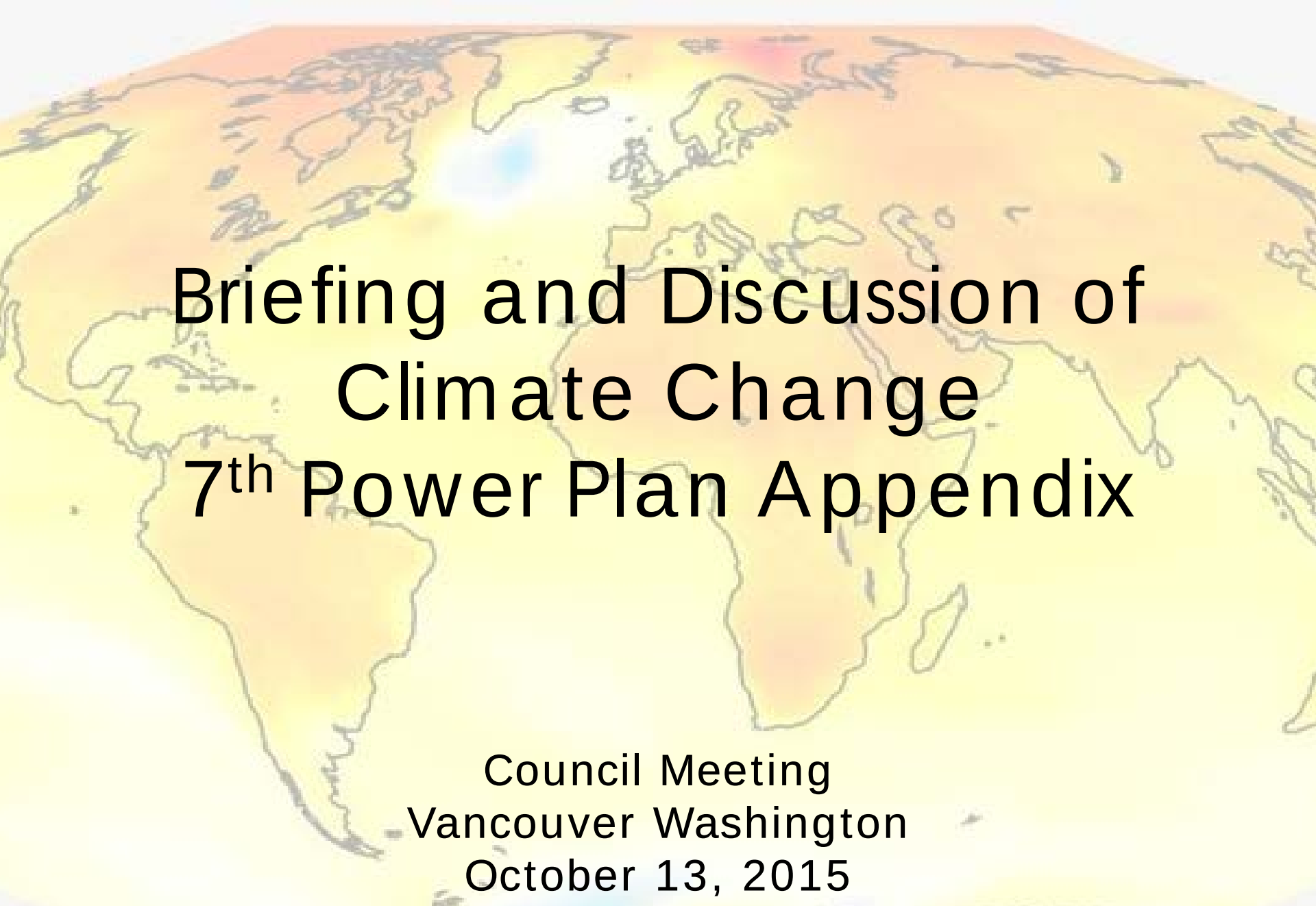


Briefing and Discussion of Climate Change 7th Power Plan Appendix

Council Meeting
Vancouver Washington
October 13, 2015

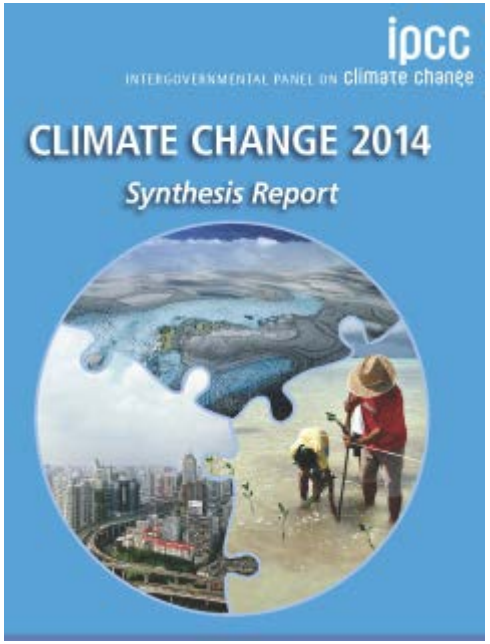
Outline

- Key Findings
- Climate change data and analysis flowchart
- Methodology
- 2026 and 2035 cases analyzed
- RPM Resource Builds
- Adequacy and when resources are needed to offset climate change
- Summary of L/R balance changes

Key Findings
(Climate Change Impacts)

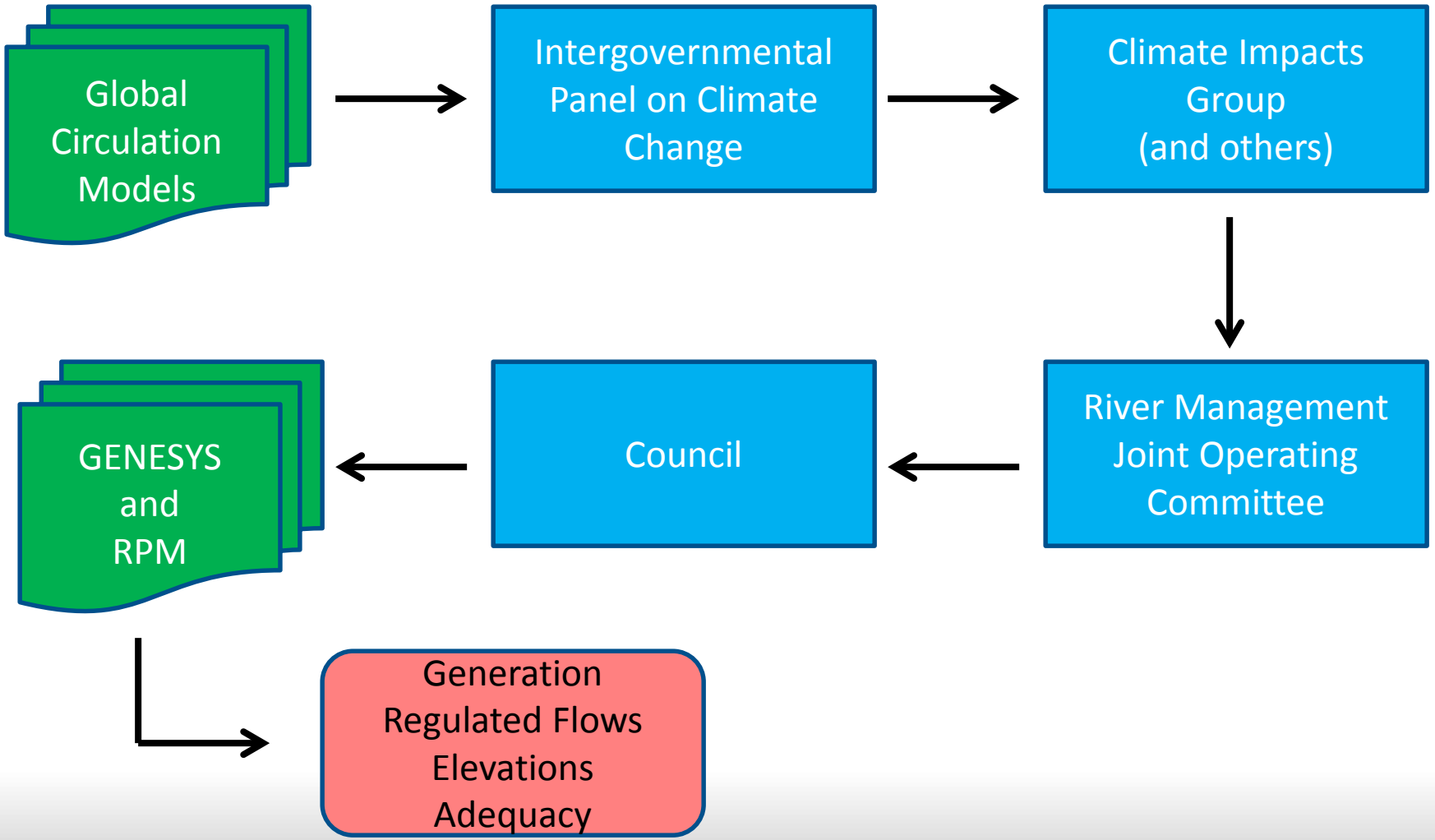
1. Load
   - Lower in winter
   - Higher in summer
2. River Flows
   - Higher in winter
   - Lower in summer
3. Resource Acquisitions to offset climate change
   - 2016 to 2026: None
   - 2026 to 2035: Only when load > medium forecast
4. 2016-2021 Resource Strategy: No Change
5. Add Action Item: Continue to participate in climate change research

Intergovernmental Panel on Climate Change 2014 Assessment Report



- Completed in November 2014
- Compilation of dozens of Global Circulation Model studies
- Temperature increase projections somewhat lower than the AR4 report
- Need downscaled temperature changes and climate adjusted natural flows
- Downscaled data not available until 2017

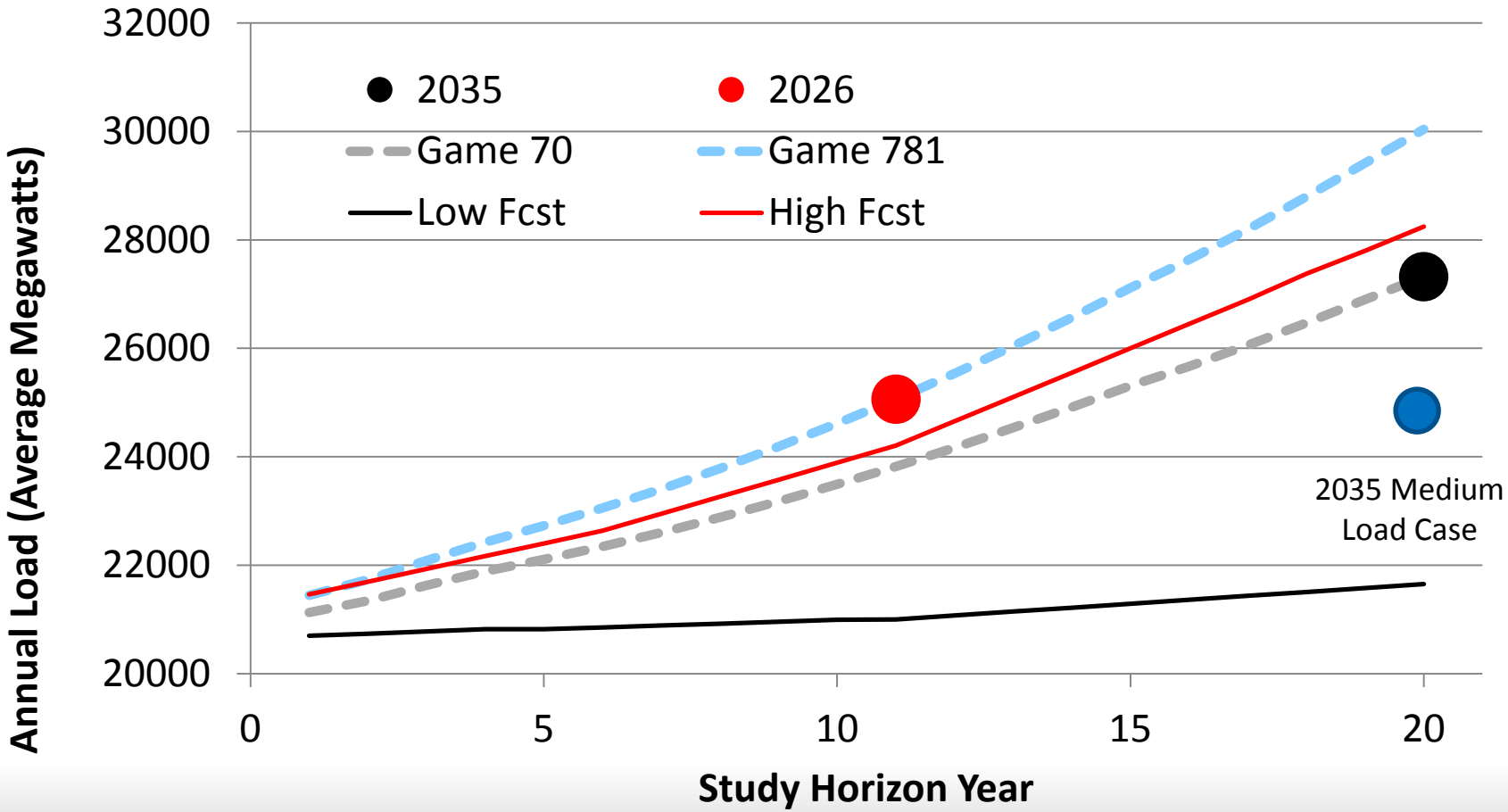
Climate Change Analysis Flowchart



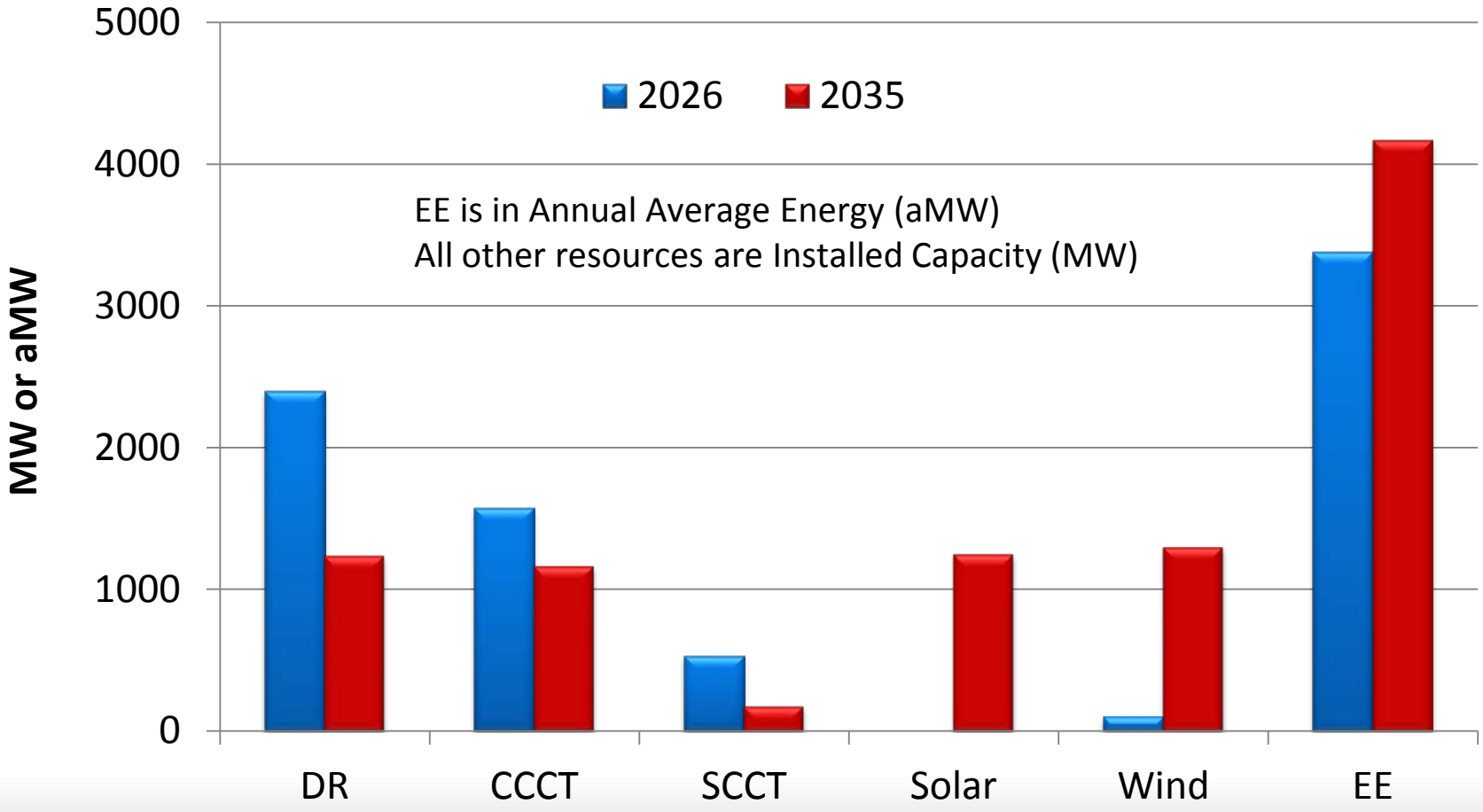
Methodology

- Take resource builds for 2026 and 2035 from various RPM futures
- Use RPM loads and resources in GENESYS to assess adequacy
- Apply climate induced changes to loads and unregulated flows
- Reassess adequacy for 2026 and 2035 under various load conditions

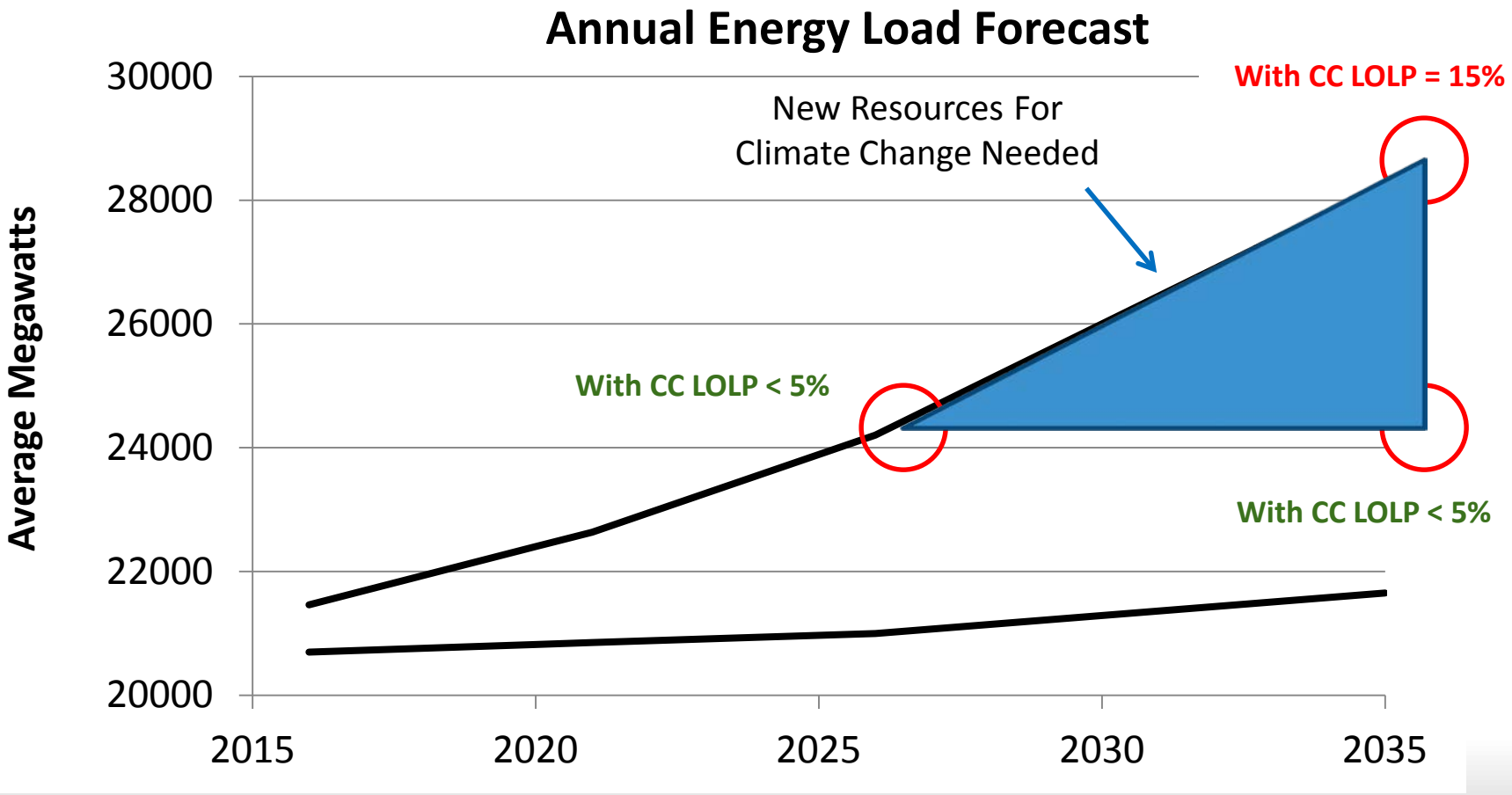
2026 and 2035 Cases Analyzed



RPM Resource Builds



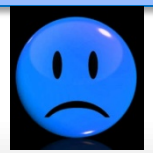
Adequacy and when Resources are Needed to Offset Climate Change



Climate Induced ENERGY L/R Balance Changes (aMW)

	2026 High Load Case		2035 High Load Case	
	Winter	Summer	Winter	Summer
Hydro Generation	700	-125	1,500	-140
Load	-20	400	-40	750
Resource - Load	**720**	**-525**	**1,540**	**-890**

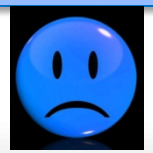


Climate Induced CAPACITY L/R Balance Changes (MW)

	2026 High Load Case		2035 High Load Case	
	Winter	Summer	Winter	Summer
Hydro Generation	700	-100	1,500	-100
Load	-50	1,300	-80	2,300
Resource - Load	**750**	**-1,400**	**1,580**	**-2,400**

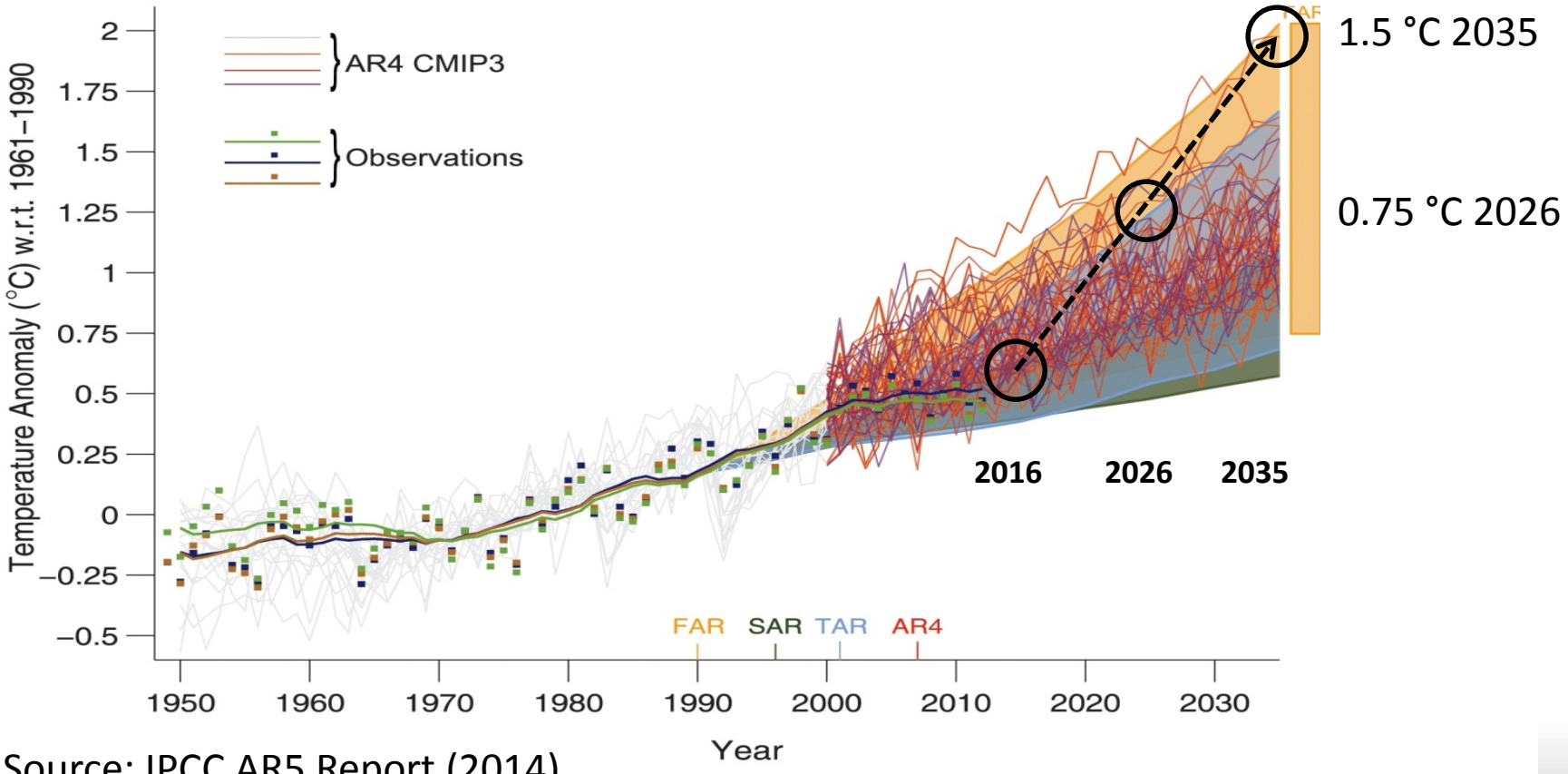


Additional Slides

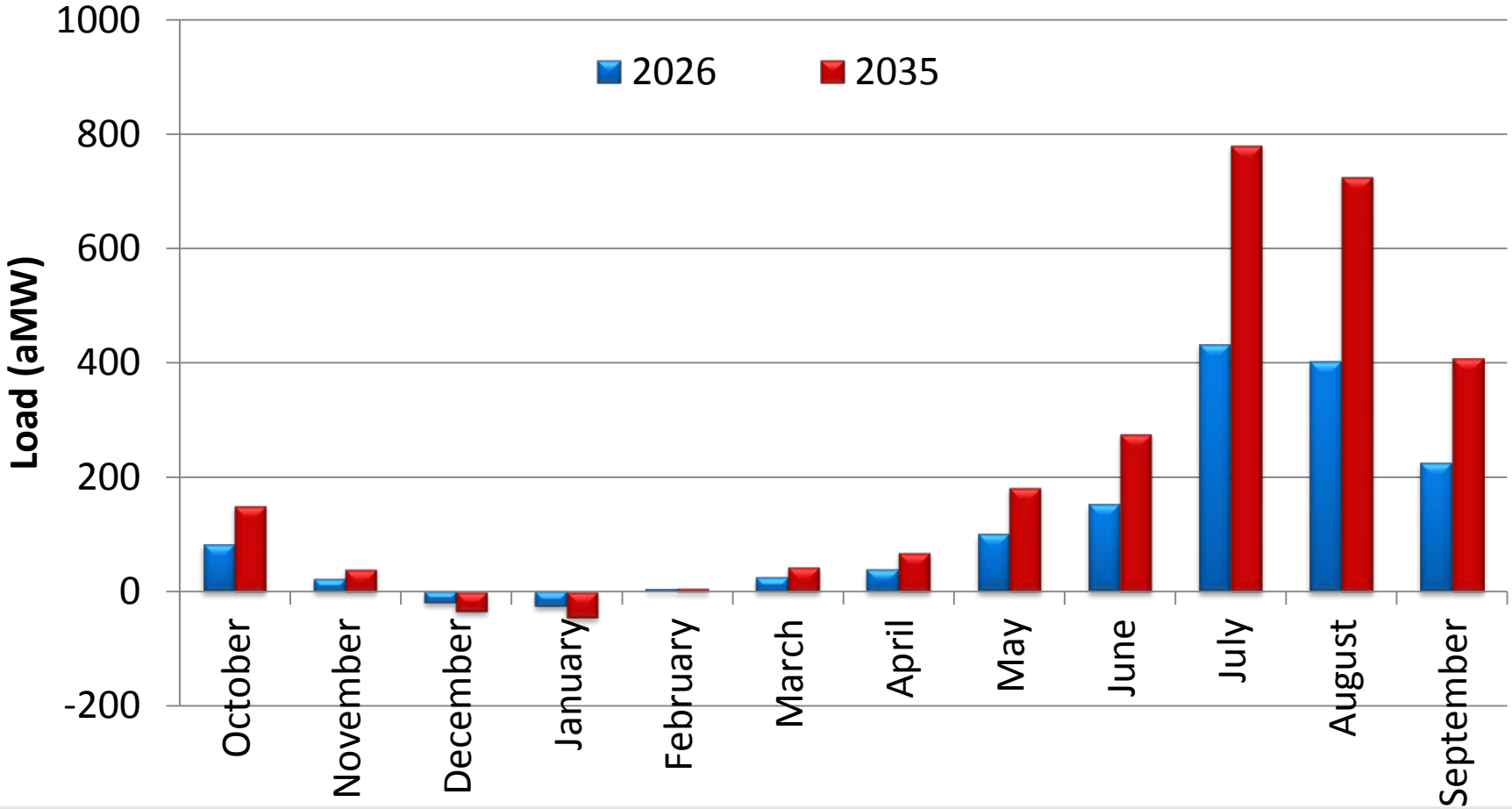
- Climate Change Impacts to:
  - Temperature
  - Load
  - Natural flows
  - Regulated flows
  - Hydroelectric generation
  - Reservoir storage

Projected Temperature Change for 2026 and 2035

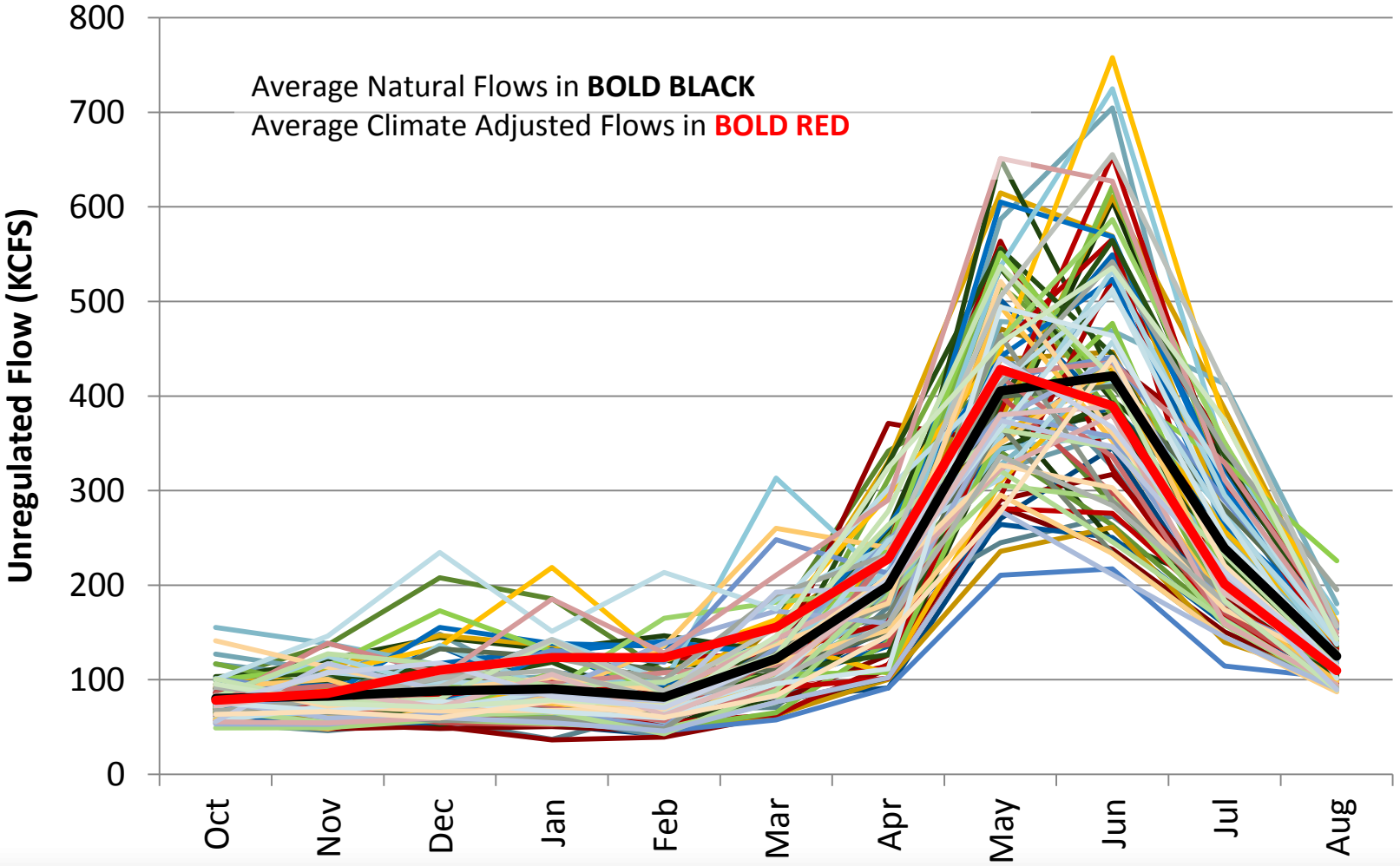


Source: IPCC AR5 Report (2014)

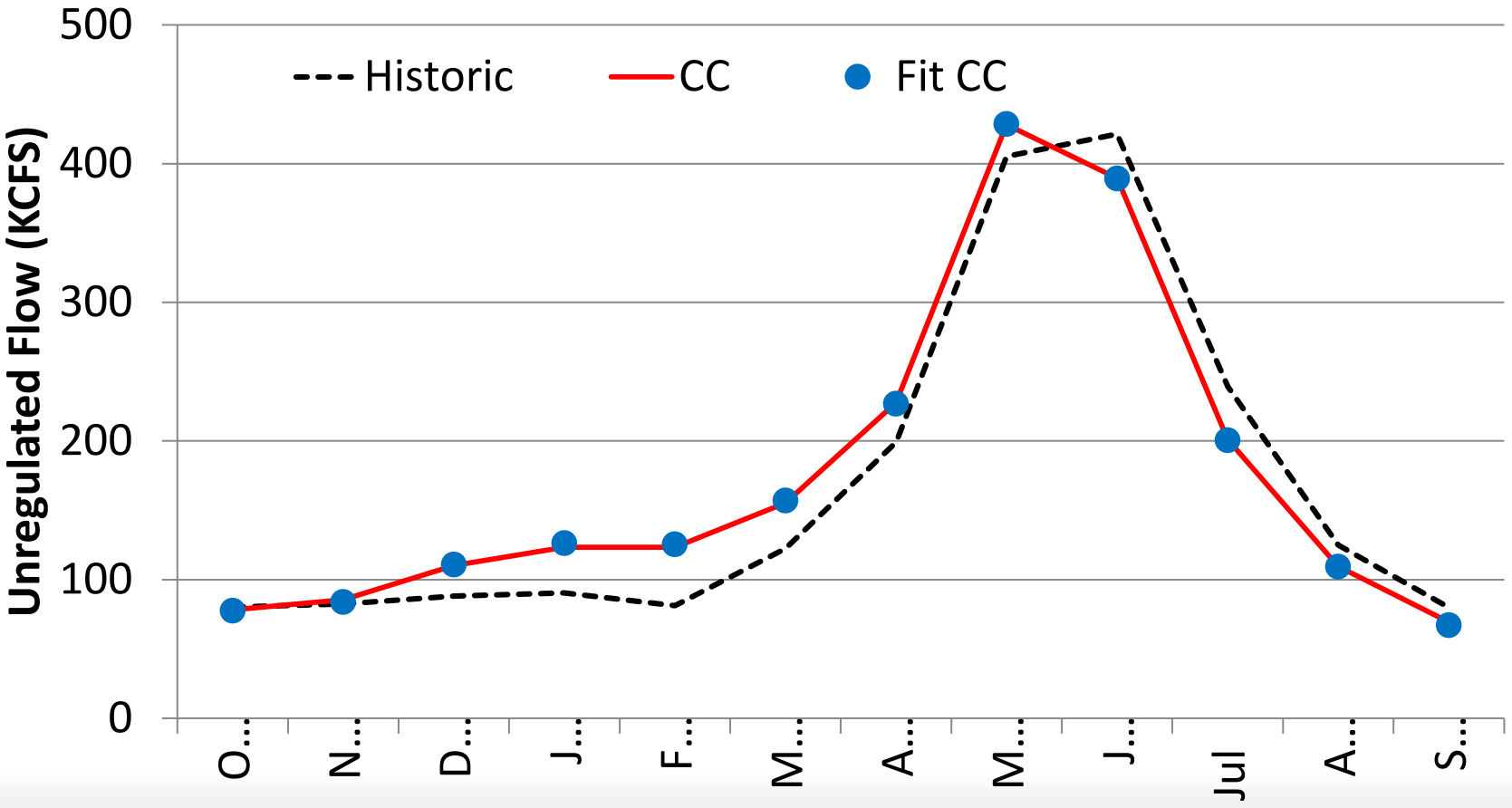
Change in Monthly Average Loads



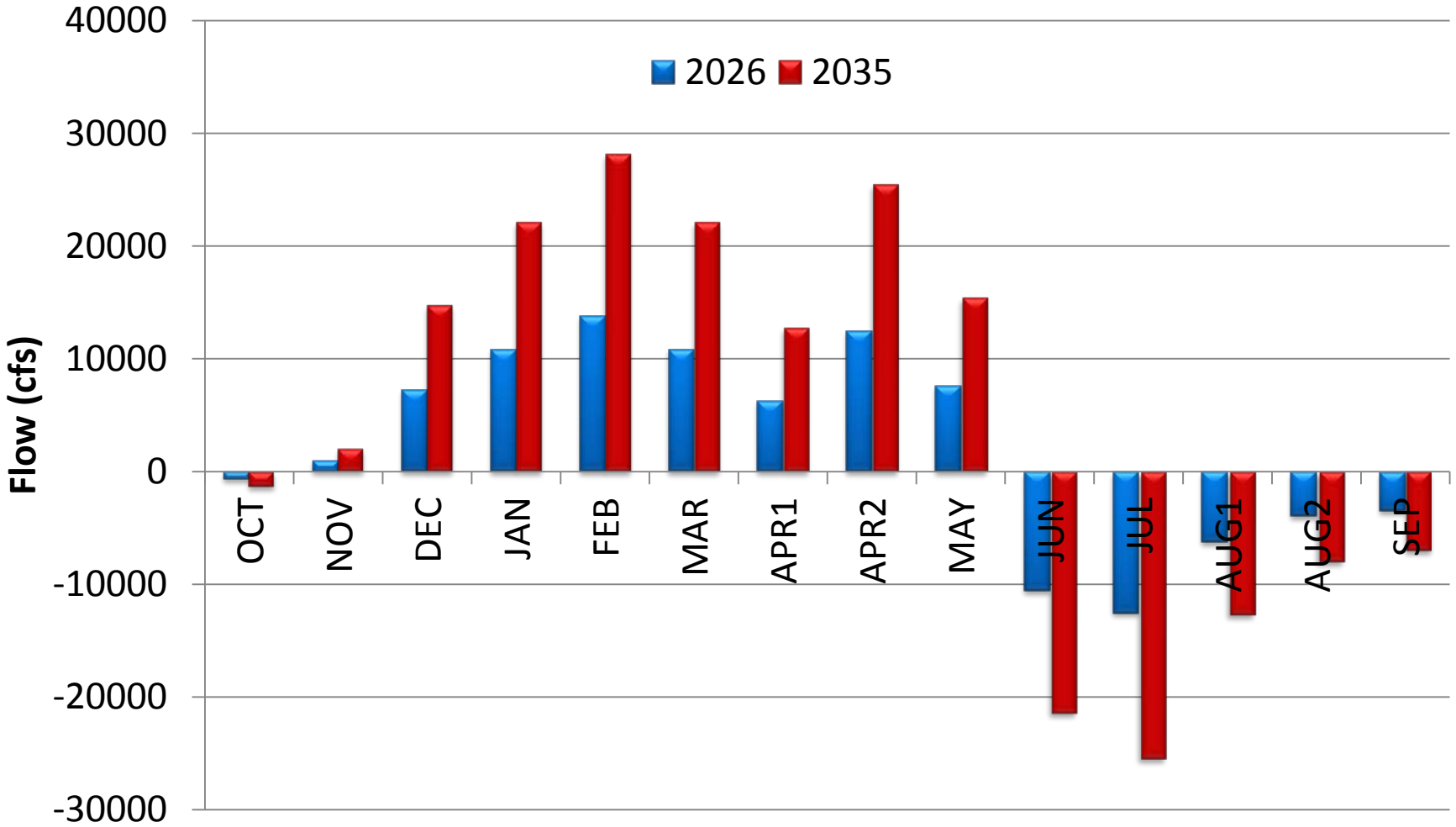
Average Flows vs. Year-to-Year Variation



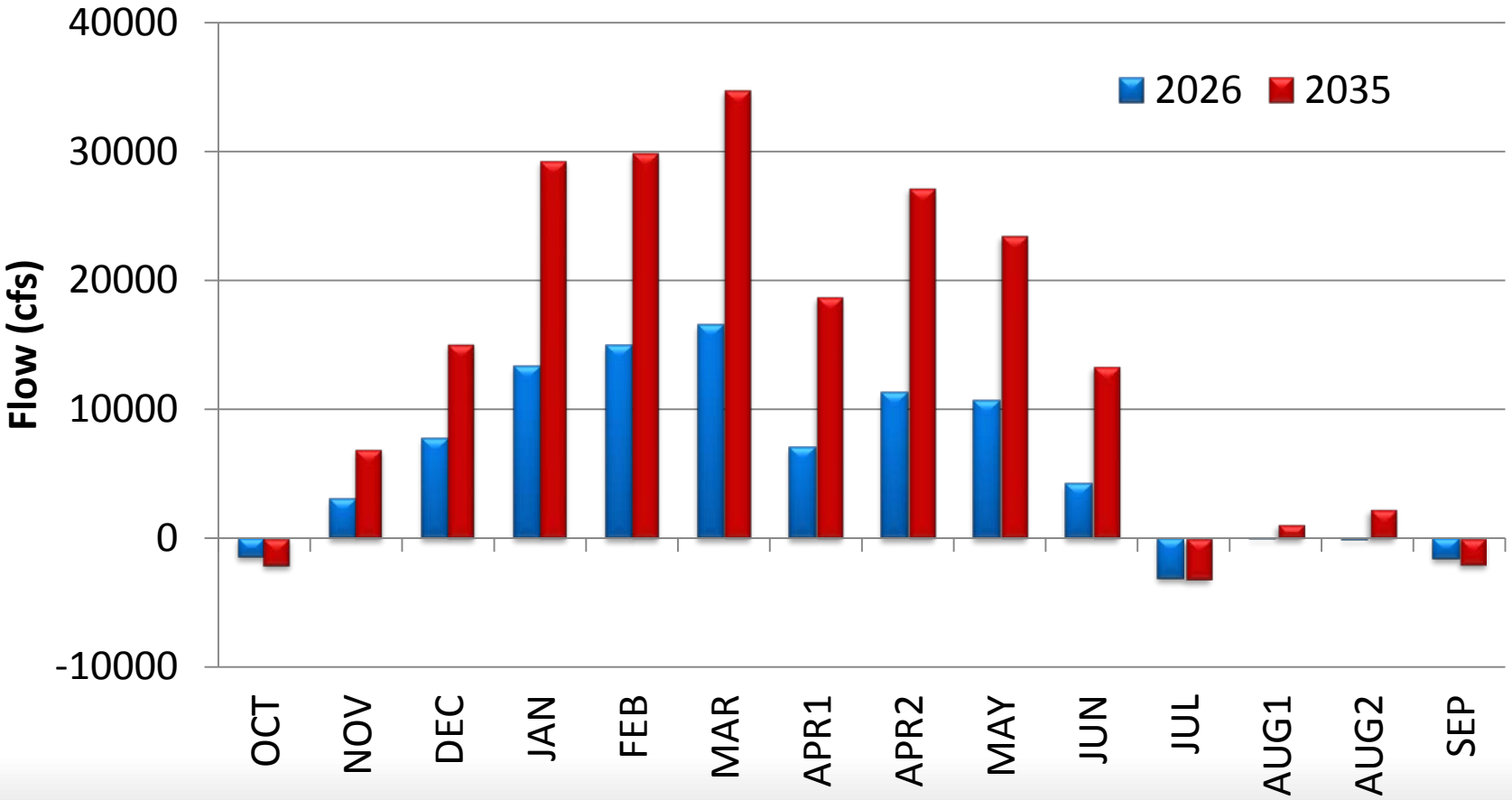
2045 Average Unregulated Flows



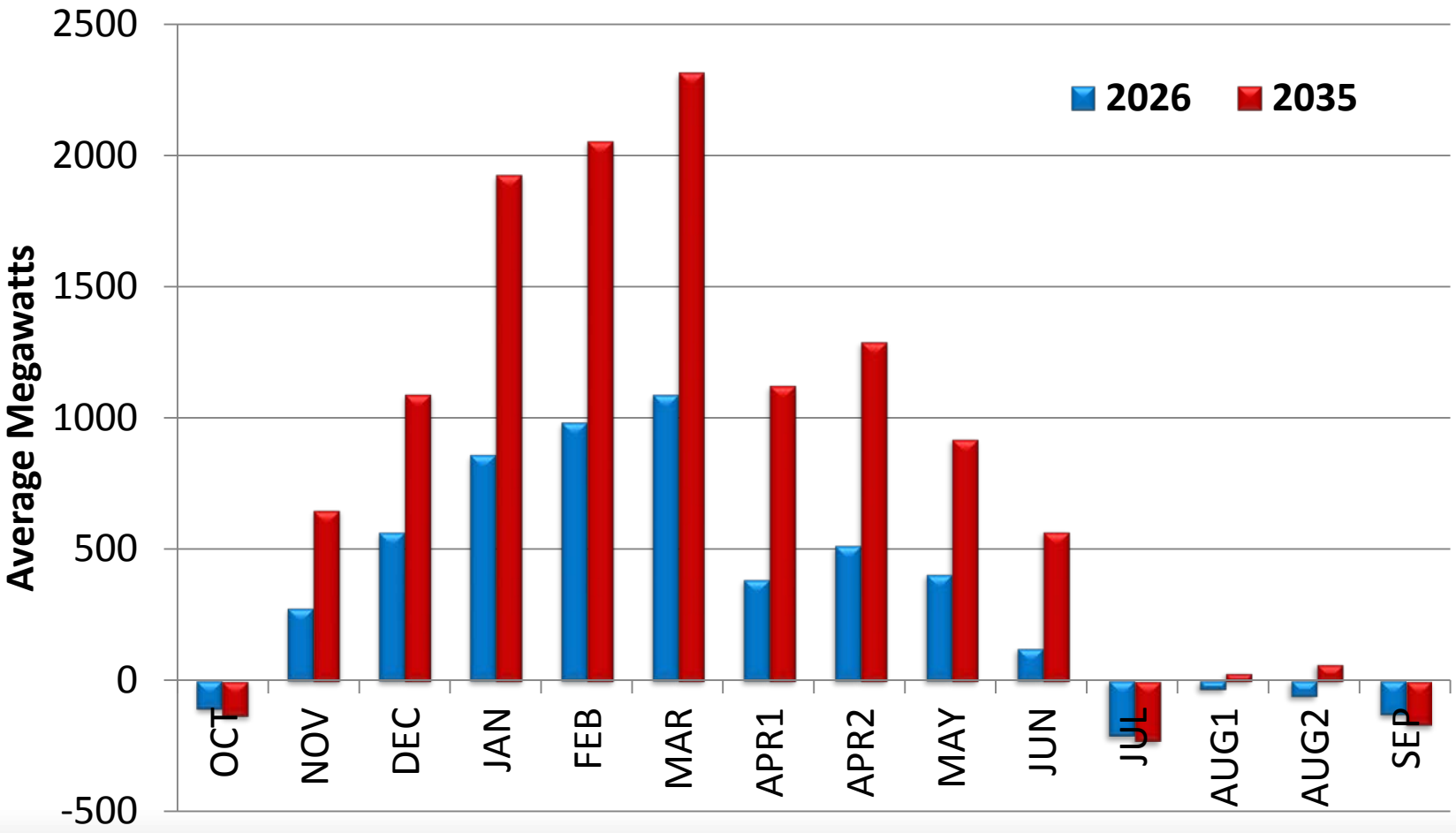
Change in Unregulated Flows at The Dalles



Changes in Regulated Flows at The Dalles



Changes in Hydro Generation



Change in End-of-Month Storage
(Coulee, Horse, Libby, Dworshak)