BENDING THE CURVE

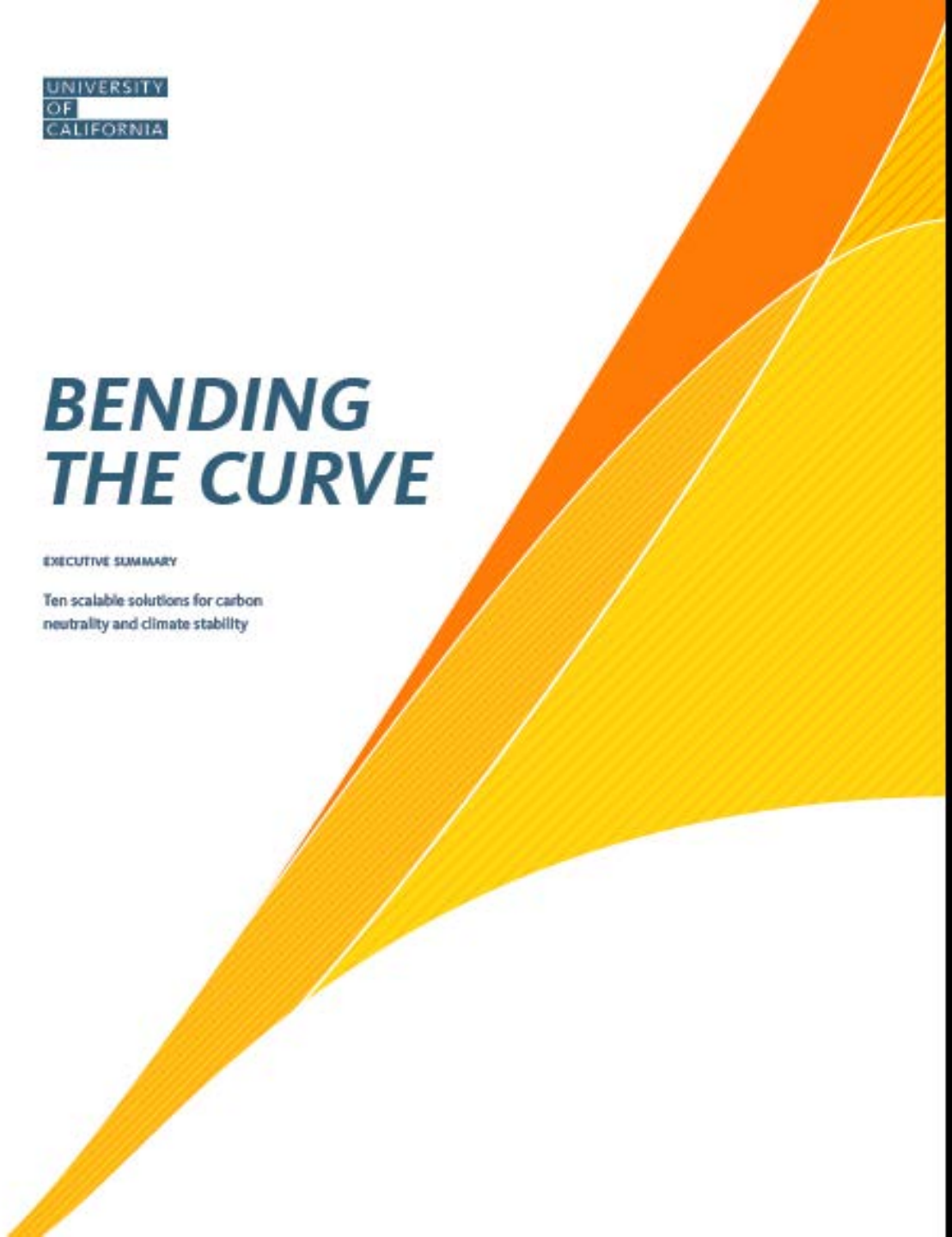
10

Solutions From The University Of California

Unveiled At The University of California Carbon Neutrality & Climate Stability Summit

Veerabhadran (Ram) Ramanathan
Chair of the Report

October 27, 2015
Scripps Forum, La Jolla



<u>Great Team Work</u>:

- ***UC-OP***
- ***All 10 Campuses & 3 DOE Labs***
- ***Governor's Office***
- ***The UC-50 Climate Solutions Group***

The UC-50 Climate Solutions Group

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CHAPTERS WRITTEN BY 50 AUTHORS FROM THE 10 CAMPUSES, CARB AND 2 DOE LABS

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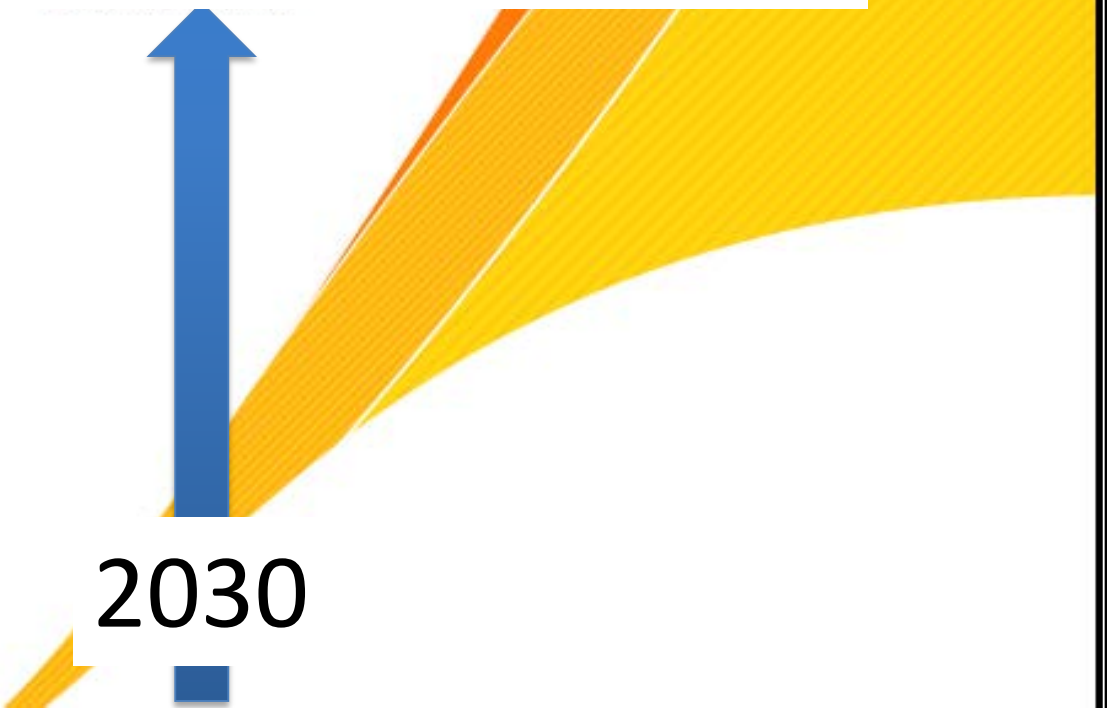
UNIVERSITY OF CALIFORNIA

BENDING THE CURVE

3 TRILLION TONS CO2 BY 2030



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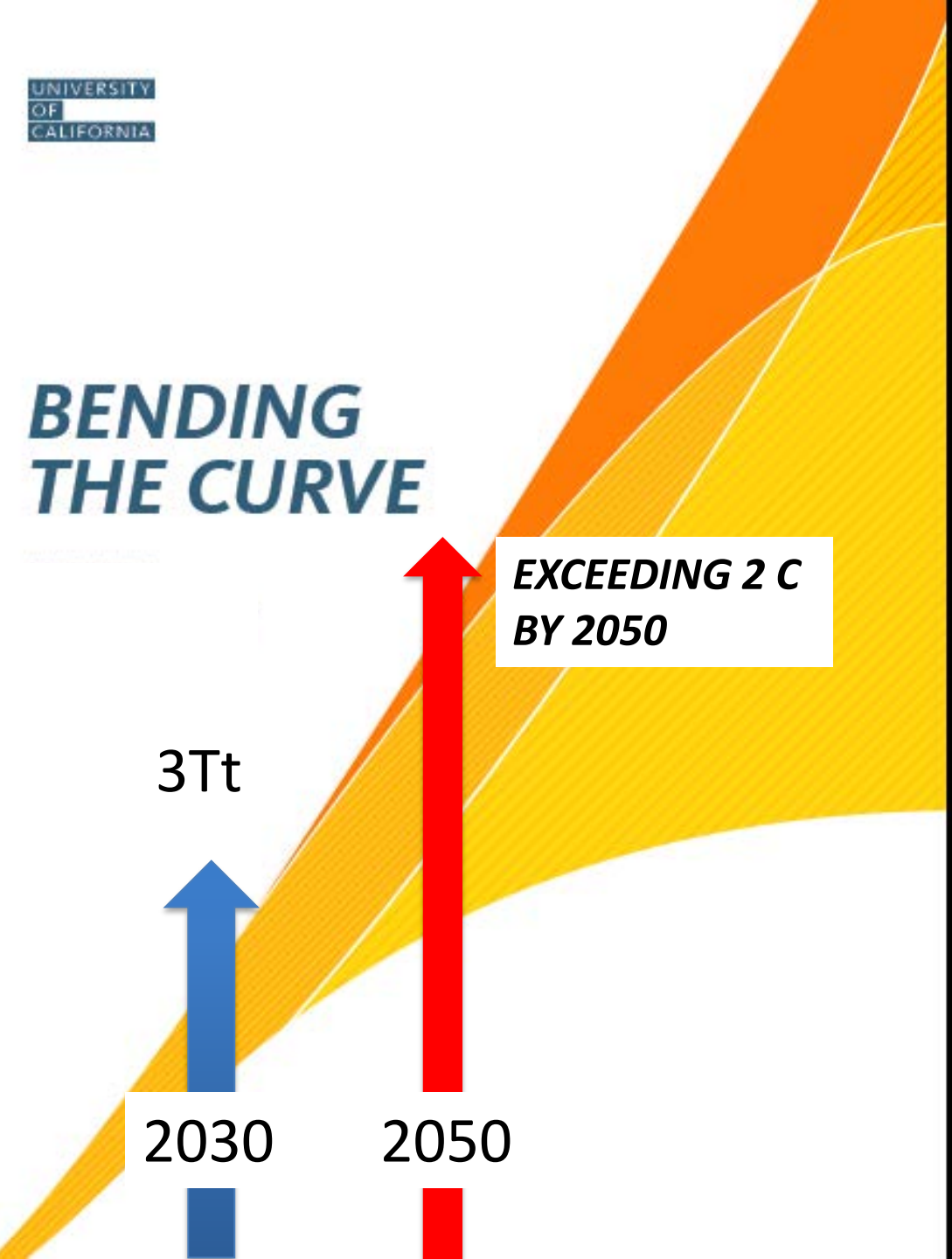
BENDING THE CURVE



NEED TO WORRY ABOUT TWO TIME SCALES:

- ***NOW TO 2030***
- ***2030 TO 2050***

"We are the University of California, and there is no reason that UC can't lead the world in this quest, as it has in so many others."

President Janet Napolitano
University of California
2013

Statement issued during the announcement of the Carbon Neutrality Initiative of the University of California

UC AS LIVING LABORATORY FOR BENDING THE CURVE

Buildings: 34% Of CO2

Internet Of Things Reduced Peak Demand By 30%

Food Waste: Third Largest CO2 Emitter

Largest Anaerobic Digester- Us Campus 12 Mwh/Day; Diverts 20kt/Yr Of Waste.

UC AS LIVING LABORATORY FOR BENDING THE CURVE

Transportation

Largest CO2 growth

- Hydrogen Fuel Cell,
- Bio-Hydrogen
- From sewer waste

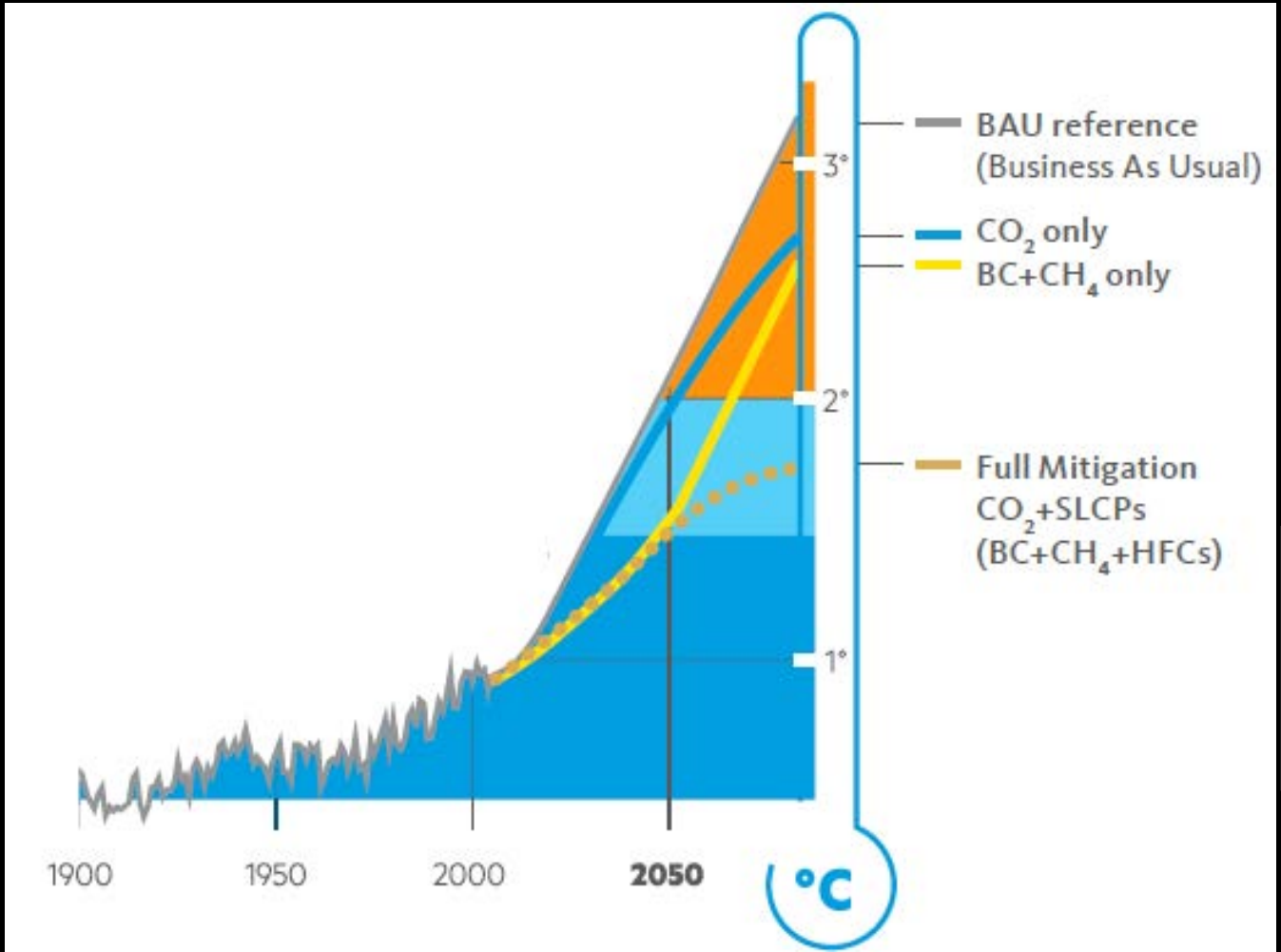
Power:

Largest CO2 Source

- 2.8 MW Biogas Fuel Cell;
- 5 MWH Storage;
- 40 kW PV;
- 1.2 mgal Thermal Storage,

SCIENCE SOLUTIONS

1. ***Bend The Warming Curve Immediately By Reducing Short-lived Climate Pollutants & Sustainably By Replacing Fossil-fueled Energy Systems With Carbon Neutral Technologies***



Source Of Graphics Climate & Clean Air Coalition, UNEP

SOCIETAL TRANSFORMATION SOLUTIONS

2. ***Foster A Global Culture Of Climate Action Through Communication And Education; Develop innovative approaches to change social attitudes and behavior.***

3. ***Deepen The Global Culture Of Climate Collaboration:***

stakeholders, community, and religious leaders with researchers to initiate collaborative actions to mitigate climate disruption

 # 2 And # 3 Address Intra & Inter Generational Equity

GOVERNANCE SOLUTION

4. ***Scale Up Subnational Models Of Governance And Collaboration Around The World To Energize National And International Action.***

Use the California example [Under 2MoU] to help other state and city level jurisdictions become living laboratories.

MARKET AND REGULATIONS BASED SOLUTIONS

5. ***Adopt Market-Based Instruments to Create efficient Incentives for firms and individuals to reduce carbon emissions.***

Cap & Trade And Carbon Pricing

6. ***Target direct regulatory measures—such as rebates and efficiency and renewable energy portfolio standards—narrowly at high emissions sectors not covered by market-based policies.***

TERMINATE SUBSIDIES THAT ENCOURAGE EMISSION-INTENSIVE ACTIVITIES.

TECHNOLOGY BASED SOLUTIONS

7. ***Promote immediate widespread use of mature technologies.***

[photovoltaics, wind turbines, battery and hydrogen fuel cell electric light-duty vehicles; efficient end-use devices]

FOR 40% CARBON REDUCTION BY 2030

TECHNOLOGY BASED SOLUTIONS

8. ***Aggressively Innovate For Complete Electrification Of Energy & Transportation Systems And Improve Building Efficiency.***

[distributed micro-scale grids; new energy storage technologies; heat pumps; fuel cells]

REQUIRED FOR 80% REDUCTION BY 2050

TECHNOLOGY BASED SOLUTIONS

9. ***Immediately make maximum use of available technologies & regulations to reduce methane emissions by 50%, black carbon emissions by 90 % & Phase out hydrofluorocarbons***

CAN BEND THAT CURVE BY 0.6C BY 2050

NATURAL AND MANAGED ECOSYSTEM SOLUTIONS

10. ***Regenerate damaged natural ecosystems and restore soil organic carbon. Implement food waste reduction programs & energy recovery systems***

7 BILLION TONS OF CARBON POLLUTION MITIGATION

Message from the Vatican
Oct 26, 2015

I have quickly read through your ten solutions which not only recall God's Ten Commandments but are also very appropriate. The PAS and I fully support you and we are going to organize the event in Paris.

Mgr MARCELO SANCHEZ SORONDO
Chancellor of the Pontifical Academy of Sciences and Pontifical Academy of Social Sciences

"We must combine rigor and imagination to confront climate change: the rigor of scientific facts with the imagination to perceive what is now unseen – the dangers that lie ahead if we do not act."

Honorable Edmund G. Brown, Jr.
Governor of California
September 25, 2015

Thank You: UCOP, The Ten-campus+2 DOE Labs UC System & State Of CA, For The Great Carbon Neutrality Journey

YOU ARE A BEACON FOR THE WORLD

The UC Slogan for COP-21

BEND THAT CURVE