

# global thermostat

*a carbon negative solution*



## Presentation to China Environment Exchange

Global Thermostat Pilot Plant Private Unveiling, October 1, 2010 SRI International

# Global Thermostat Technology



## Closes the Human Carbon Cycle

Co-generation approach removes CO<sub>2</sub> from the atmosphere. **Makes energy production**

## Carbon Negative

CO<sub>2</sub> used for Enhanced Oil Recovery, Algae-based biofuels, CO<sub>2</sub> based Geothermal Electricity, Plastics, Cement



## Enabling us to

Accelerate transition to renewable energy

Address global energy needs, economic and environmental challenges cost effectively and safely

# The Need for Negative Carbon

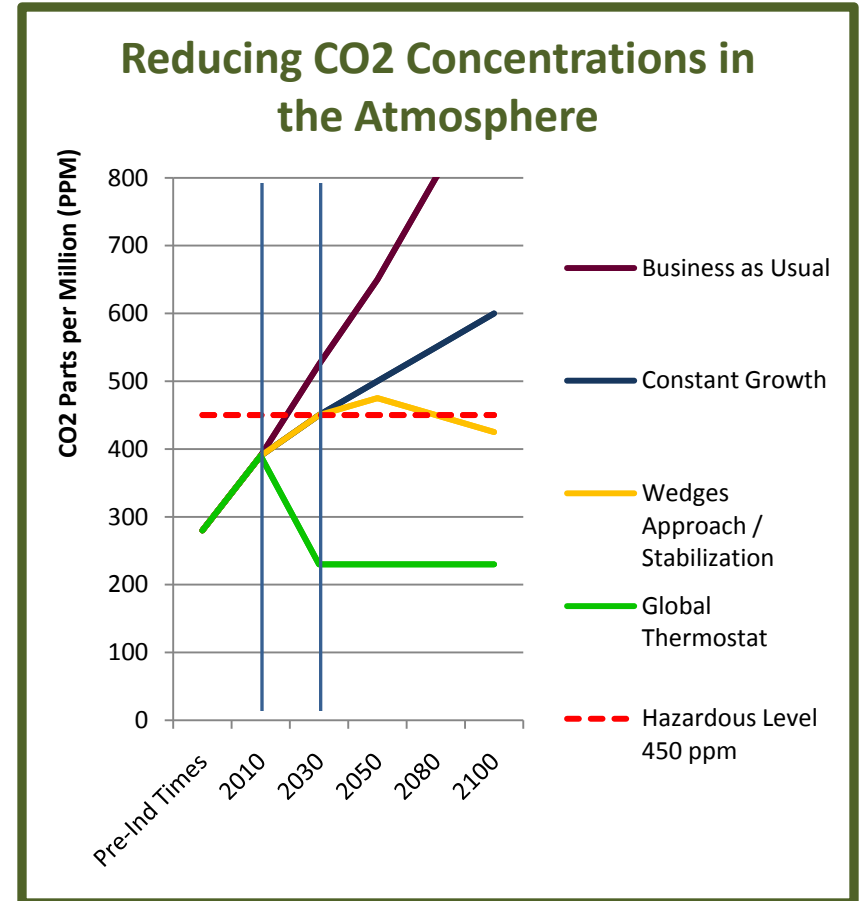
## Carbon *Neutral* is not enough

- Neutralizing emissions will not prevent further increases in atmospheric CO2
- Even the most aggressive efficiency improvements and renewables adoption are unlikely to keep CO2 concentration at the generally agreed 450ppm to avoid catastrophic climate risk

## Negative Carbon is the solution<sup>1</sup>

- Air capture enables direct and rapid reduction of CO2 concentration
- GT allows for the capture of even more CO2 than we are loading into the atmosphere or that the earth's systems can absorb – Negative Carbon

<sup>1</sup> United Nations Headquarters, New York, November 12, 2009. Presentation by G. Chichilnisky on "[The Rising Tide at Copenhagen: A Win-Win Solution for Industrialized and Developing Nations](#)"



**GT's technology directly reduces carbon concentration in the air, making *carbon negative* possible**

# Why Negative Carbon?

## Needed

To contain rising levels of atmospheric carbon

- We procrastinated too long –IPCC, Chichilnisky-Cohen-Eisenberger 2009

## Needed

To provide clean energy in Africa, Latin America and Small Island States

- Using carbon market of Kyoto Protocol and its CDM – not possible without negative carbon

## Needed

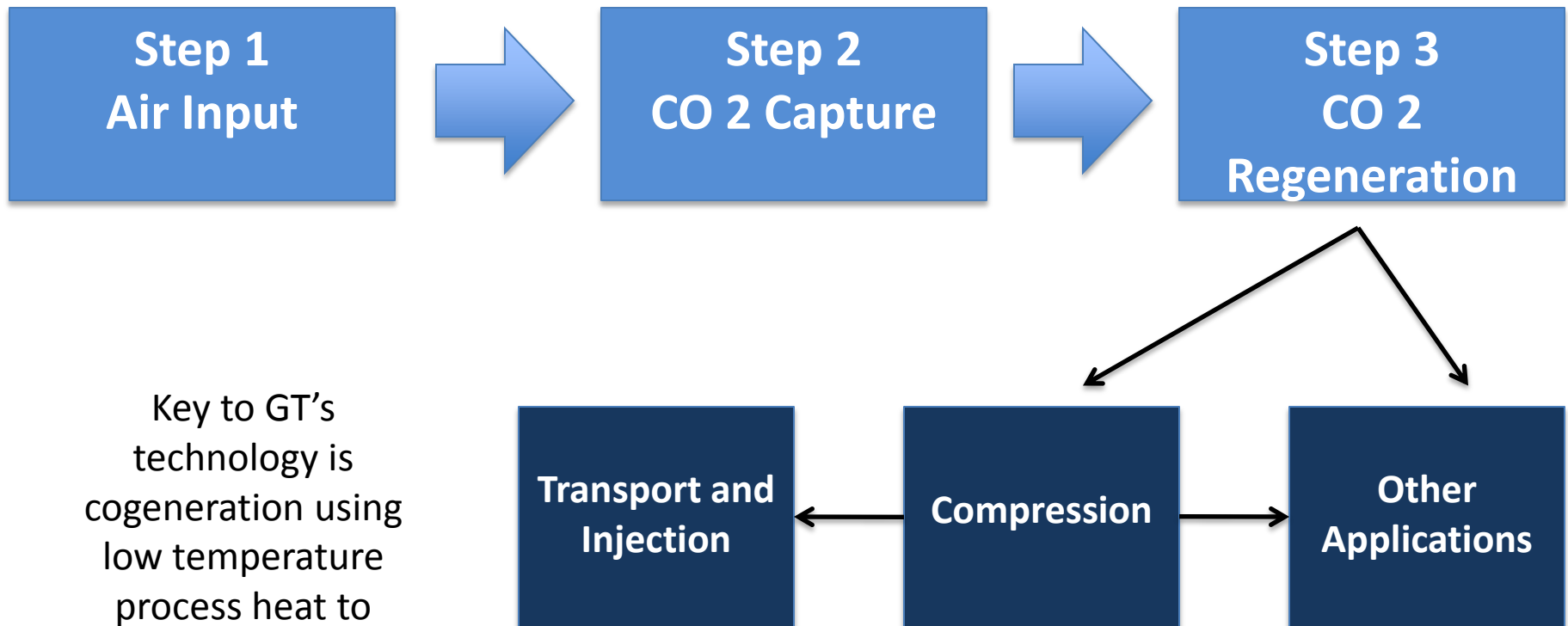
To resolve the global divide which is the cause of environmental havoc

- The Future of our Species – our Common Future

# GT's Air Capture Solution

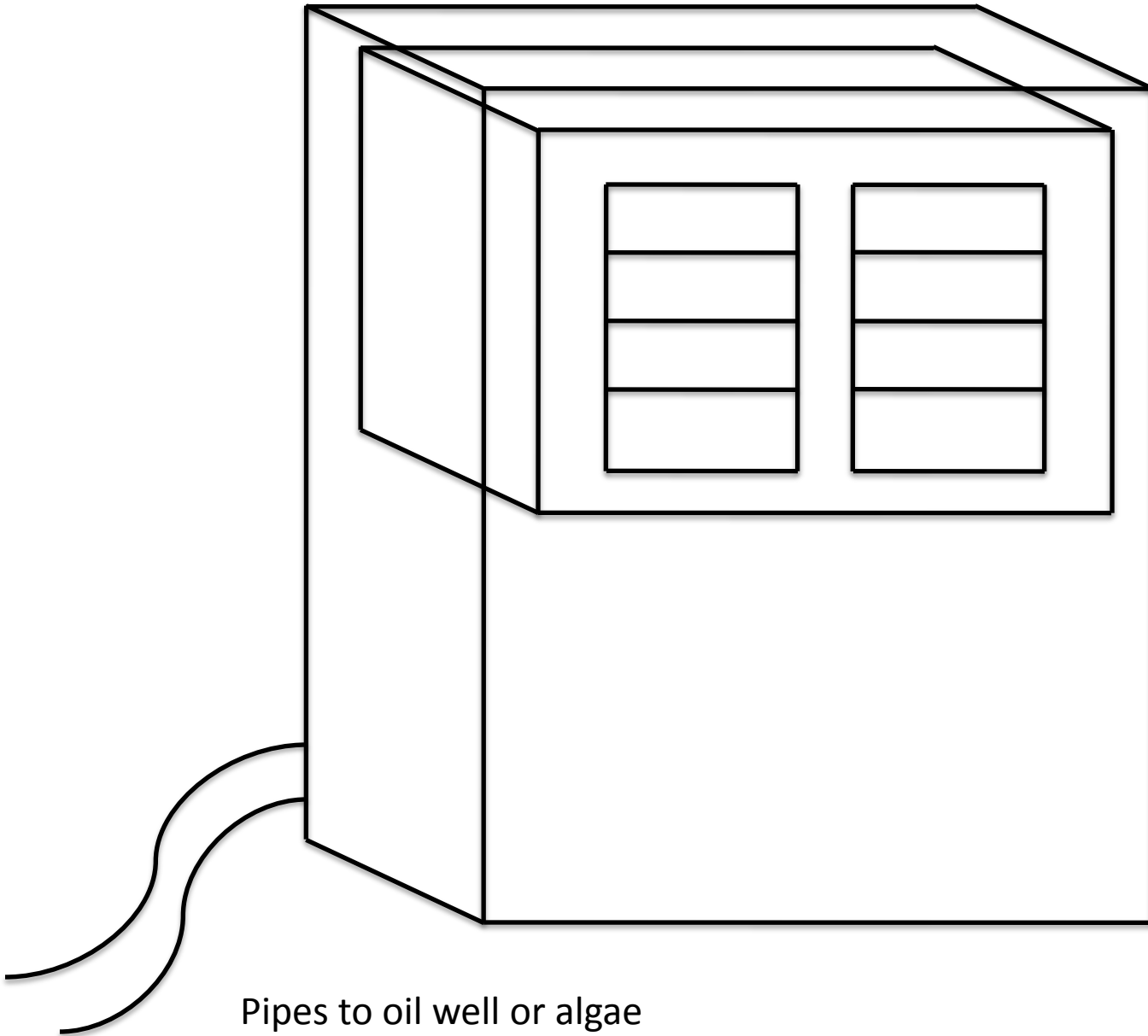
---

## Three-Step Process Produces Concentrated CO<sub>2</sub> Stream



Key to GT's technology is cogeneration using low temperature process heat to capture CO<sub>2</sub>

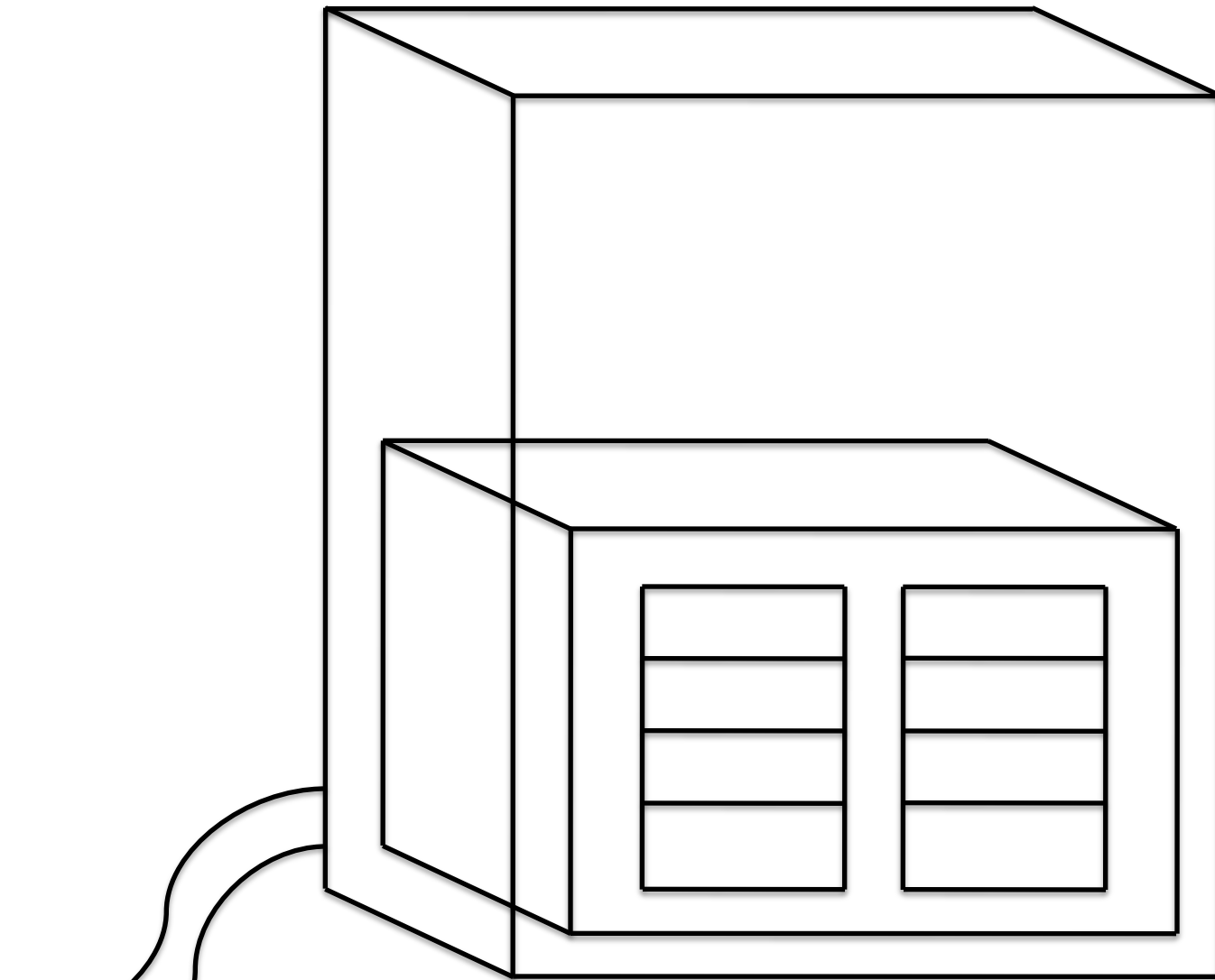
Subsequent steps are shared by all CO<sub>2</sub> capture methods though pipelining costs can be reduced by co-locating where CO<sub>2</sub> is stored or used



**UP**



Absorbing CO<sup>2</sup>



**DOWN**



Releasing CO<sup>2</sup>

Pipes to oil well or algae ponds

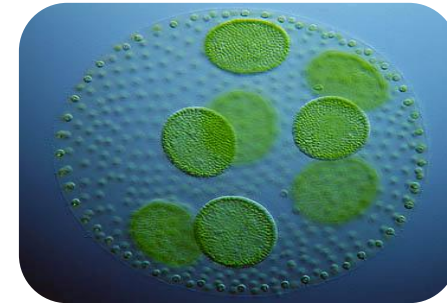
# Applications & Markets for Captured CO2



**Storage**



**Enhanced Oil Recovery\***



**Algae-Based Biofuels\***



**Hydrogen-Based Fuels**



**Products** cement,  
fertilizer, plastics,  
greenhouses

**\*EOR and Algae-based biofuels represent most significant opportunities for commercial applications of CO2 captured using GT's technology**



# Unique Advantages of GT's Technology

---



Measurable advantages over other forms of carbon capture

## Low-Cost Provider

- Powered by low cost & widely available process heat

## Scalable Design

- Modular design adapts to different sized applications



## Carbon Negative Solution

- An energy or industrial plant can capture even more CO<sub>2</sub> than is emitted – a carbon negative solution

## Flexible Integration

- Fossil, renewable, nuclear plants, industrial plants, (cement, steel) – anywhere heat is available

# GT Pilot at SRI - October 1, 2010



# Strategic Partners

---

 **BASF**

The Chemical Company



**CORNING**



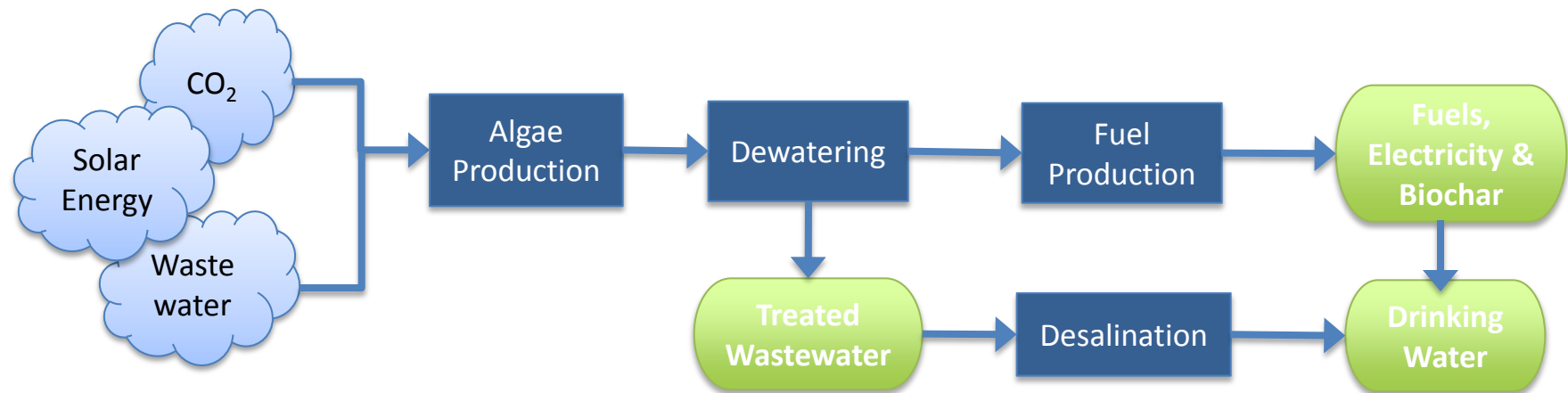
**SUMMIT POWER**

 **Nexant**

# Project with Algae Systems

GT is developing fully-integrated biorefinery in partnership with Algae Systems

- Produces *carbon negative* transportation fuels (gasoline diesel)
- Treats municipal wastewater and produces drinking water
- Generates green electricity and biochar fertilizers



Provides critical municipal services while producing energy

***As Green As It Gets***

# Company Overview

---

- Founded in 2006
- Technology captures more CO<sub>2</sub> than is emitted by fossil power plants
- **Low-cost and flexible location. Uses process heat. Cogenerates power and CO<sub>2</sub> capture**
- Patents filed globally. Licenses and shares revenue from selling CO<sub>2</sub> and biofuels, cement, clean water, plastics
- Team of leading energy scientists, proven entrepreneurs, highly respected investors. Extended team of **leading global corporations**
- Live Pilot at SRI October 1, 2010
- Commercial Plant with Summit Power's IGCC Plant in Texas (recent DOE award of \$350mm)

# Management Team

---

- **Graciela Chichilnisky, Founding Director**
  - Author Kyoto Protocol carbon market
  - Professor Columbia University; PhDs in Mathematics and Economics **MIT, UC Berkeley and Harvard**
  - Founder and CEO, FITEL & Cross Border Exchange
- **Peter Eisenberger, Founding Director**
  - Lead R&D globally at Exxon & Bell Labs
  - Former Vice Provost & Professor, Columbia University;
  - Director, Princeton University Materials Institute
  - PhD Applied Physics, Harvard University
- **Edgar Bronfman, Jr., Chairman**
  - Lead investor
  - Chairman & CEO, Warner Music Group