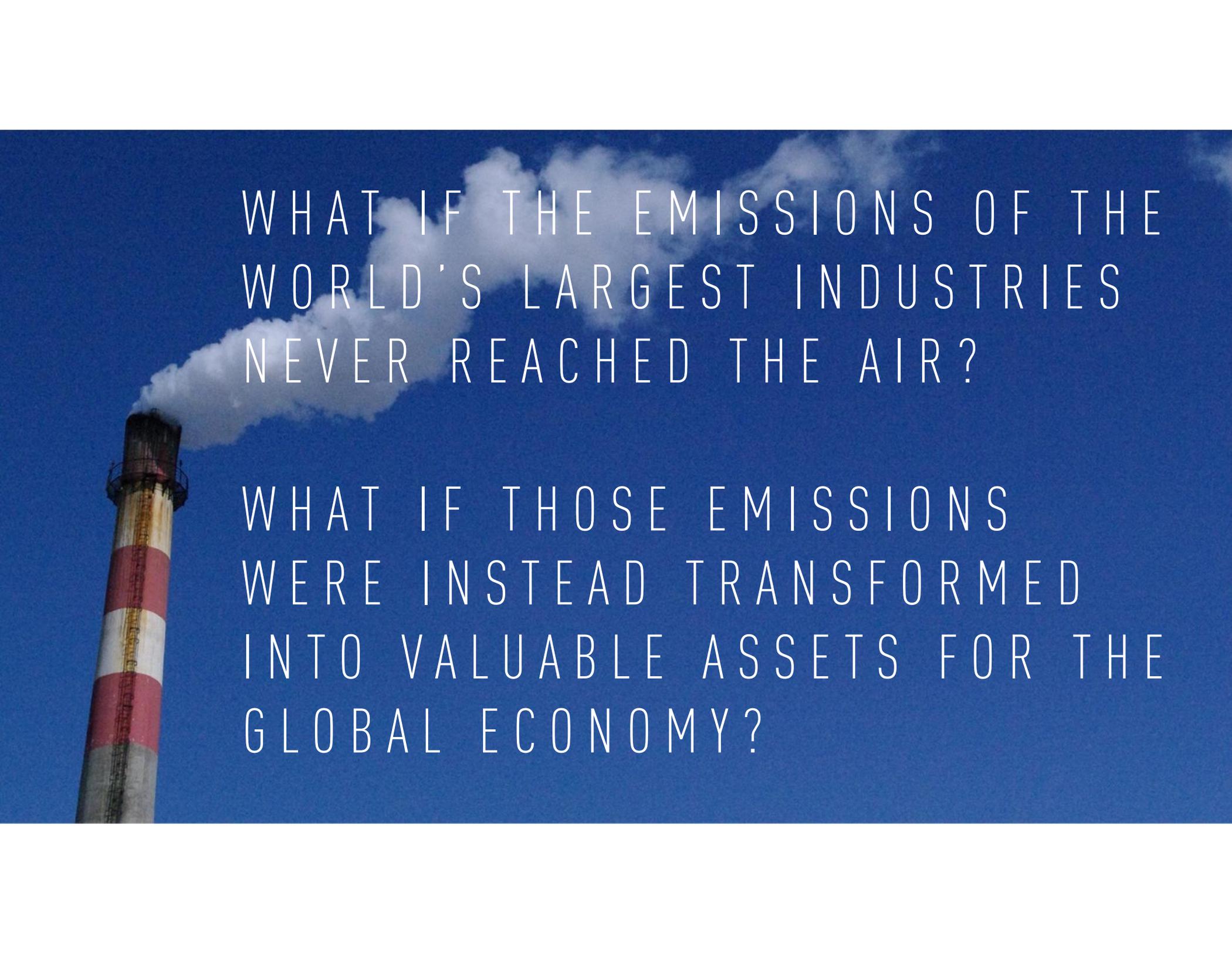


# OPUS<sup>12</sup>

CREATING VALUE BY CONVERTING CO<sub>2</sub> INTO  
HIGH-VOLUME LIQUID FUELS AND CHEMICALS

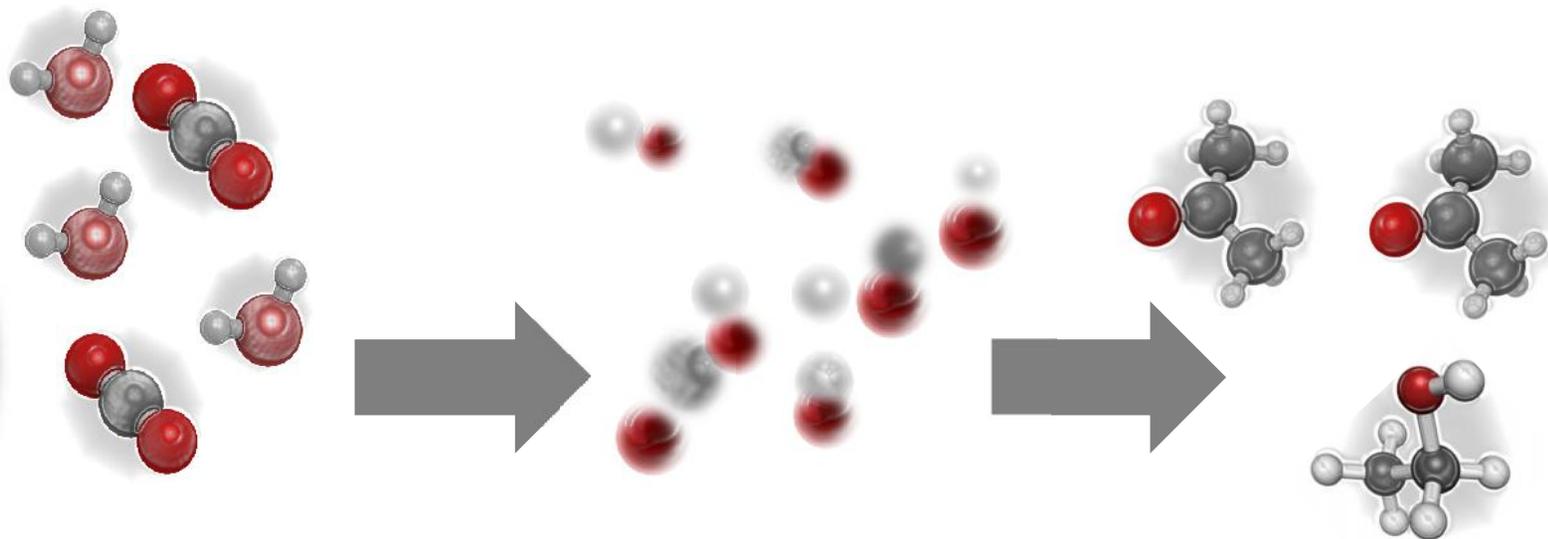
Nicholas Flanders, Co-founder & CEO | [Nicholas@OPUS-12.com](mailto:Nicholas@OPUS-12.com)



WHAT IF THE EMISSIONS OF THE  
WORLD'S LARGEST INDUSTRIES  
NEVER REACHED THE AIR?

WHAT IF THOSE EMISSIONS  
WERE INSTEAD TRANSFORMED  
INTO VALUABLE ASSETS FOR THE  
GLOBAL ECONOMY?

# Electrochemical reduction of CO<sub>2</sub>



**carbon dioxide +  
water**

**16 compounds**



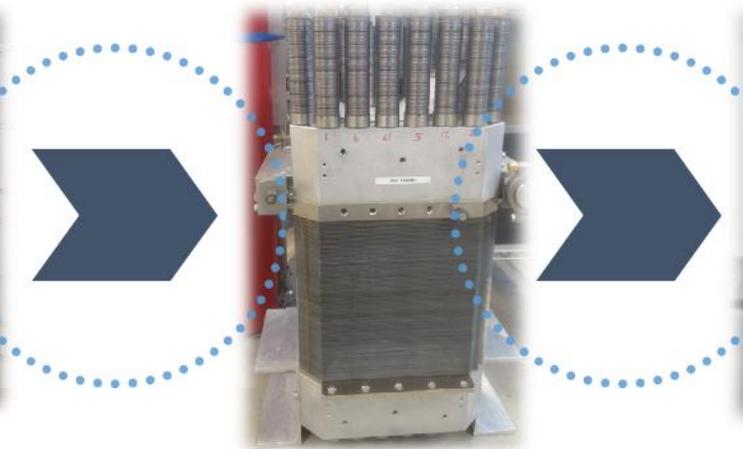
# Our electrochemical device can bolt onto any existing source of industrial CO<sub>2</sub> emissions

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1. CO<sub>2</sub> + INPUTS

2. OPUS 12 REACTOR

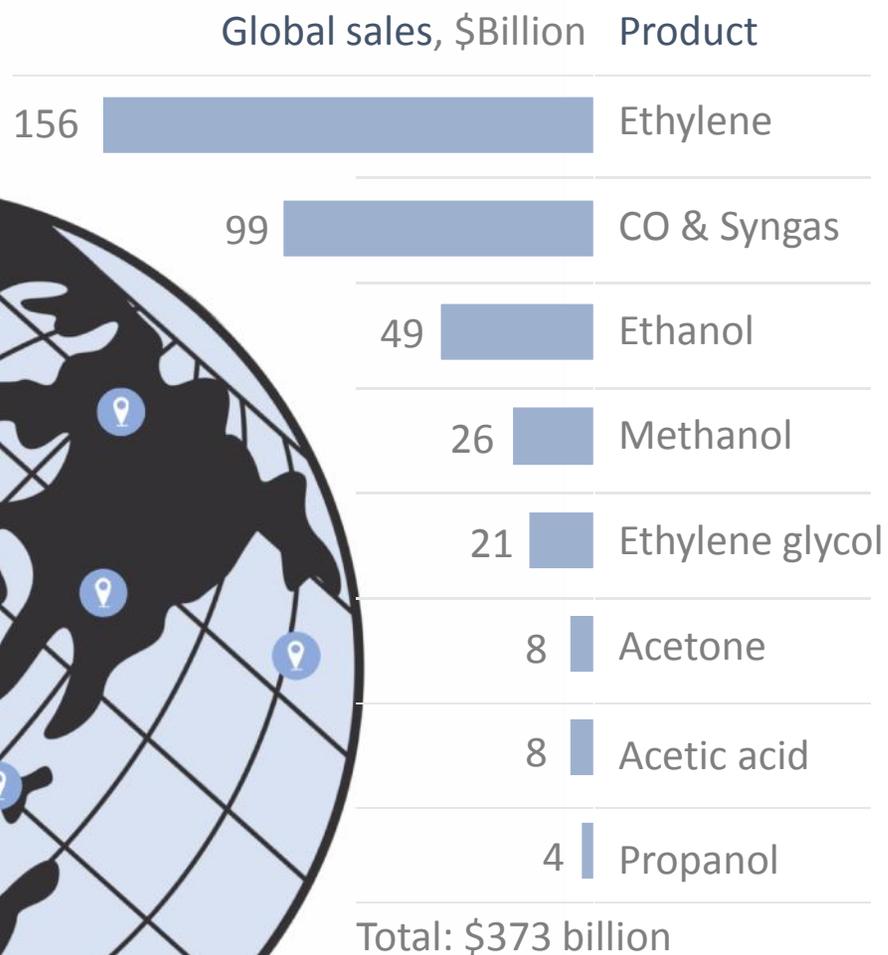
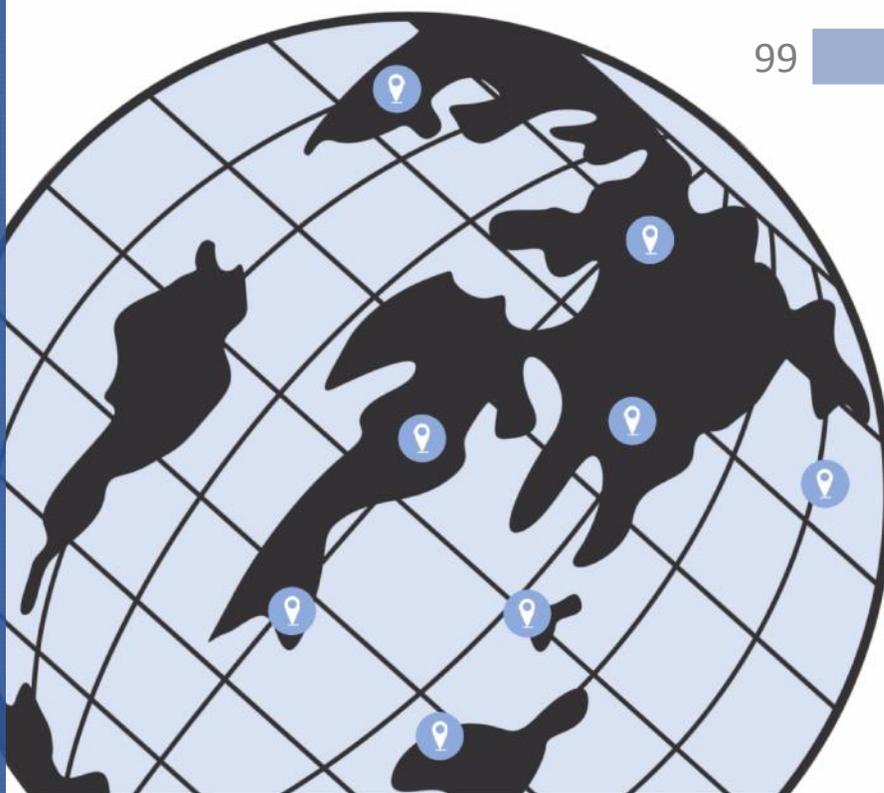
3. CHEMICALS AND FUELS



# ECO2R: a \$400 billion global market

The global market for our technology is huge and diversified: nearly \$400 billion and growing at over 4% per year

Our team has demonstrated the electrochemical conversion of CO<sub>2</sub> into 16 different products; the top eight are some of the world's highest-volume chemicals



**Team:** We combine cutting-edge scientific expertise in the field of CO<sub>2</sub> electroreduction, commercial experience in scaling electrochemical technologies, previous successful startup experience, and an understanding of the global energy system. Our scientific advisors are world leaders in their fields.

**Team:** 25 years of ECO2R research, previous startups



**Nicholas Flanders, Co-founder & CEO**  
MBA/MS E-IPER, Stanford  
*Work Experience:* COO/CFO Levo (\$20M+),  
McKinsey CleanTech practice



**Dr. Kendra Kuhl, Co-founder & CTO**  
PhD in Chemistry, Stanford, Post doc, SLAC  
*Research:* Transition metal catalyzed CO<sub>2</sub>  
electroreduction.



**Dr. Etosha Cave, Co-founder & CSO**  
PhD in Mechanical Eng, Stanford  
*Research:* Modified gold catalysts for CO<sub>2</sub>  
electroreduction.



**Dr. Sasha Gorer, Principal Scientist**  
PhD in Electrochemical Eng. Weizmann I.S.,  
20 years electrochemical scale-up experience



**Advisors:** leaders in their fields

Catalyst  
engineering

Prof. Thomas  
Jaramillo,  
Stanford



Reactor  
design

Prof. John  
Newman,  
LBL



Polymer  
development

Prof. Nate  
Lynd,  
University of  
Texas



Device  
scale-up

Kathy Ayers,  
Proton Onsite



# Current status: scaling up at world-leading energy engineering facilities

We are developing our technology at the world-class Lawrence Berkeley National Lab; we are working toward a commercial pilot



- We were selected as part of the first cohort at Cyclotron Road, a new clean energy accelerator at Lawrence Berkeley National Lab
- The CR program gives us access to free lab space and equipment to develop our technology, and enables us to collaborate with the best energy researchers in the world



We have raised non-dilutive grant funding from DOE, NSF and Stanford, which we have used to de-risk the technology and develop our high-performance prototype



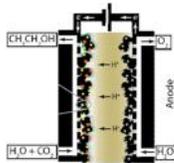
We will use industrial-grade reactor systems from a leading systems provider for CO<sub>2</sub> electroreduction in our commercial pilot

Winner, 2015 Department of Energy  
Transformational Idea Award

Winner, 2015 Fortune Cool Companies  
Competition

# OPUS<sup>12</sup>

## Product



- $\text{CO}_2$  + water + electricity  $\rightarrow$  fuels and chemicals
- Cost-competitive with conventional products
- Record-setting technology + scalable design

## Market

- \$400 billion globally; \$40 billion for U.S. beachhead
- Customer interest across all target markets

## Next steps

- On-site pilot plant in 2017
- World class team dedicated to product scale-up

Nicholas Flanders, Co-founder & CEO | [Nicholas@OPUS-12.com](mailto:Nicholas@OPUS-12.com) | 917-349-3740