Climate Change: Science and Beyond

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What We’ll Talk About:

- How We Got Where We Are Today
- Climate Change Fundamentals
- How Do We Leverage Change? An Individual & Community Guide
Remember: We Have Inherited the Earth
Let’s Look at Some Climate Fundamentals

**WEATHER**
- Short-term
- Individual storms and events, e.g. today’s weather, Hurricane Sandy, the drought of 2011

**CLIMATE**
- Long-term
- Weather averaged over a longer period of time
- Decadal trends

“Climate tells you which clothes to buy; Weather tells you which clothes to wear”. 
How Does Energy Get Distributed?

- 6% scattered from atmosphere
- 19% absorbed by atmosphere & clouds
- 20% scattered and reflected by clouds
- 51% absorbed by surface
- 4% reflected by surface
How Does Energy Get Distributed?
### Global Warming Is Not a New Idea

<table>
<thead>
<tr>
<th>Author</th>
<th>Statement</th>
<th>CO₂ PPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyndall (1869)</td>
<td>Earth’s climate can be altered through variations in a few trace gases like CO₂ and water vapor</td>
<td>261 ppm</td>
</tr>
<tr>
<td>Arrhenius (1896)</td>
<td>“birth” of modern climate science by showing saturation band of CO₂ expands with increasing atmospheric CO₂ concentration</td>
<td>295 ppm</td>
</tr>
<tr>
<td>Callendar (1938)</td>
<td>Human activity is causing atmospheric CO₂ to rise</td>
<td>311 ppm</td>
</tr>
<tr>
<td>Keeling (1970)</td>
<td>If specialists assert that accelerated use of fossil fuels is harmful, what will we do?</td>
<td>325 ppm</td>
</tr>
<tr>
<td>Shaw (1980)</td>
<td>Document shares predictions on atmospheric CO₂ and changing climate in internal ExxonMobil document (which btw is pretty spot on)</td>
<td>339 ppm</td>
</tr>
</tbody>
</table>

[Source](http://cdn.exxonmobil.com/-/media/global/files/climate/02_technological-forecast-on-co2-greenhouse-effect-1980.pdf)
Climate Change: Beyond “natural” cyclicity

Current CO₂ in the atmosphere

The Ice Age Cycle

Figure from the National Academy of Sciences

Predictions captured by Shaw and others from the late 1970s/early 1980s show the predicted impact of CO$_2$ on global mean temperature.
But wait...what about “global cooling” in the 1970s?

Not actually that popular of a theory

Partially based on the anthropogenic release of aerosols into the atmosphere
It’s not just climate change…

It is predicted that there will be more plastic in the ocean than fish by 2050

Nitrogen and phosphorus pollution creates “dead zones” in oceans and estuaries

The Sixth Mass Extinction is currently underway

(http://www.cbf.org/about-the-bay/issues/dead-zones/nitrogen-phosphorus)
(http://advances.sciencemag.org/content/1/5/e1400253.short)
Individual Choices: Do They Matter?

The Myth of Inevitability

Photo From National Geographic
Individual Choices: Do They Matter?

The Myth of Insufficiency

- A drop in the bucket is a drop in the bucket - and all those drops add up.

- A sense of lack cultivates anxiety and consumption.
Collective Choices Matter, Too
Create Space for Awareness

- Are you aware of global issues?
- Are you aware of community issues?
- Are you aware of your own actions? Your internal motivations? Your values?

Awareness creates space for right action.
Things we can do

- Support local climate action plans
- Support the Clean Power Plan and other strategies for reducing emissions
- Educate yourself & others
- There is strength in numbers
- Look and listen for opportunities