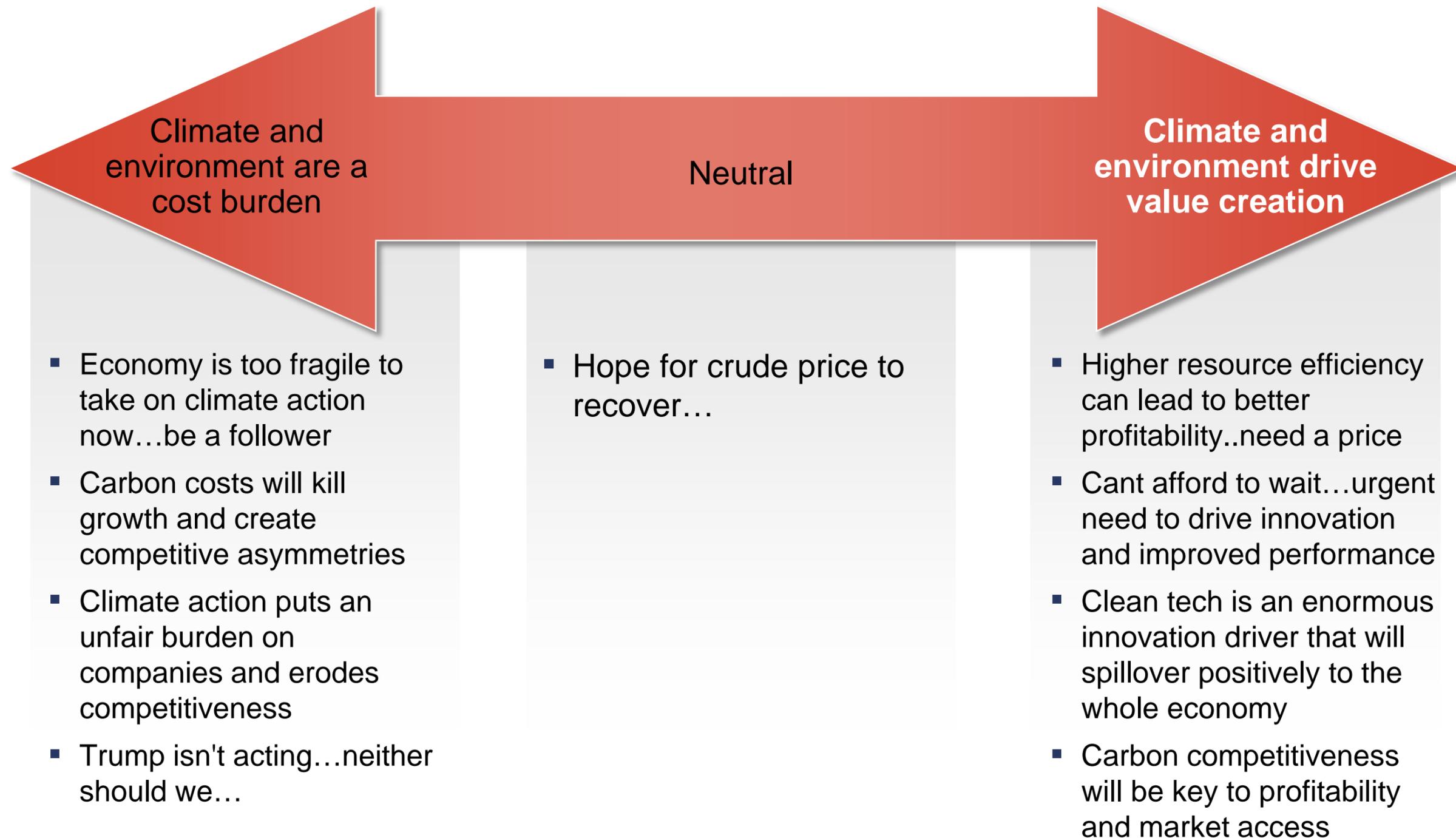


Alberta Climate Leadership Plan: Technology and Innovation Impacts

The Journey to achieve Resilience and
Sustainability in the 21st Century

Gord Lambert
Presentation to Energy Leaders Roundtable
November 14, 2018

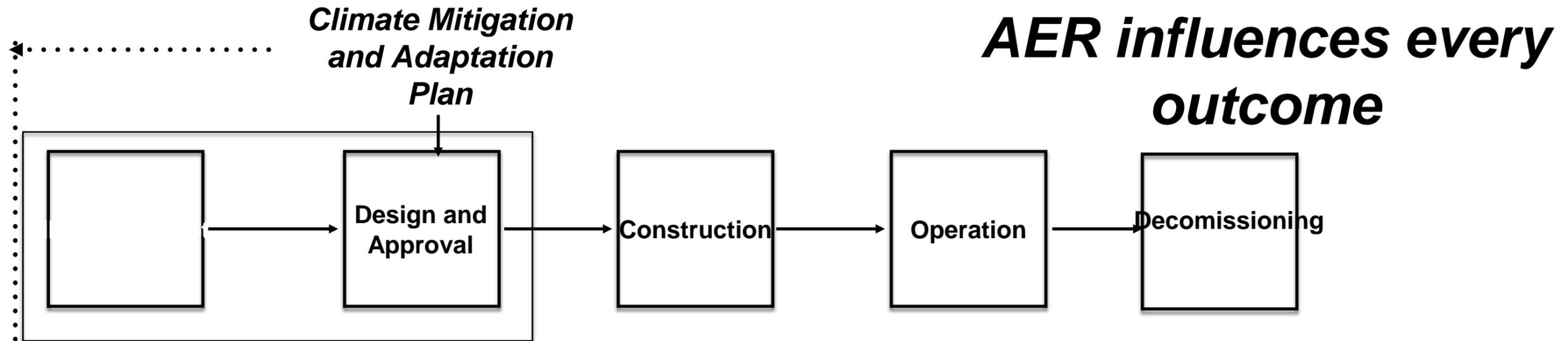
The state of the debate: Energy, Innovation, Climate and Competitiveness



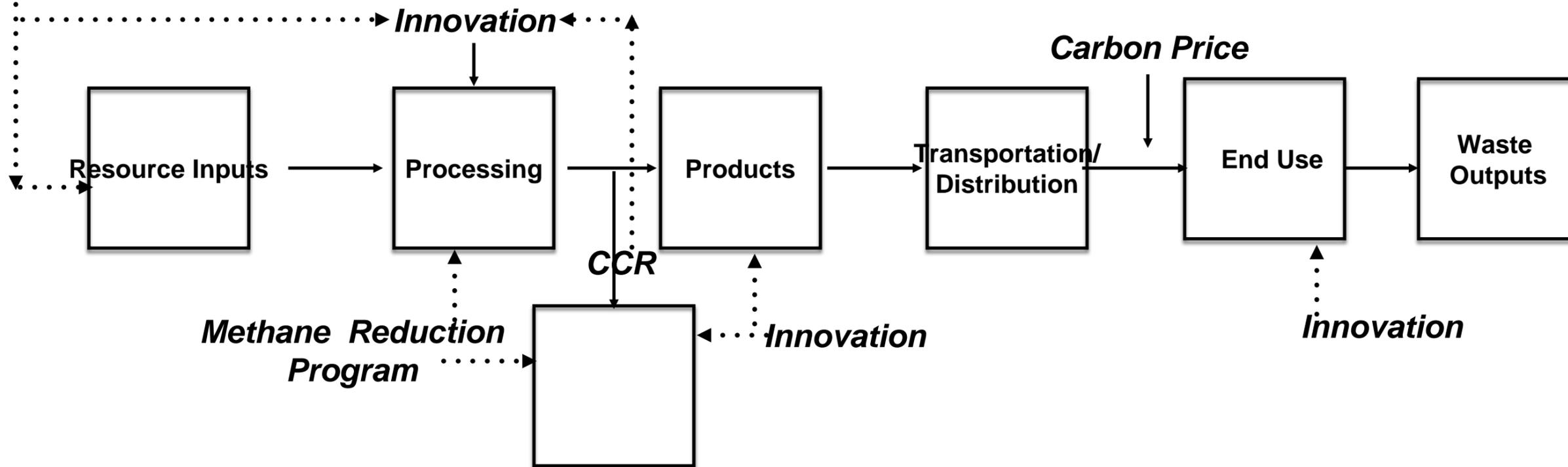
SOURCE: The Global Commission on the Economy and Climate, New Climate Economy project

Innovation is Required Throughout the Energy Value Chain

Project Lifecycle



Oil and Gas Product Lifecycle



Policy Initiatives

- Climate Change Innovation and Technology Framework 1.4B\$ over 7 yrs
- Funding for partial upgrading 2B\$
- Petrochemical support
- Alberta Innovates- new strategic orientation (plus merging of three entities into one)
- Emission Reduction Alberta- enhanced role and mandate
- Methane Regulation
- Carbon Competitiveness Regulation
- IDA- efficiencies can enable enhanced resourcing for strategic initiatives
- Alberta Innovates, EDT and the Climate Innovation Office are convening multiple entities to achieve bigger bolder outcomes (Team Alberta approach)

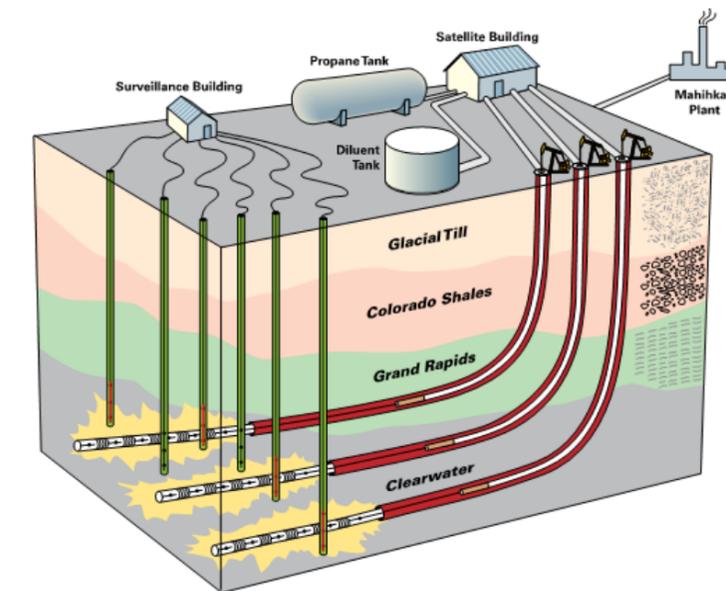
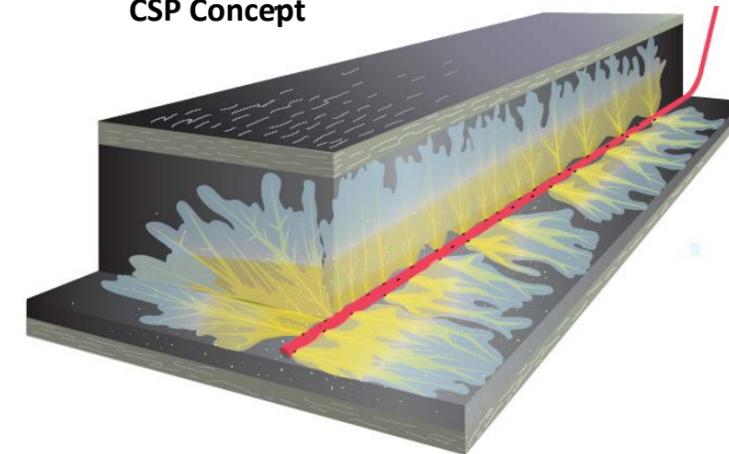
CSP Process

- Alternating cycles of solvent injection and bitumen/solvent production through a horizontal well
- Solvent injection below fracture pressure and above solvent vapor pressure
- Solvent mixes with bitumen via fingering, dispersion, and gravity-driven, thereby reducing the viscosity
- Targets resource not currently viable – thick lean or thin clean reservoirs that are not economic with thermal processes
- About 90% reduction in direct GHG intensity, no water requirement

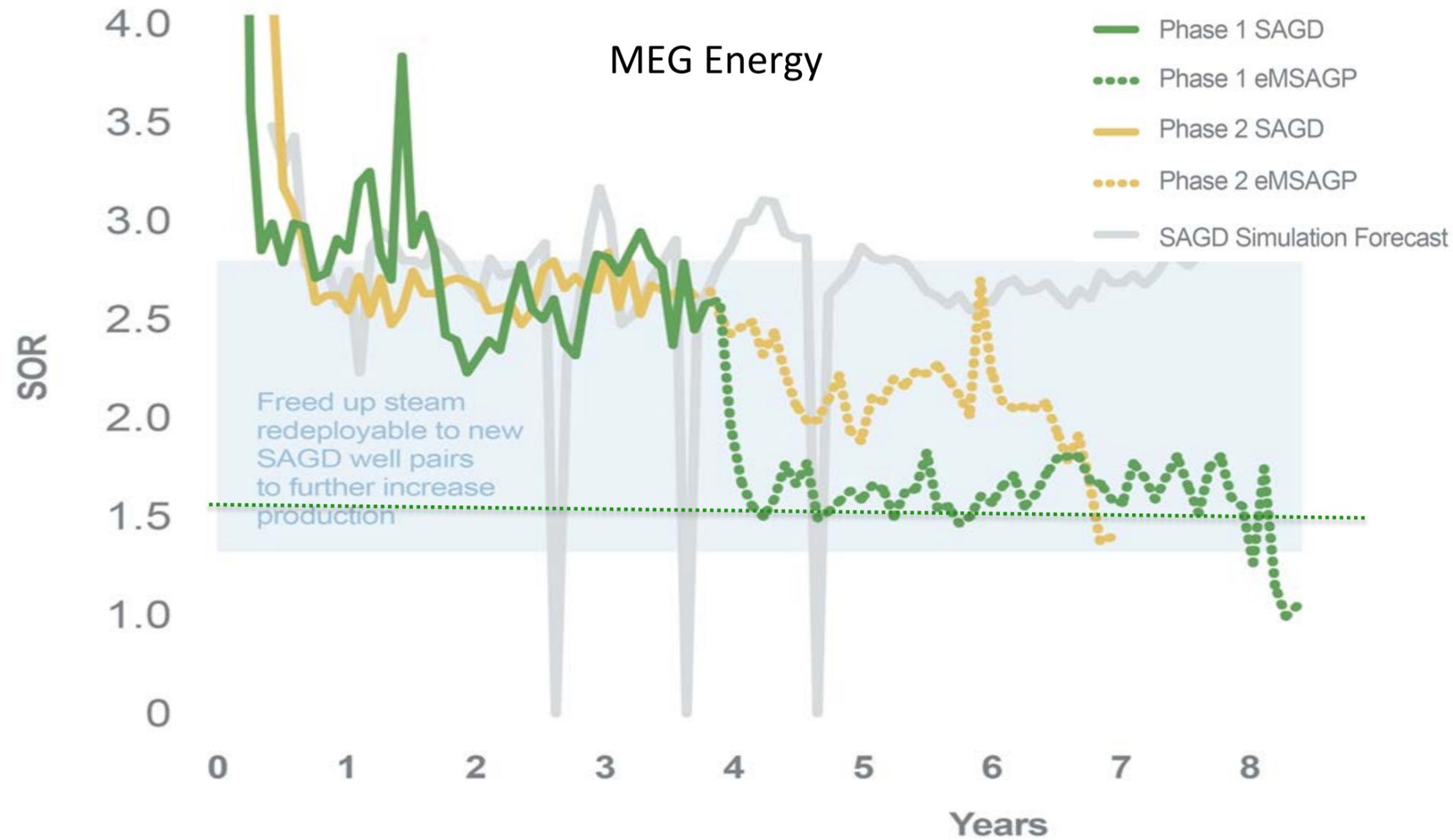
CSP Pilot

- 100 M\$ pilot constructed in Cold Lake, started up in June 2014
- Pilot Scope: three 100 m horizontal wells, six vertical observation (OB) wells
- Surface facilities: solvent storage and injection; production and measurement, and pipeline to Mahihkan plant
- Multiple cycles of solvent injection (primarily propane) over 3-5 years
- Extensive surveillance with dedicated surface facilities and surveillance tools in both horizontal and OB wells, including pressure, temperature, and produced fluid measurement, as well as passive seismic monitoring

CSP Concept



Energy efficient recovery example: eMSAGP



Steam oil ratio reduced from 2.5 to 1.5

http://www.megenergy.com/sites/default/files/user_uploaded/pdf/MEG%20Energy%20Investor%20Presentation%20August%202016%20%28web%29.pdf

Organizing for Success
New Game: Collaboration vs Cooperation

- Recognition that Cooperation has been our legacy approach to working together

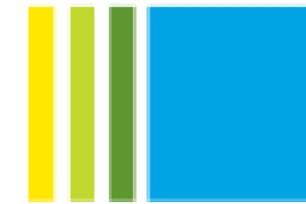
- Cooperation= pursuit of individual interests jointly

Versus

- Collaboration= joint effort to achieve common goals

- Purpose- Acceleration....of important value adding outcomes
- Collaboration is a much higher bar...forming, storming and norming are essential to PERFORMING
- Shared ownership and engagement is observed in behaviors and in results...timelines, deliverables, resource allocation
- When you get it right...outcomes are $2+2= 5+$
- It is NOT Committee work...it is NOT superficial sharing of information or dialogue with no real impact
- Accountability for delivering real outcomes
- ***It is a new way of leveraging capacity....***

+ The result



COSIA is an alliance of 13 oil sands producers, representing 90 per cent of production from the Canadian oil sands, who are innovating, collaborating and driving accelerated environmental performance improvement.

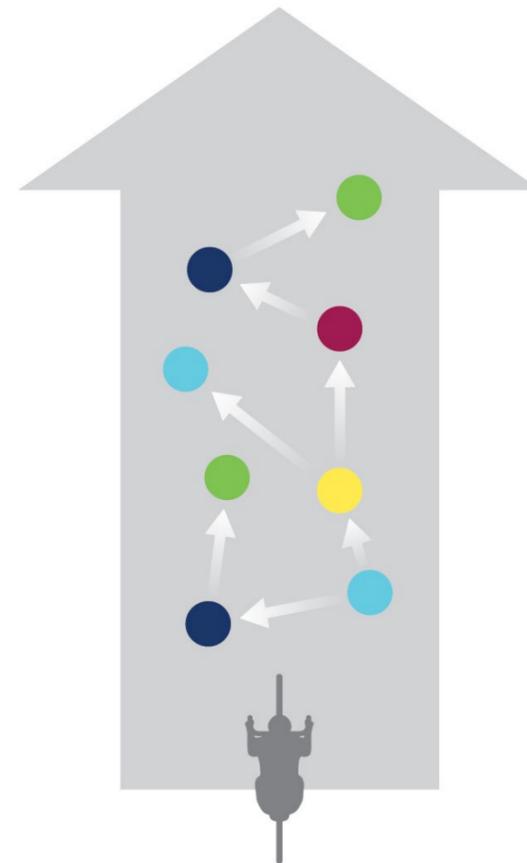


Re-Imagining Competition and Collaboration: Road Cycling as a Metaphor

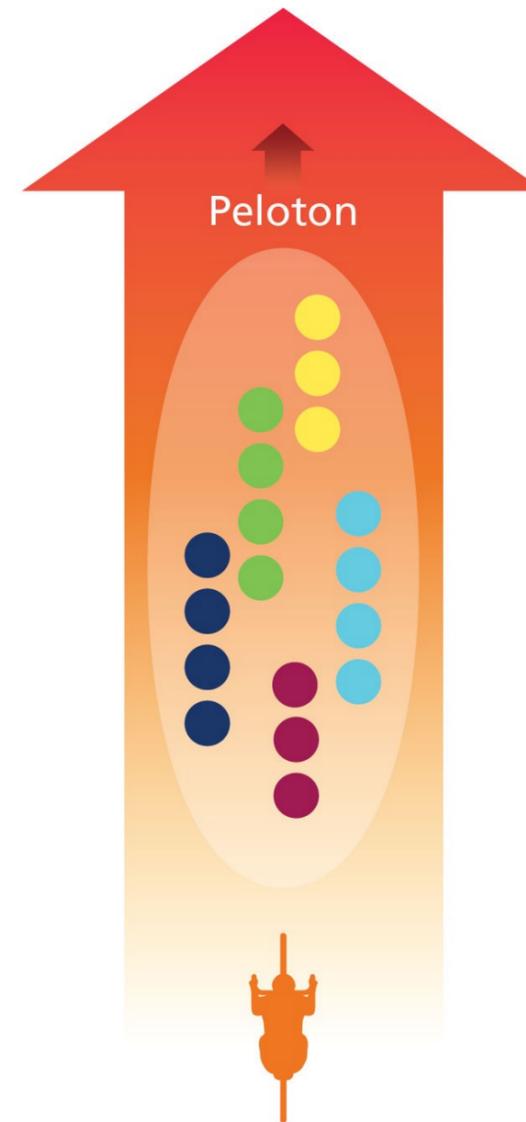
Issues of the Commons: Environmental and Social Challenges

Mindset: you win by making someone else lose

- Polarizing behavior
- Throwing wrenches or avoiding them
- Gridlock vs forward momentum
- Low trust



Where we are now



Where we need to be

Mindset: accelerated progress to achieve an outcome

- Equitable contribution
- Efficiency and effectiveness
- Optimum use of resources
- Encourage ambition
- High trust