



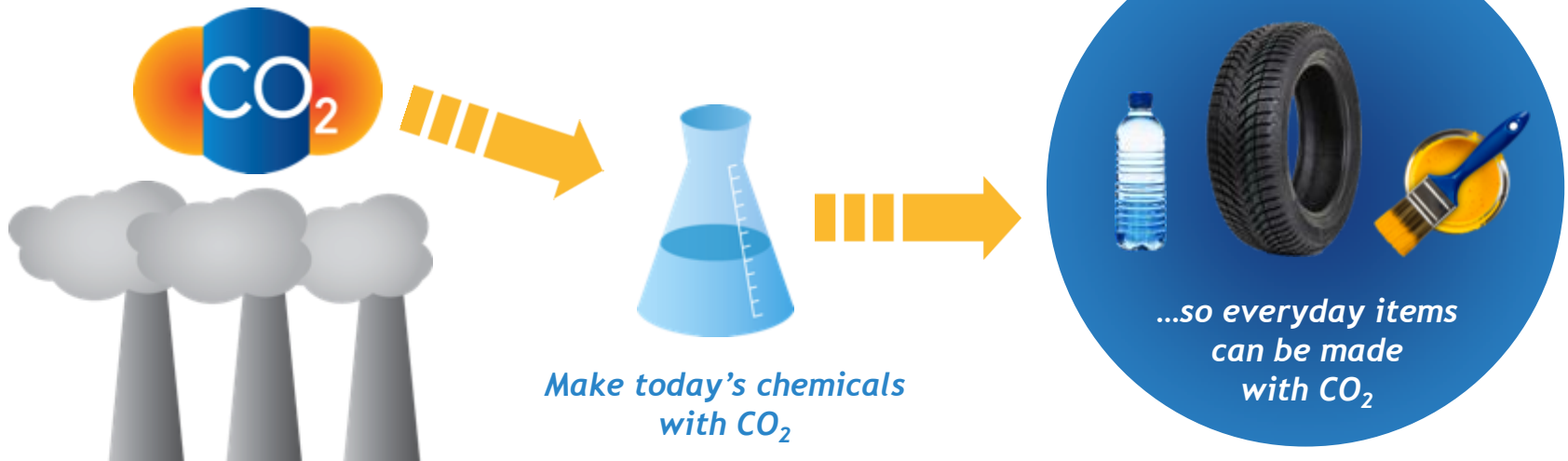
## Harnessing Bio-CO<sub>2</sub> as a low cost feedstock to make more sustainable chemicals



*BIO World Congress  
Dave Law, CEO  
July 20, 2015*

# Making everyday products with CO<sub>2</sub>: the lowest-cost carbon feedstock

Lower costs of production *and* environmental benefits



# Summary: huge market, strong progress, dominant IP

- Disruptive technology to harness CO<sub>2</sub> as lowest-cost feedstock to produce high-volume chemicals:
  - competitive advantage for *multiple* chemicals with large markets, especially C2s
  - lower cost, reduced carbon footprint
  - *dominant IP* in field, with >100 patents and applications
- First process, Mono-ethylene Glycol (MEG, \$27B market):
  - key steps being optimized at lab-scale, on track for 2016 pilot
  - Focus: utilizing bio-based CO<sub>2</sub> feedstock to produce bio-MEG
- Current Investors include:



# Large market opportunities

## Basic chemicals



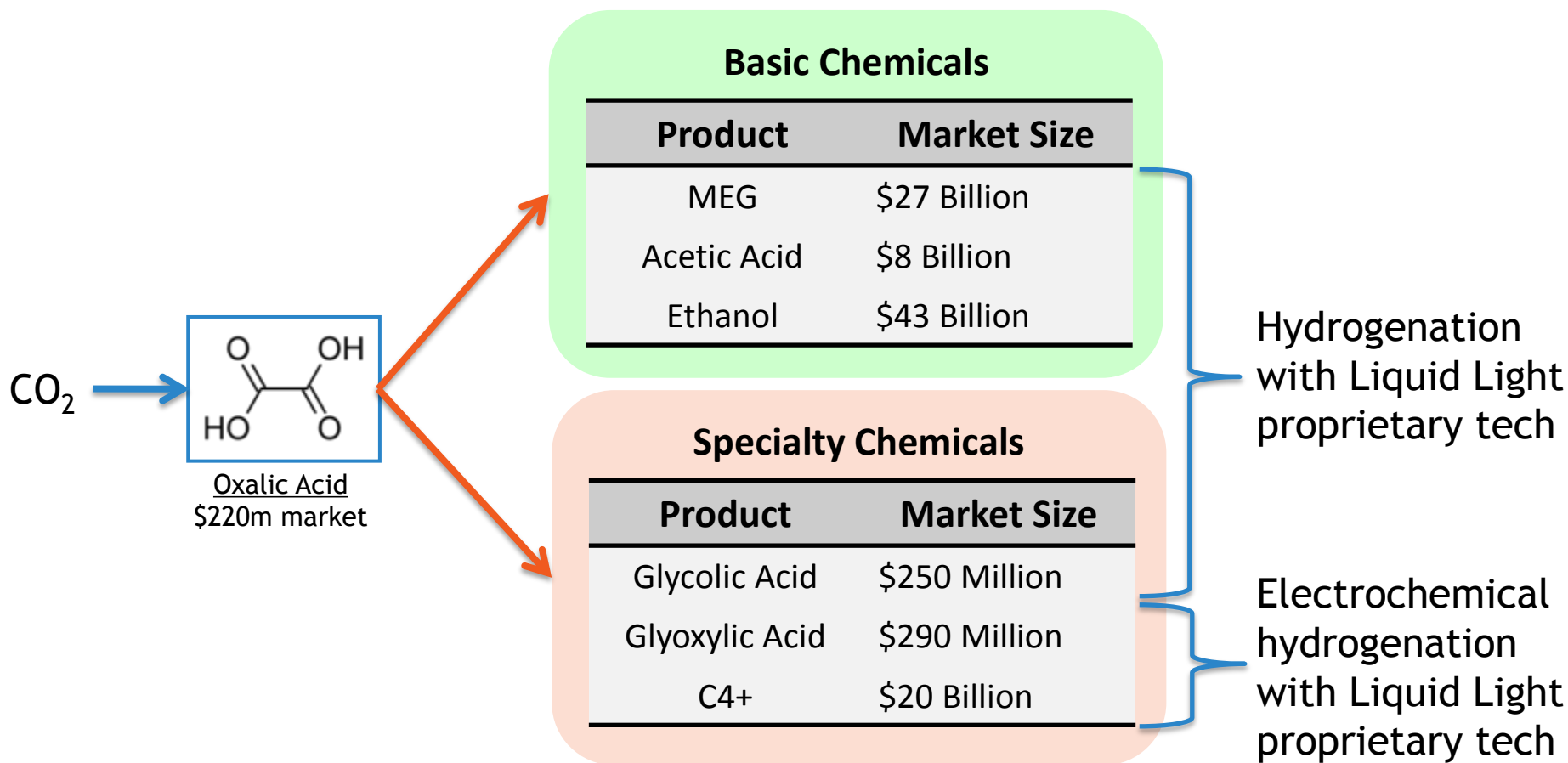
First product, ethylene glycol

## Intermediate and specialty chemicals



E.g., formic acid, glycolic acid

# Multiple chemicals from one platform



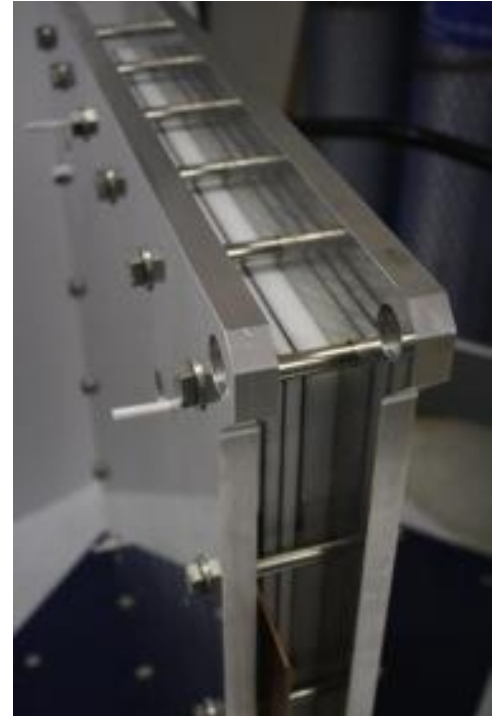
# CO<sub>2</sub> electrochemistry is Liquid Light's core technology

A technology *platform*: lets us create processes for *multiple* chemicals = multiple earnings streams

Can simultaneously make co-products, increasing value

High-efficiency of Liquid Light reaction cell validates core technology

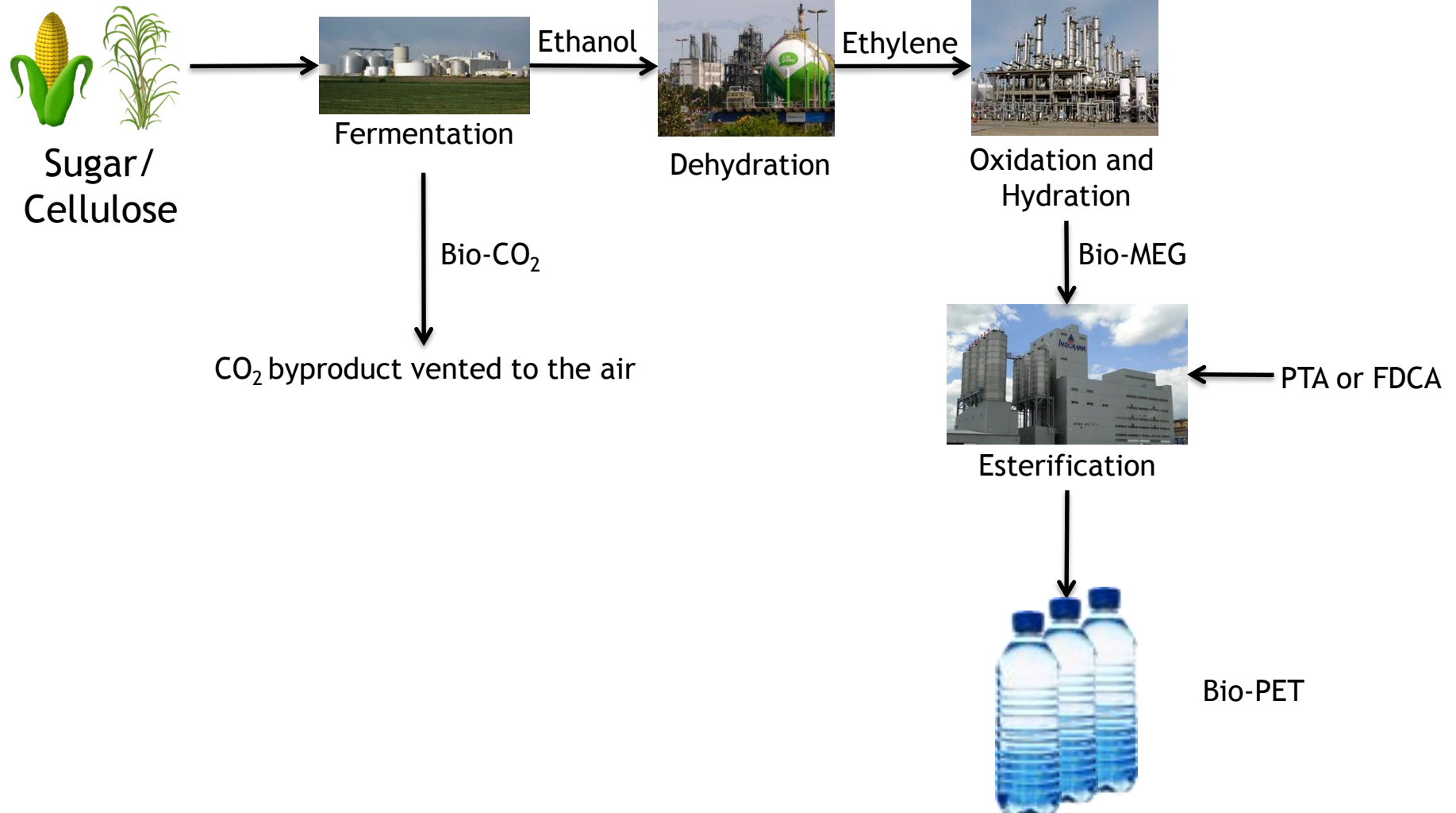
Commercial plant scale-up follows well-known examples (e.g. chlor-alkali plants), reducing commercial deployment risk



# Liquid Light's reaction cell, demonstration-scale



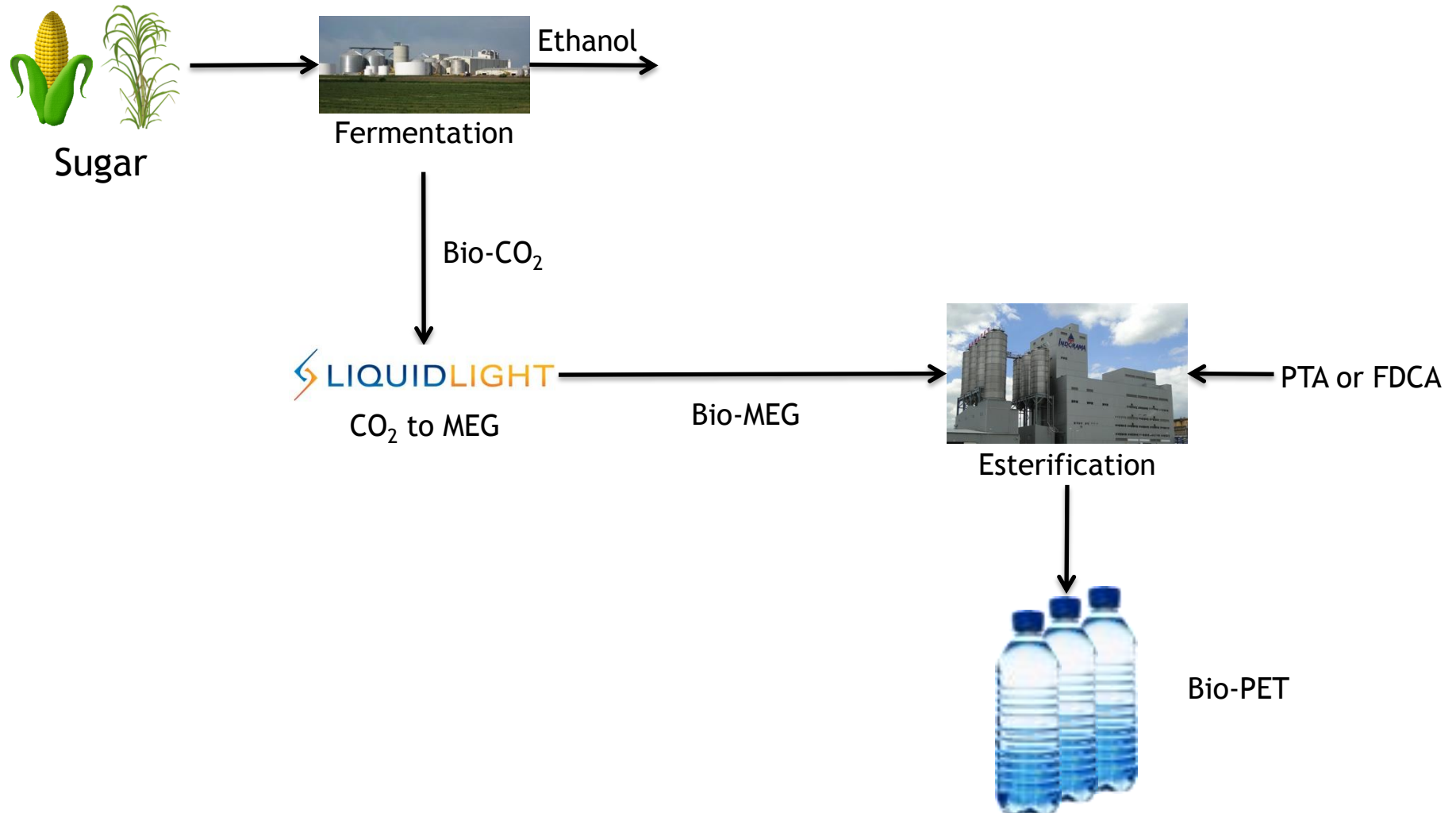
# Why customers care, part 1: Current bio-PET is expensive; wastes CO<sub>2</sub>, multiple steps





## Why customers care, part 2:

With LL: bio-PET less expensive to make; ethanol producers increase revenue; consumers get more sustainable products



# Extensive and growing IP portfolio

24

Issued/Allowed  
Patents



100+

Applications  
Pending

- **CO<sub>2</sub> electrochemistry**
  - Dozens of high-value chemical products
- **Co-production**
  - Broad coverage of all potential CO<sub>2</sub>-derived products including platform products
  - Similar broad coverage of anodic products to include halogens, oxidation of organics...
- **C2 platform**
  - Both electrochemical and catalytic hydrogenation routes to glycolic acid, glyoxylic acid, MEG, acetic acid

IP for chemicals with markets >\$250B

Catalysts, components, methods, processes: all areas of coverage



- Electrocatalytic breakthroughs offer disruptive technology to harness CO<sub>2</sub> economically for multiple chemicals
- Using bio-CO<sub>2</sub> as a feedstock, can produce a range of bio-based chemicals
- Pilot plant in Canada on track for 2016
- Technology development agreement signed supporting The Coca-Cola Company's PlantBottle™ Packaging Program

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