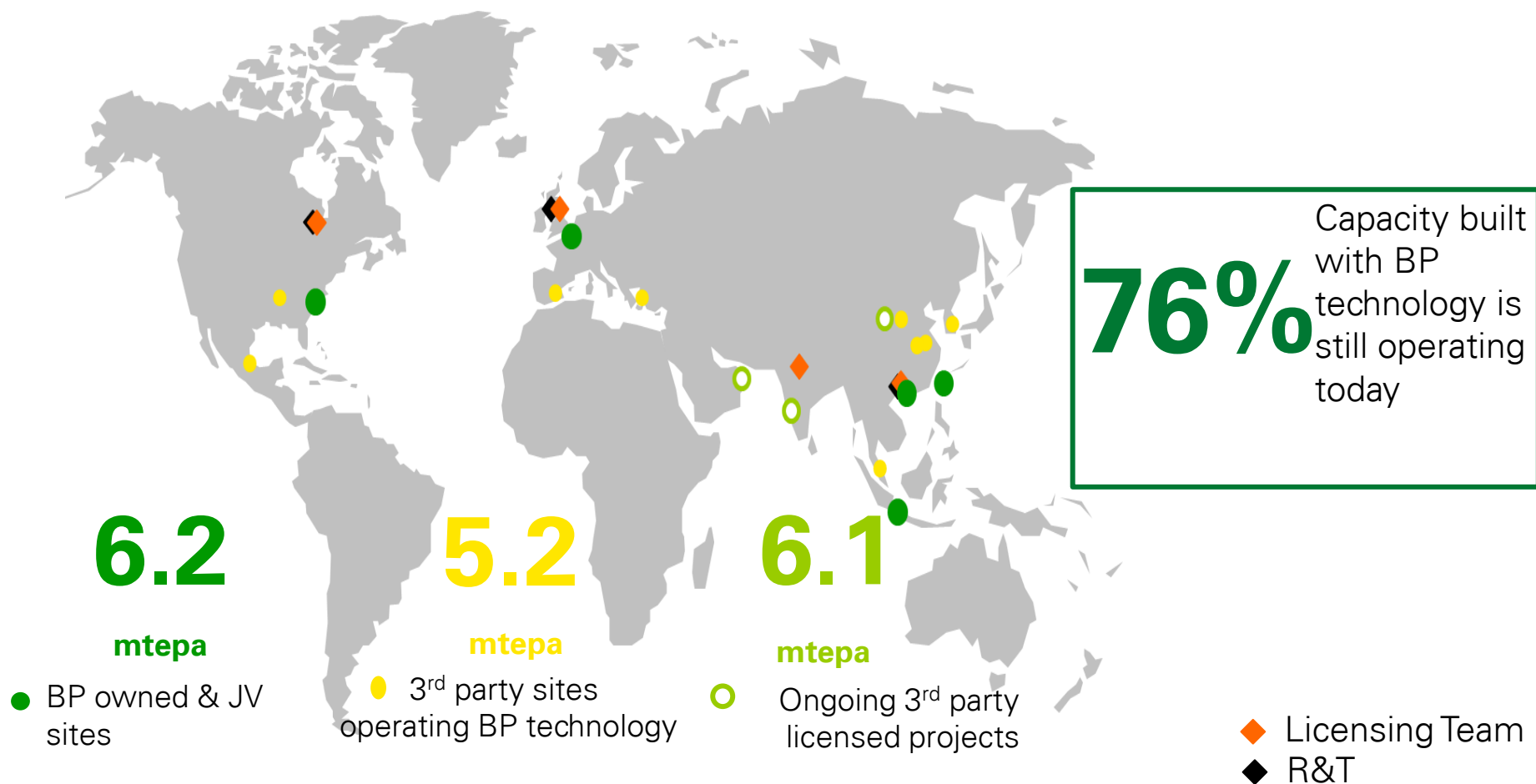




# BP PTA

## Global and Established Technology

BP has been a leader in PTA technology, manufacturing excellence, and licensing since becoming the first commercial producer of PTA 50 years ago



\*Data Source: IHS World Analysis Report: PTA & DMT



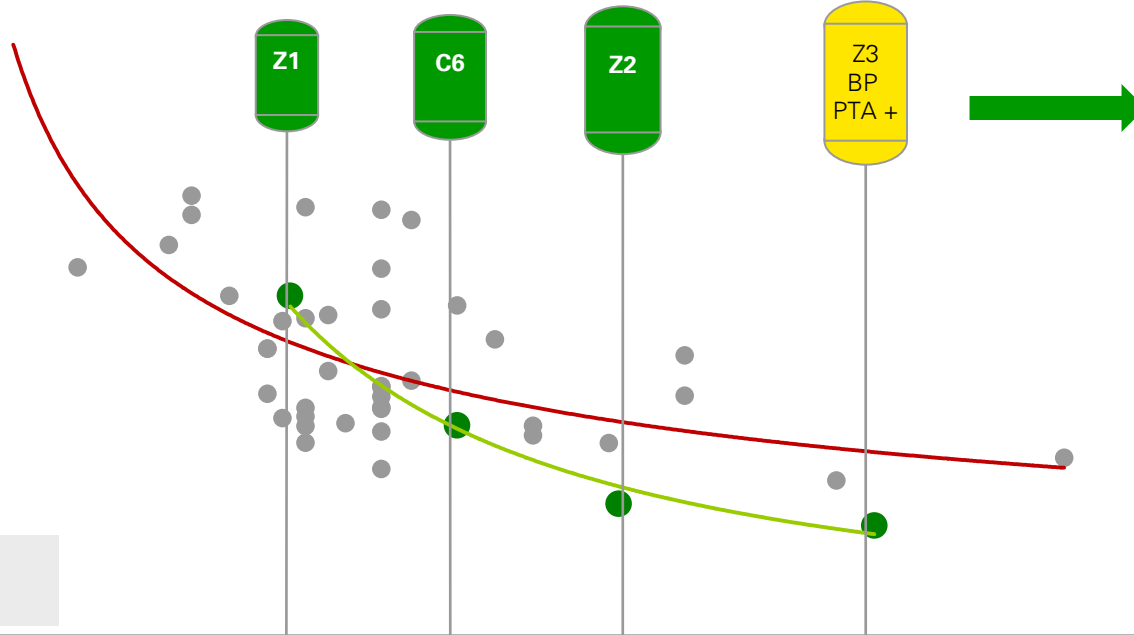
# BP PTA

## Driving Capital Efficiency

Normalized EPC Cost per Capacity (USD/mtepa)

● Competitor PTA technology

● BP's evolving PTA technology



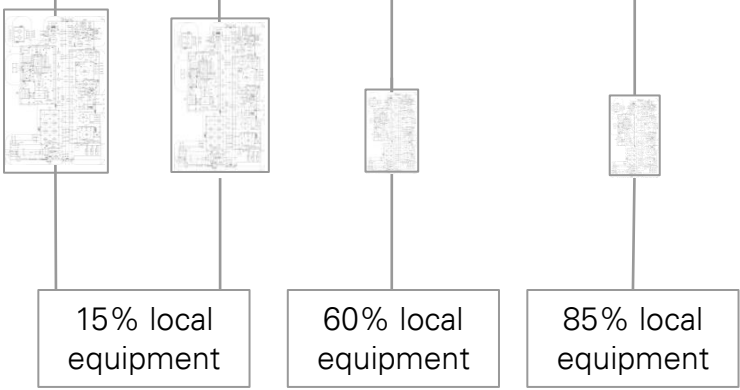
Scale advantage

Reduced equipment count by 160 pieces (30%)

Improved plot plan efficiency (capacity/m<sup>2</sup>) by 400%

Local equipment sourcing

**\$60 million** savings over our closest competitor





# BP PTA

# A story of Continuous Improvement

**25% lower capital**  
than conventional technology

**44% lower variable costs**  
than Zhuhai 1

**33% lower variable costs**  
than Zhuhai 2

## 2003

**First generation of breakout technology focused on reducing capital costs**

- 40% fewer pieces of equipment
- 40% smaller plot plan
- 75% less process wastewater
- 40% less solid waste

Zhuhai 1

Some parts of technology implemented as retrofits to existing PTA assets

500 ktpa

## 2008

**Lowest capital and variable cost single train PTA plant in the world**

- Additional plot plan reduction
- 50% reduction in GHG
- Over 50% reduction in fuel
- Net generator of electricity

Zhuhai 2

Technology leverages economies of scale, process integration, and allows for more local sourcing of equipment

900 to 1100 ktpa

## 2015

**Lowest cost producer in the world**

- 100% Operating rates
- 97% Reliability post TAR
- On-spec within 24 hrs of startup

Zhuhai 3

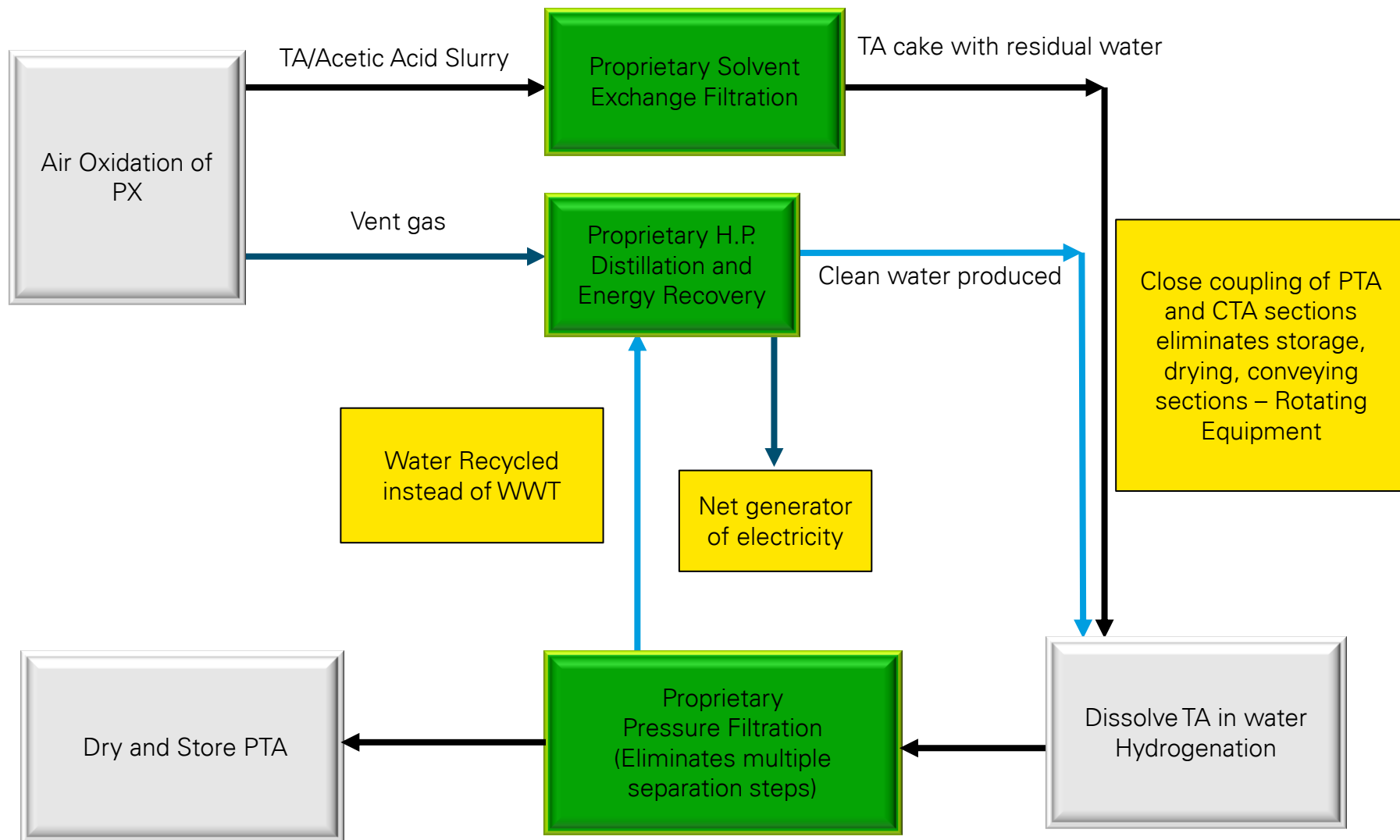
Variable cost is the lowest in the world and still dropping with ongoing optimization

1,250 ktpa



# BP PTA

## Deployed at Zhuhai 2 and Zhuhai 3







# BP PTA Market Leader in Environmental Performance

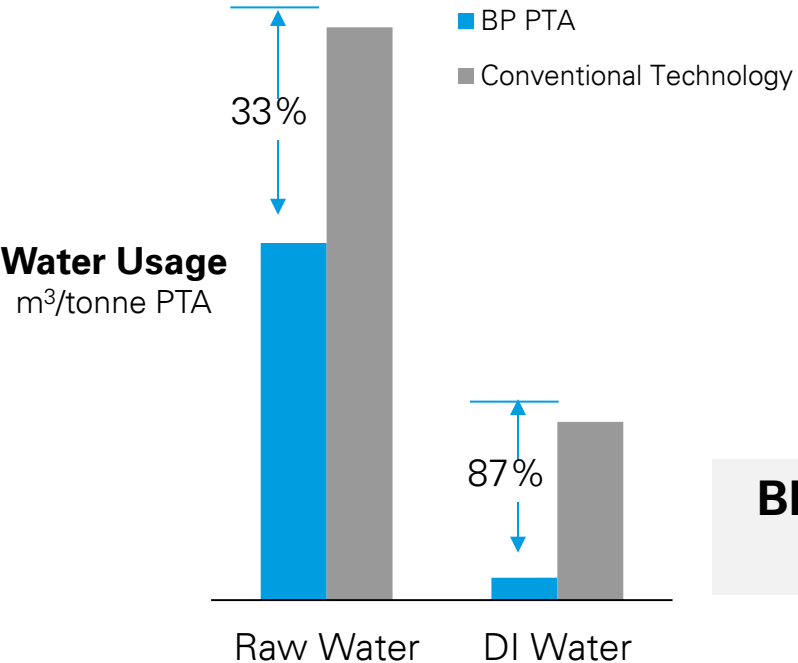
⚡ Recovers enough heat to power the entire site and sell electricity to the grid

**95%** Lower solid waste disposal\*

**75%** Lower water discharge\*

**65%** Lower GHG emissions\*

## Distinctive Environmental Performance



BP Zhuhai was the only PTA plant to receive China's "Energy Efficiency Advanced Enterprise" award In 2016

**BP PTA produces the most cost efficient PTA in the world using the cleanest technology**



# bp PTA<sup>air</sup>™

The sustainable  
future of PTA

---

29% lower carbon PTA

---

Carbon neutral PTA

---

Carbon neutral products

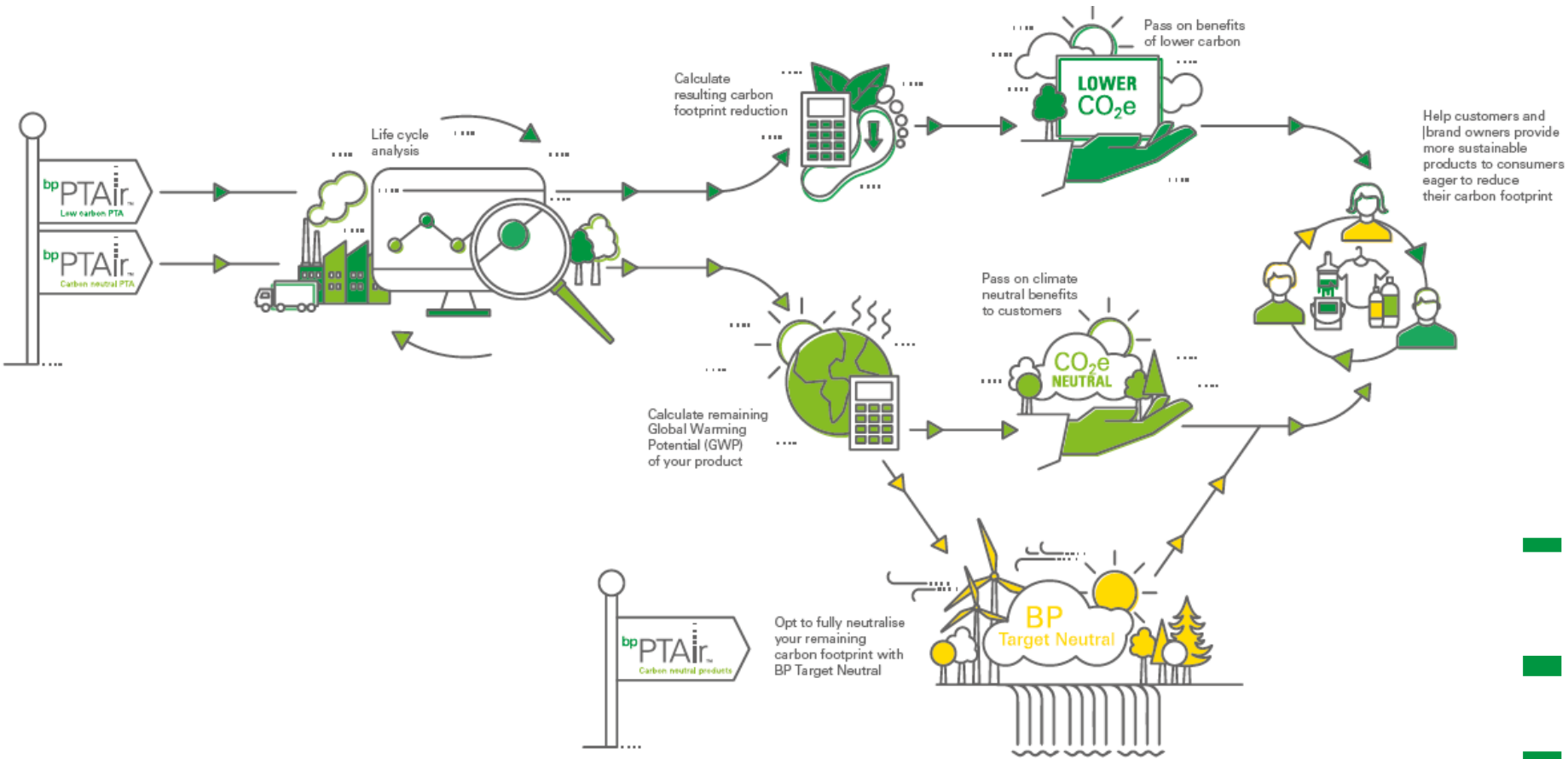
---

NOW !





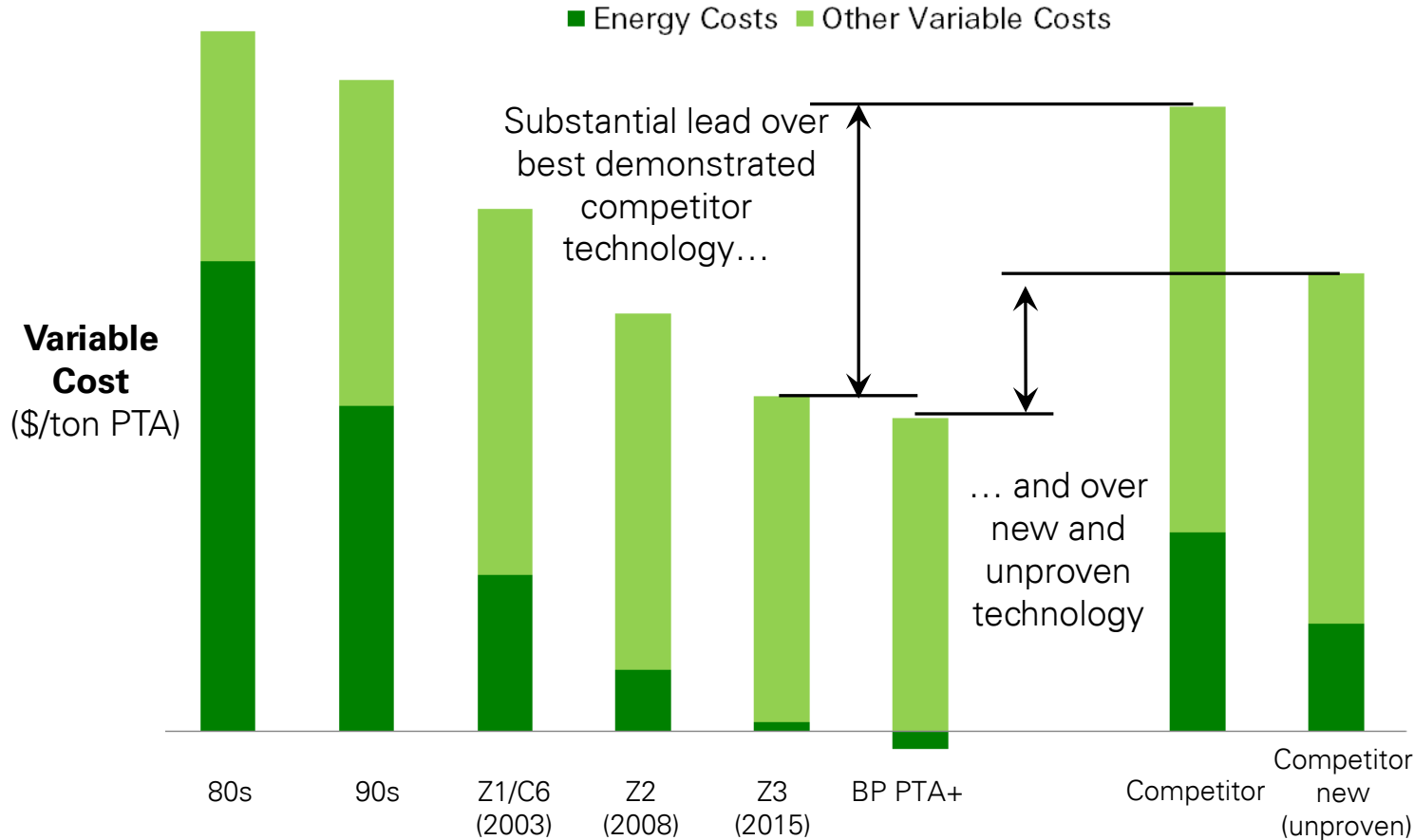
# How to implement PTAir





# BP PTA

# A Demonstrated Technology that Works



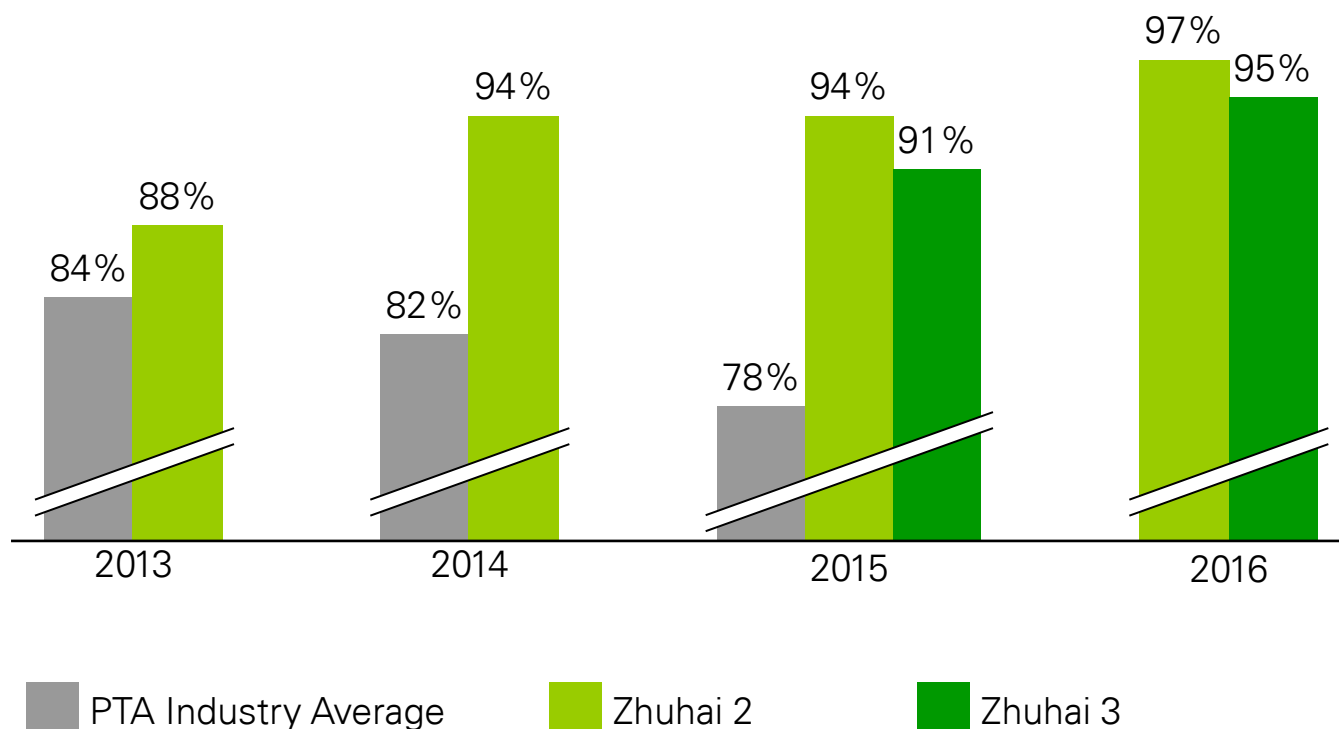
Based on BP experience and industry data, any new technology will have a \$15/ton higher VC than expected for at least 3 years until new technology issues are resolved.

**This is technology that delivers in practice, not just on paper**



# BP PTA Leading Technology for all Commercial Environments

- Zhuhai 2 has been consistently operating safely at >95% reliability
- Utilization at Zhuhai is > 95% due to low costs whilst most of China is at ~ 80% through downturn



**Our technology is proven worldwide in plants that produce the most cost efficient PTA available on time, on budget and on spec, reliably and safely**



## BP and TechnipFMC

An exclusive strategic alliance

### Delivering projects on time and budget, minimizing execution risk

17

years

The BP-TechnipFMC alliance began in 1999

8

mtepa

PTA capacity engineered by TechnipFMC based on BP technology

20

Fully owned, JV, and licensed PTA projects completed through this alliance

- The collaboration spans from technology development to project life cycle optimization
- TechnipFMC is a key element of BP's PTA business strategy:
  - State of art methodologies
  - Joint development of the evolving technological suite (up to PTA+)
  - Ready to go integrated PTA community



**TechnipFMC is a world leader in the design of PTA units with unique experience in BP technology**



## TechnipFMC

Providing excellence to BP licensing projects

### Strong local presence

- Historical footprint in India with extensive references within all categories (state owned, private) of local clients and specific tailored synergy in PTA among the Rome and local offices

### Compressed schedule

- High level of standardization of the ISBL process and LLIs design
- Extensive re-use of engineering

### Actual material quantities and costs

- Apply Value Improving Practices methodology to support clients from project inception (both ISBL and OSBL)

### Market expertise

- Local and offshore, capable of responding to specific PTA-tailored market inquiries
- Mitigates the risks of core/ LLIs materials management as well as of “out of the comfort zone” procurement campaigns

### Risk management

- Built from both an extensive in-house database of recent PTA projects and TechnipFMC’s extensive project execution capability



**BP PTA**

No one offers more

**Lowest Total Cost of Ownership**

**Commercially Proven**

**Distinctive Environmental Performance**

**Manufacturing Support**

- Technical Service, Training
- Critical spare parts and catalyst beds
- Access to continuous improvement
- Logistics support/advice
- Second operators from BP assets
- TAR and safety support
- Optimization services
- Global Manufacturing Excellence group

**Marketing Support**

- Assistance with project feasibility studies
- Pre-Marketing
- Customer Support (PET)
- Supply/offtake agreement opportunities

**Tailored Offer**

- Capacity flexibility and potential retrofits
- Joint offers (pX/PTA, PTA/PET)
- PTAir – low carbon & carbon neutral PTA, carbon neutral products

**BP has won four PTA licenses since offering its demonstrated technology in 2012**



# BP PTA

Advantaged Proven Technology

