

# ***CX technology for HDPE project***



**Mitsui Chemicals**

License Department  
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**CX** is  
*the HDPE manufacturing technology  
which Combines ideal process & catalyst  
and leads to eXcellent quality.*

CX process provides resins that have excellent mechanical properties maintaining outstanding process-ability. Licensed throughout the world, CX process and its products are greatly appreciated by top companies everywhere.

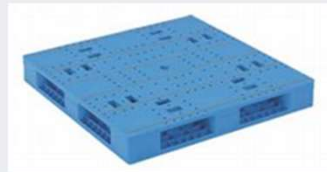


*CX process can provide resins to suit a wide variety applications*

## Film



## Injection



## Pipe

PE-100



PE-80



## Blow

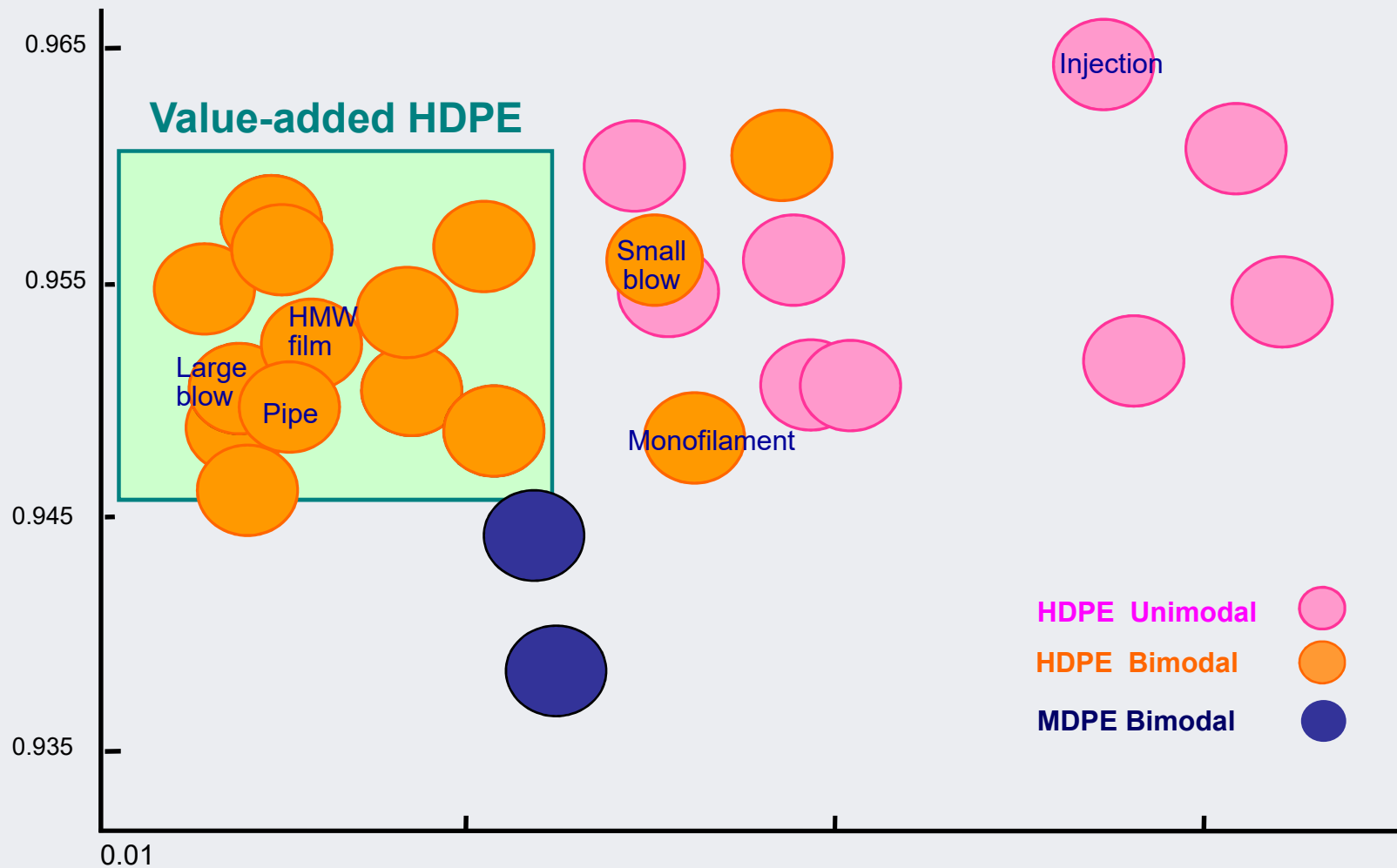


## Other extrusion

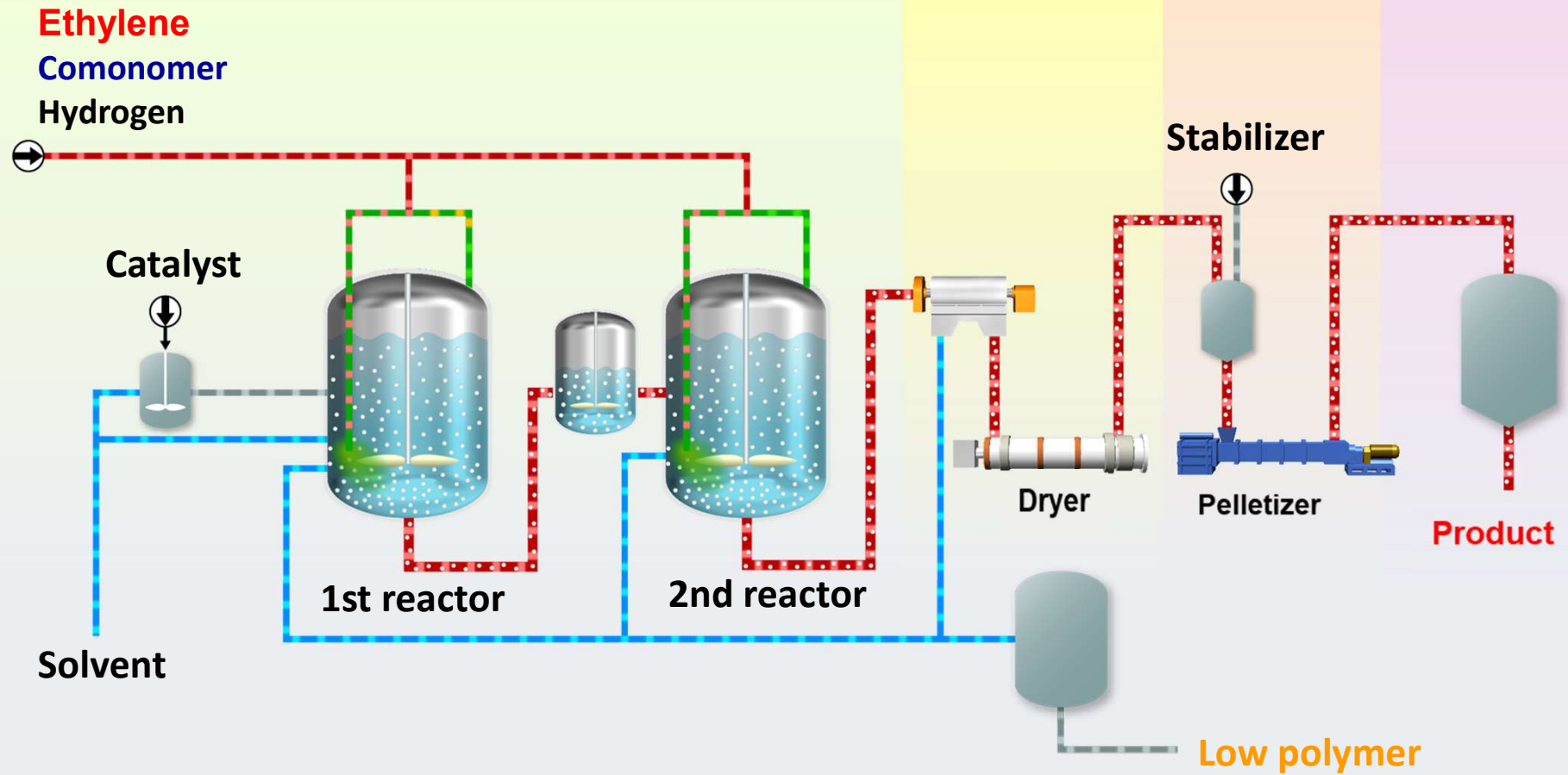


# Product map

*CX products cover all important applications of HDPE and MDPE*



# CX process flow scheme



## A. Quality

- Realize ideal HDPE polymer structure.
- Excellent property with flowability.

## B. Easy & Simple operation

- Sophisticated by more than 50 years operation experience.
- The reactors can be operated without cleaning for several years.
- Ensure safety in emergency and easy restart.
- Simple catalyst preparation

## C. Environment-friendly

- No VOCs (Volatile Organic Compounds) to atmosphere

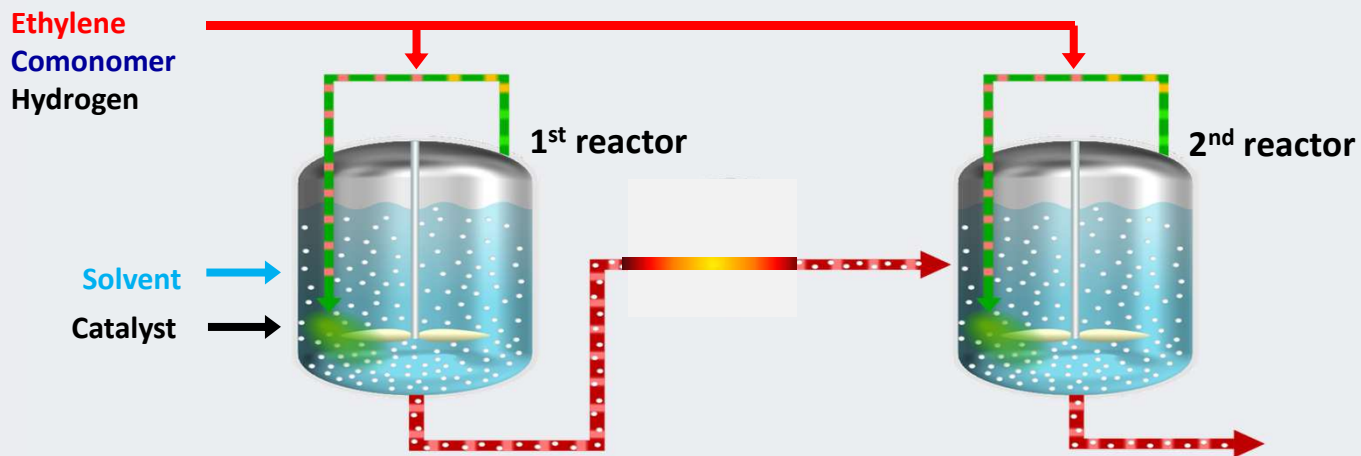
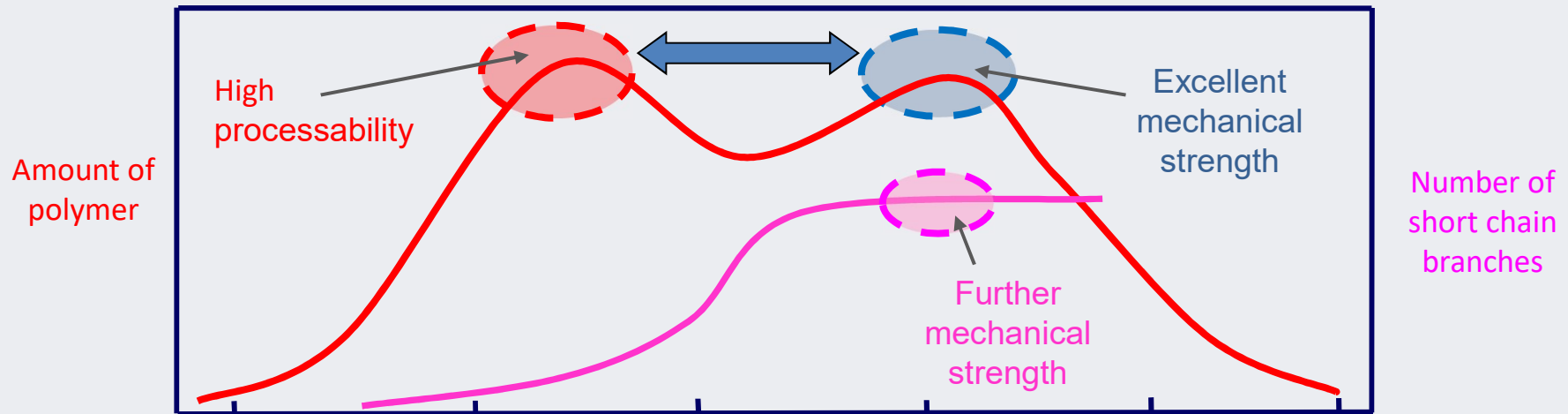
## D. License Experience

- 40 years licensing experience
- Recorded 48 CX plants & over 8 million tons/year.

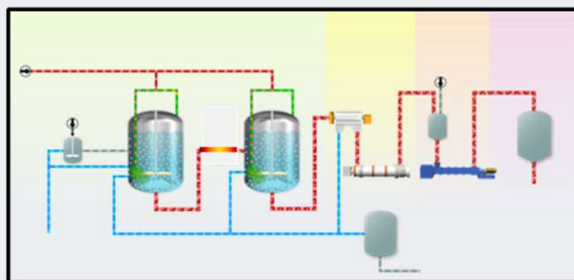
# Concept of process for excellent bimodal HDPE

A: Quality

*Bimodal slurry phase process leads to high quality HMW-HDPE*



B. Easy & Simple operation



CX process



First HDPE commercialization in Japan (Mitsui; 1958)

**TiCl<sub>4</sub>/ Et<sub>2</sub>AlCl**  
(Ziegler; 1953)

1960

1970

**2<sup>nd</sup> generation**

**MgCl<sub>2</sub>/TiCl<sub>4</sub>/Et<sub>3</sub>Al**  
(Mitsui; 1968)

1980

1990

**3<sup>rd</sup> generation**

**Next generation catalyst**

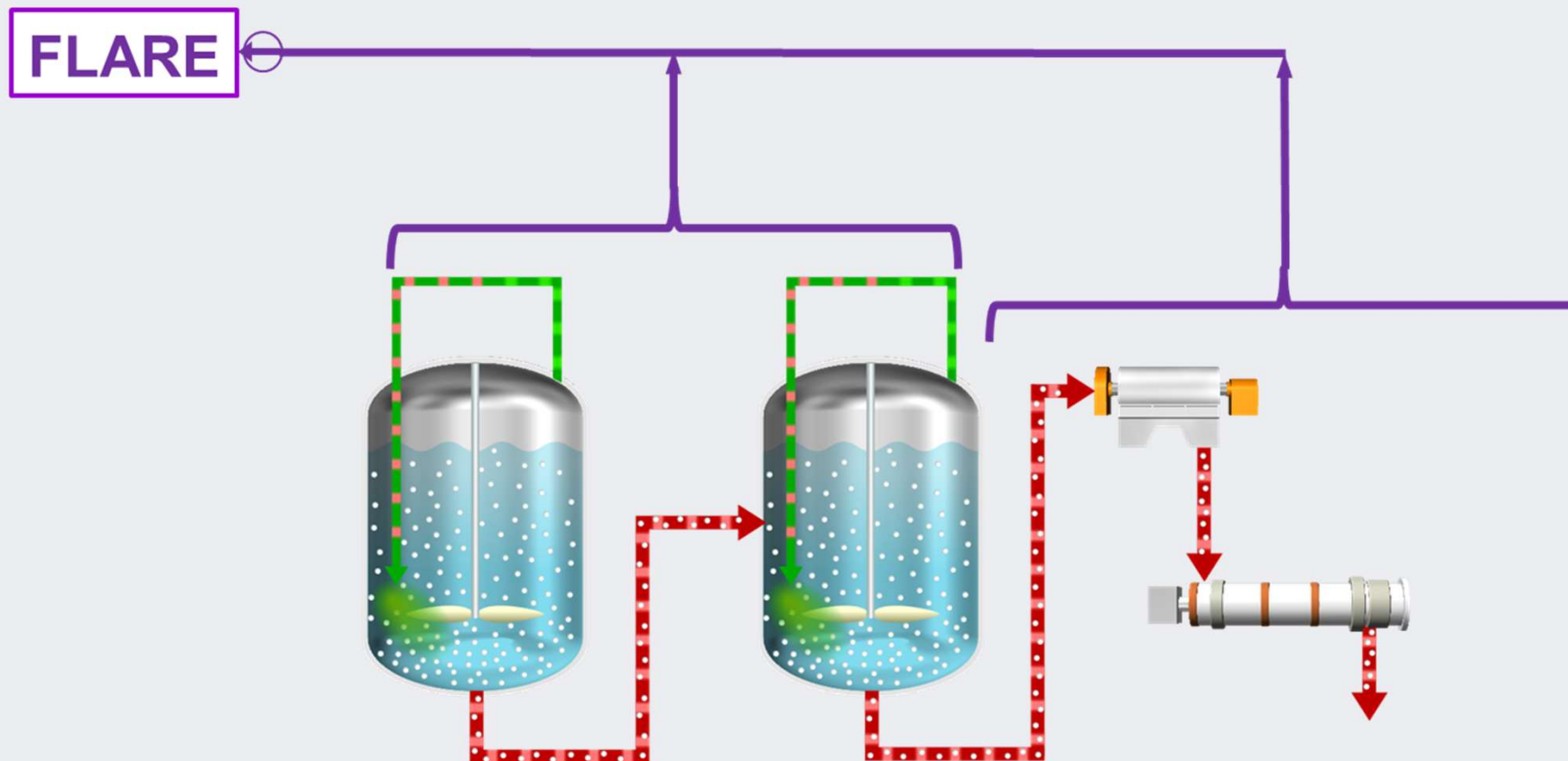
2000

- Catalyst for CX process ;**
- **One catalyst for all HDPE**
  - **High activity & good morphology**



## No VOCs from CX process

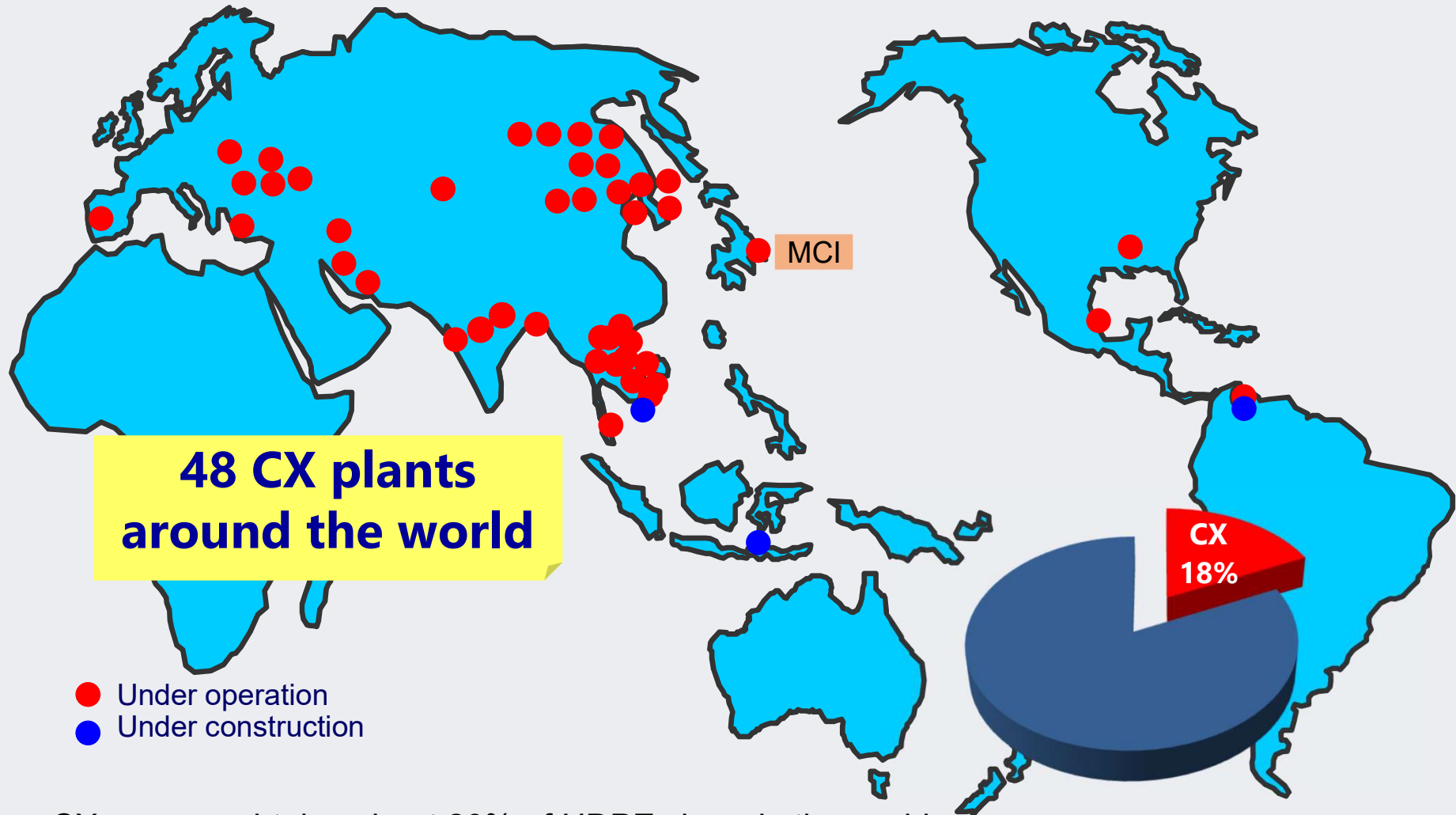
### C. Environment-friendly



Emission of Volatile Organic Compounds (VOC) is one of the most important environment problem. In CX process, VOC from the plant can be sent to flare, **there is no emission of VOC into the atmosphere.**

## Licensee location

### D. License experience



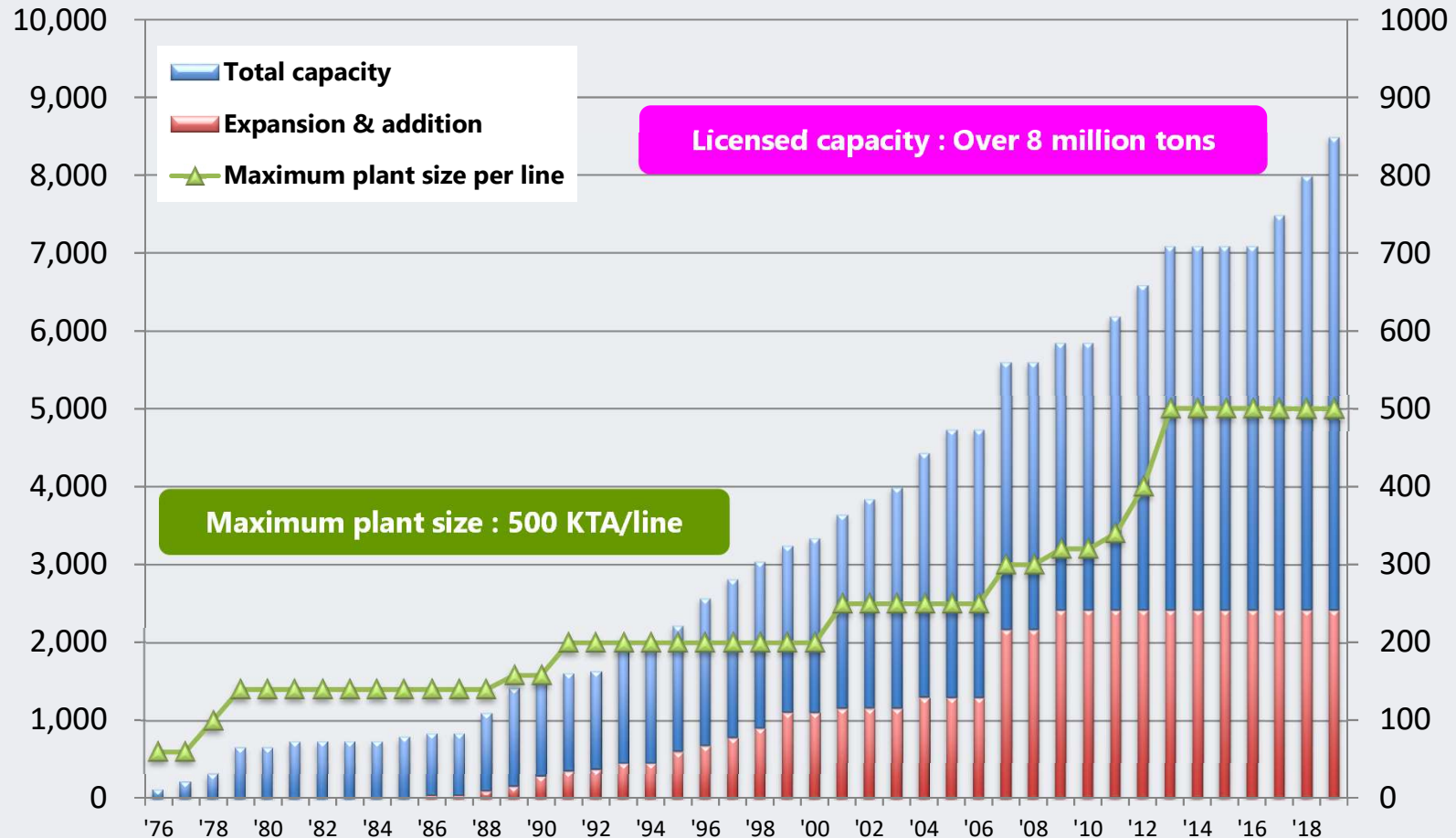
CX process obtains about 20% of HDPE share in the world.  
48 CX plants have been in operation.

# CX process license experience

## D. License experience

Total licensed capacity (KTA)

Maximum plant size (KTA)



CX license activity started from 1976 and it is sophisticated through about 40 years experience.

The maximum plant size has reached to 500 KTA.

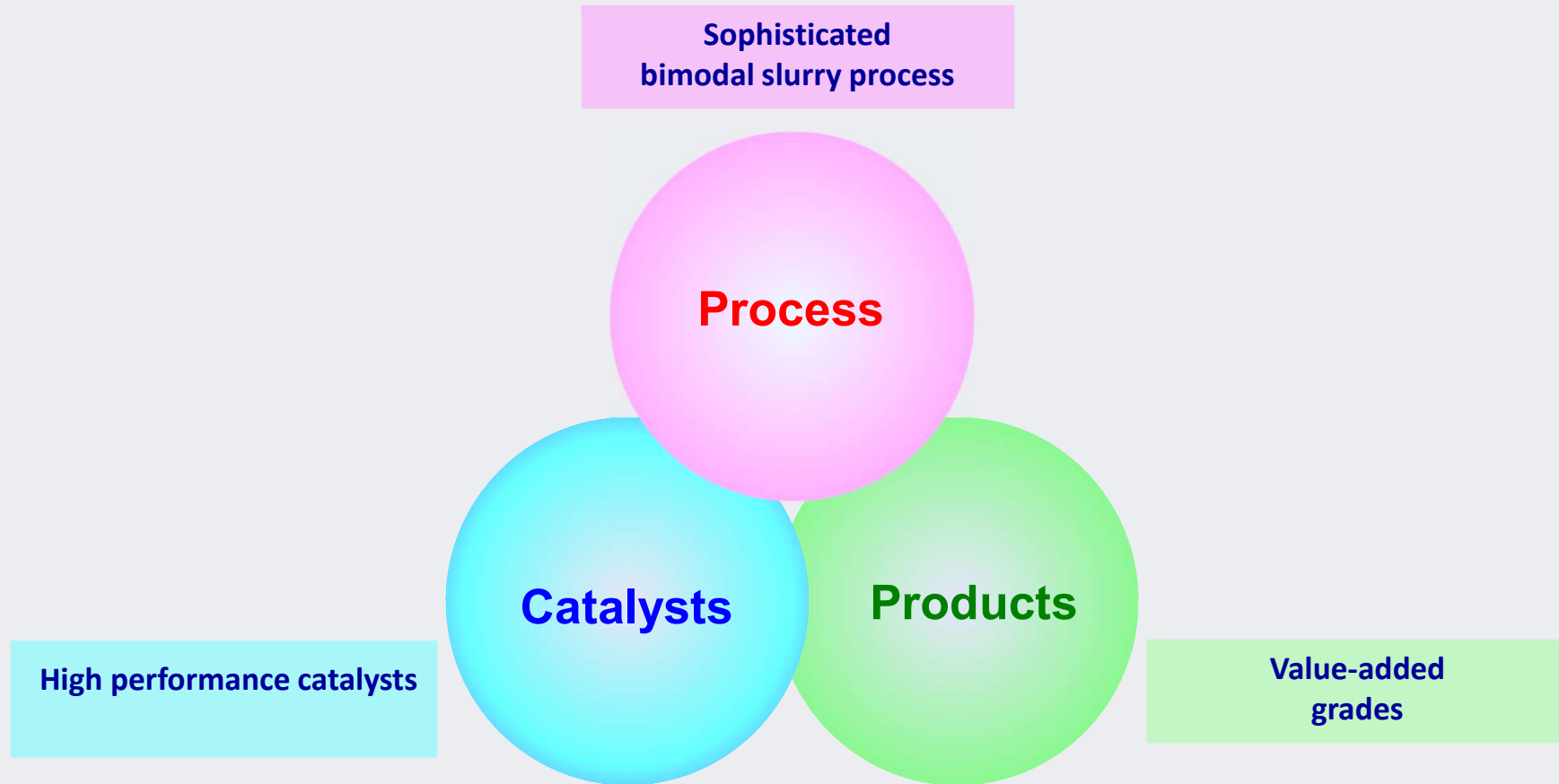
## Sharing information of CX worldwide and CXLC has high reputation

	(Companies)
1. CXLC1999	13
2. CXLC2001	9
3. CXLC2003	11
4. CXLC2005	14
5. CXLC2007	13
6. CXLC2010	12
7. CXLC2013	12
8. CXLC2015	11
9. CXLC2017	12
10. CXLC2019	7



MCI has conducted a “CX Licensee and Licensor Conference” every other year since 1999 to share information on plant operation improvements, troubleshooting activities, and product information, etc.

*MCI's HDPE technology brings huge benefits to all your projects*





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