PANEL 2

Paddling Together to Accelerate Action for Adaptation to Sea Level Rise
• We know SLR is accelerating
• = 65cm (2.1ft) by 2100
• In line with models that do not account for rapid melting.
This means the lowest 2 scenarios are obsolete.

Leaving 1m (3.3 ft)

...1.5m (4.9 ft), 2m (6.6 ft), and 2.5m (8.2 ft) for planning.

Sea Level Floods Communities in 2 Styles

#1. Long term GMSLR
- Permanent, accelerating inundation
- Arrives decades earlier than GMSL
- Has already started
- Accelerating frequency and magnitude

#2. Temporary high tide flooding
- Arrives decades earlier than GMSL
- Has already started
- Accelerating frequency and magnitude
Greenland is Exponentially Melting

Melting 50% more than pre-industrial

33% more than 20th century

Trusel, et al., 2018 Nonlinear rise in Greenland runoff in response to post-industrial Arctic warming, 104, Nature, v564, 6 December; https://doi.org/10.1038/s41586-018-0752-4
Antarctic Ice Melt has ‘Tripled Over the Past Five Years’


https://climate.nasa.gov
Carbon Dioxide Emissions Have Risen 3 yrs in a Row

http://www.globalcarbonproject.org
Emissions Follow World GDP, +130% by 2050


• Energy demand set to grow >25% by 2040
• Renewables make up only two-thirds of new capacity
• Oil consumption grows due to rising demand for petrochemicals, trucking, aviation, energy (India, China, other developing nations)
• CO₂ emissions increase to mid-century

https://www.iea.org/weo/
U.S. Energy Information Administration
Energy Consumption increases to 2040 for all fuels but coal

Market share roughly unchanged

https://www.eia.gov/outlooks/ieo/exec_summ.php
Global Warming is Accelerating

- Emissions rising
- Emissions cleaner
- Decreased ocean circulation
- Pacific shifting to + IPO

Oceans 40% warmer than previously thought

- 1.5°C by 2030
- 2.0°C by 2045

Xu, Y. et al. (2018) Global warming will happen faster than we think, Nature, v. 564, Dec. 6
We have built too close to eroding and flood-prone shorelines.  

...leaving our communities vulnerable, and damaging coastal environments.
Figure 62. Projected chronic flooding of Honoapi'ilani Highway in the SLR-XA (red) with 1.1 feet (top) and 3.2 feet (bottom) of sea level rise road flood in Olowalu, Maui.
Figure 63. Kahului Harbor and Kahului Airport in the SLR-XA with 3.2 feet of sea level rise on Maui
Hawaiian Home Lands & Cultural Sites

Figure 64. Potential chronic flooding of Ke‘anane and Wailua Hawaiian Home Lands on Maui (pink) and cultural resources (red) in the SLR-XA (blue) with 3.2 feet of sea level rise.
Figure 65. Potential chronic flooding of Hoʻokipa Beach Park in the SLR-XA with 3.2 feet of sea level rise along Maliko Bay, Maui
Wildlife Sanctuary

Figure 66. Kanahā Pond State Wildlife Sanctuary in the SLR-XA with 3.2 feet of sea level rise in Kahului, Maui
On-site Sewage Disposal Systems

Figure 67. On-site sewage disposal systems flooded in the SLR-XA with 3.2 feet of sea level rise along Mā’alaea, Maui
Comparison of Potential Chronic Flooding with 3.2 & 5 Feet of SLR

29% increase in flooding compared to SLR-XA @ 3.2 ft
• Parcel based
• Property/structures
• Aggregated into one hectare grids

Figure 61. Potential economic loss in the SLR-XA with 1.1 feet (top) and 3.2 feet (bottom) of sea level rise in Lāhainā, Maui
"Maybe it isn't going to be so bad."