



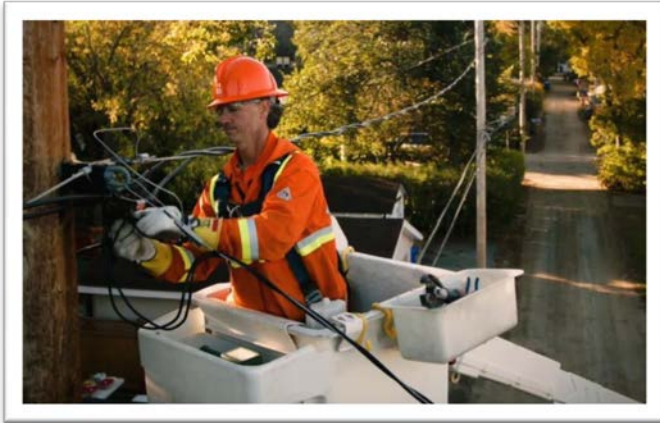
SASKPOWER CCS GHGT-12

MIKE MONEA, PRESIDENT, CCS INITIATIVES

 **SaskPower**
Powering the future®

@SaskPowerCCS

SASKPOWER'S CCS STORY.



Why We Did It



The Business Case



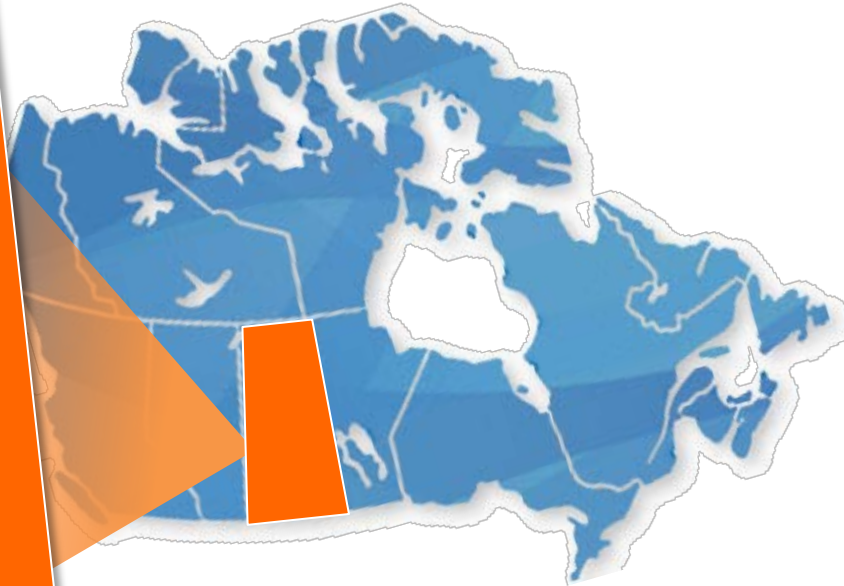
Government Approval



Construction (Learning Starts Here)

SASKPOWER'S ENERGY MIX.

- 490,000 customers
- 151,000KM of transmission line
- 3,513 MW generating capacity



DIVERSIFIED POWER GENERATION.



COAL
50%



GAS
25%



HYDRO
20%



WIND
3%



OTHER
2%



Current Results Strm: 1

H2	0.0000	CO2	99.9974
O2	0.0000	C2	0.0000
N2	0.0026	H2S	0.0000
CO	0.0000		
C3+	0.0000		
C1	0.0000		

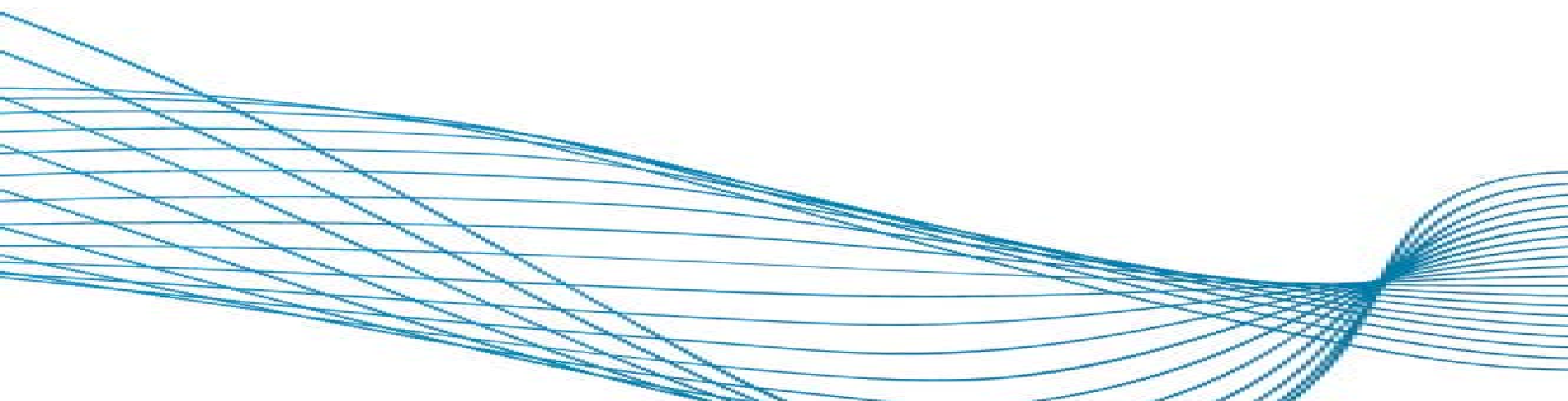
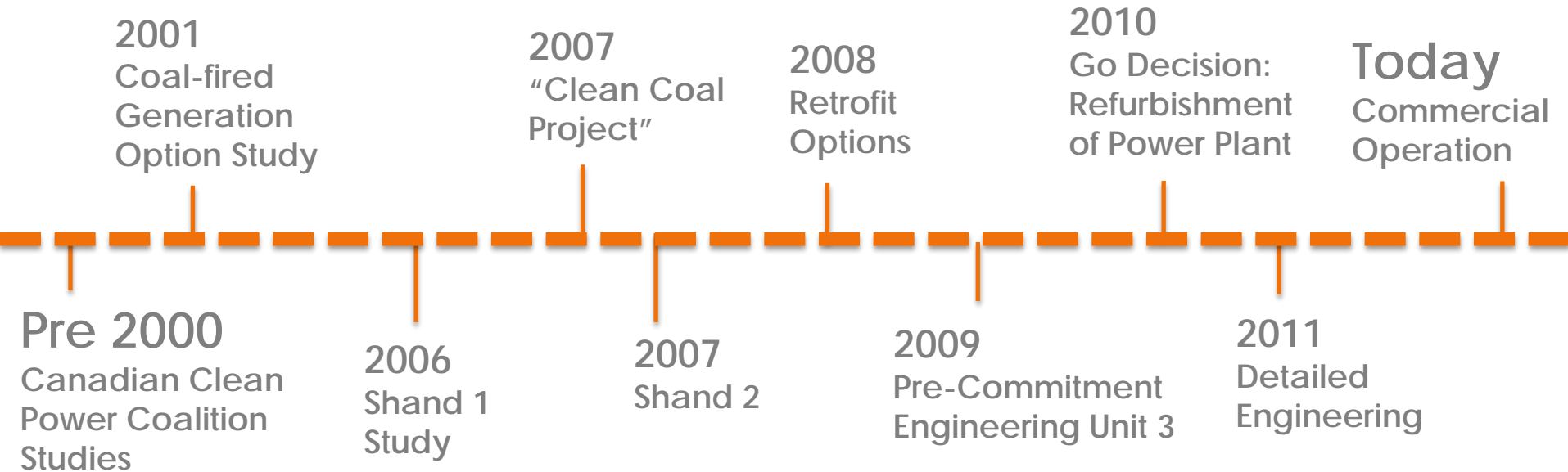
Main

Stream
Select

Next

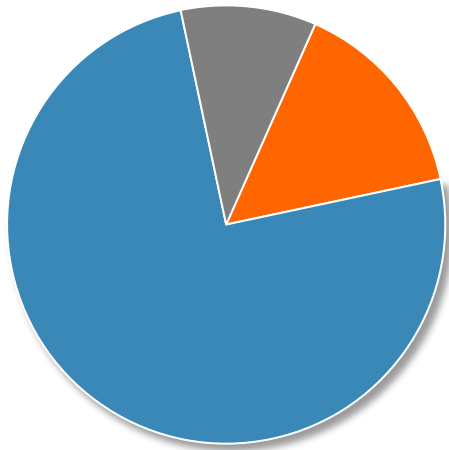
PGC1000

CCS TIMELINE.

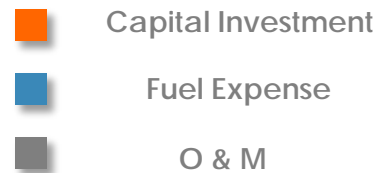
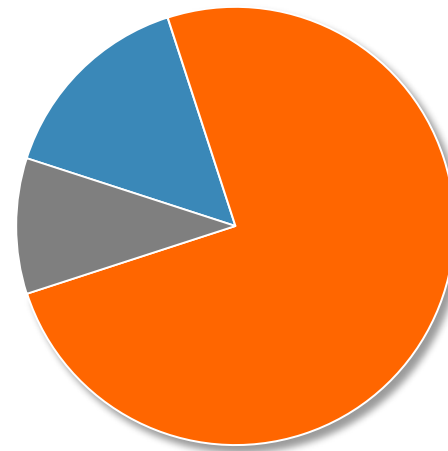


COMPARING COSTS.

Baseload Natural Gas
Cost of Electricity



BD3 Carbon Capture
Cost of Electricity



Figures from 2009 - 2010

COMPARING REGULATIONS.



- **USA – 1,100 lb/MWh gross**
*Approx 0.712 tonnes /MWh net factoring in 30% parasitic load for CCS equipment
- **Canada – 0.420 tonnes / MWh**



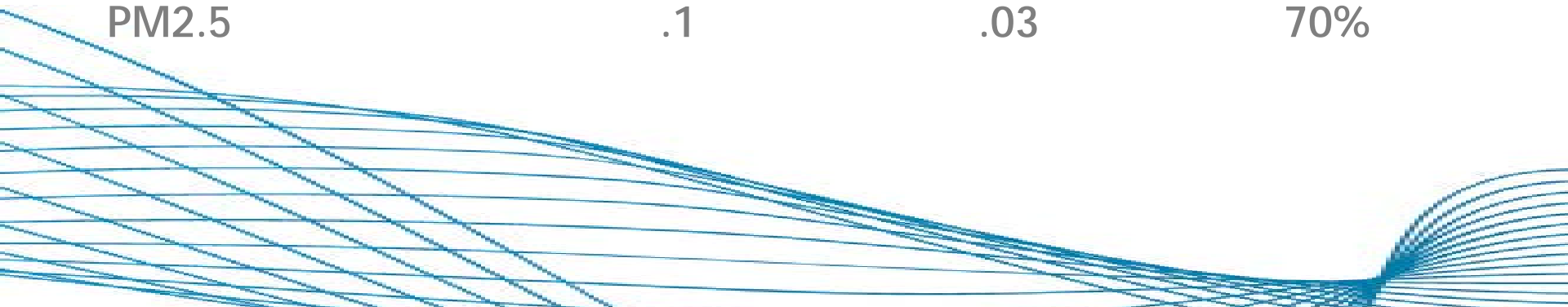
- **USA – 1,000 lb/MWh gross**
*Approx 0.504 tonnes / MWh net
- **Canada – 0.420 tonnes / MWh**

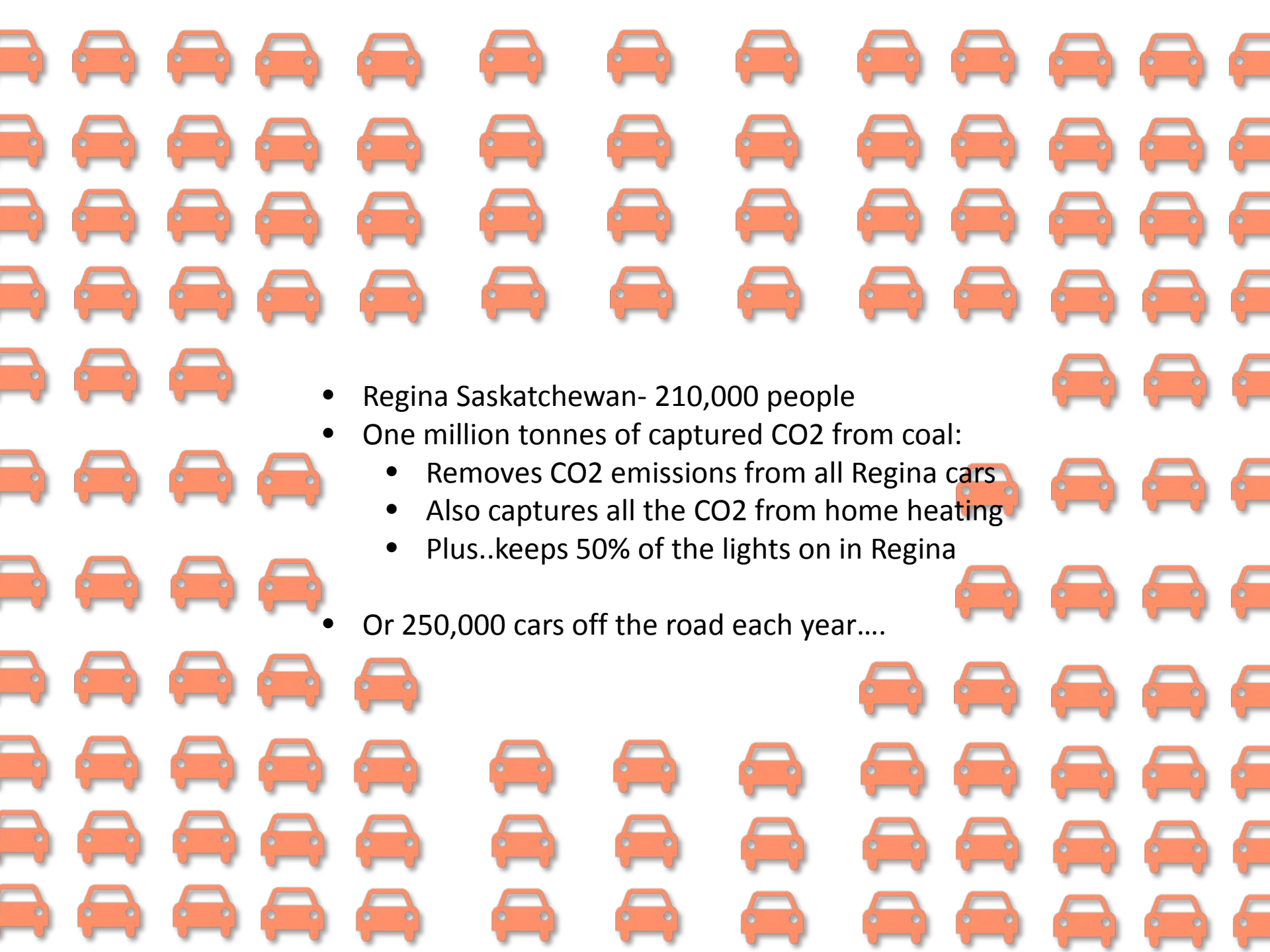


BOUNDARY DAM
CCS PROJECT

BOUNDARY DAM UNIT 3

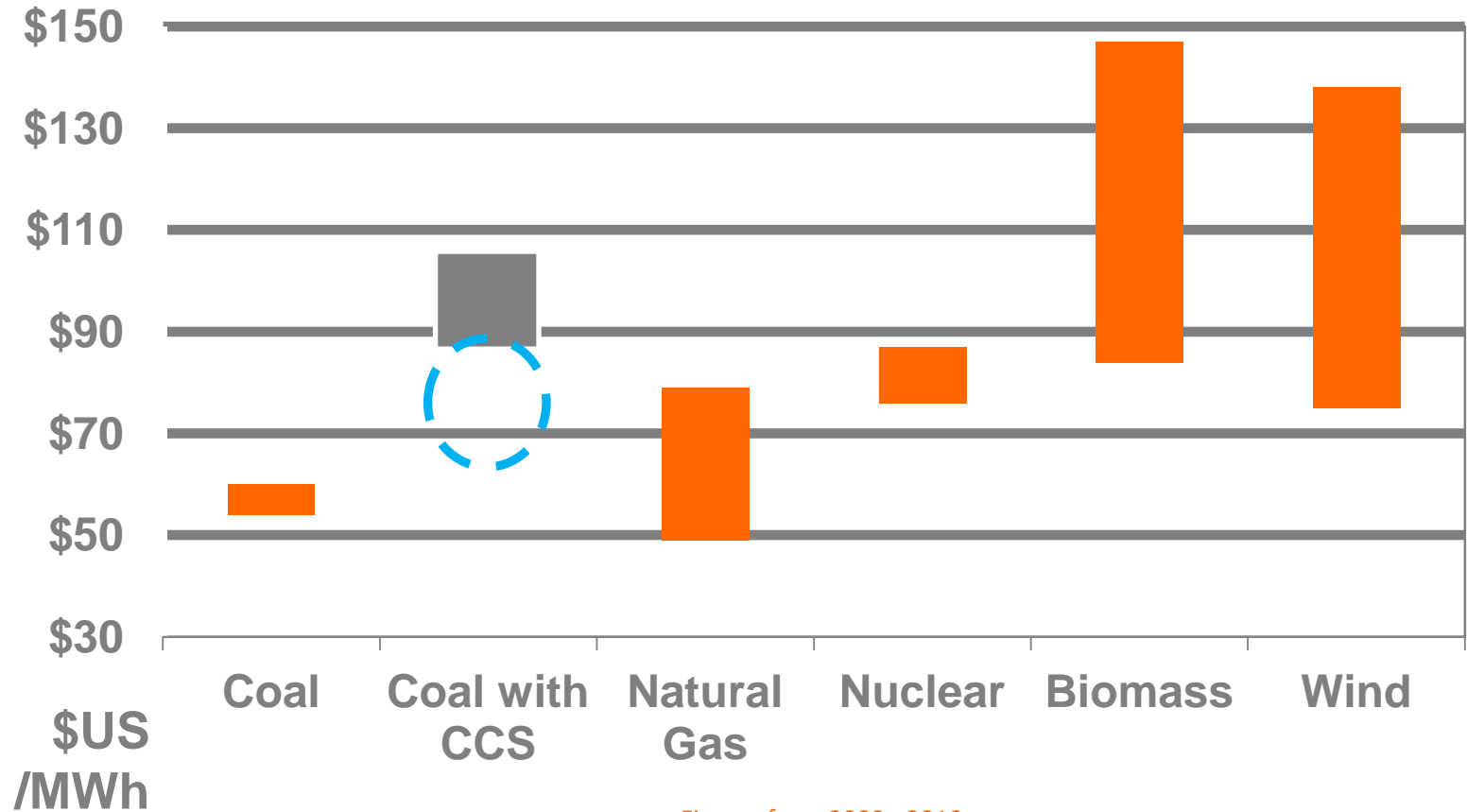
Emission Change	Pre-CCS	Post-CCS	Reduction
CO ₂	1094	120	90%
SO ₂	11	0	100%
NO	1.5	1.1	27%
PM10	.2	.02	90%
PM2.5	.1	.03	70%





- Regina Saskatchewan- 210,000 people
- One million tonnes of captured CO2 from coal:
 - Removes CO2 emissions from all Regina cars
 - Also captures all the CO2 from home heating
 - Plus..keeps 50% of the lights on in Regina
- Or 250,000 cars off the road each year....

GENERATION COSTS.



Figures from 2009 - 2010



CCS FACILITY.

CO₂ AND SO₂ ABSORBERS



CO₂ STRIPPER



SO₂ ABSORBER





ACID PLANT



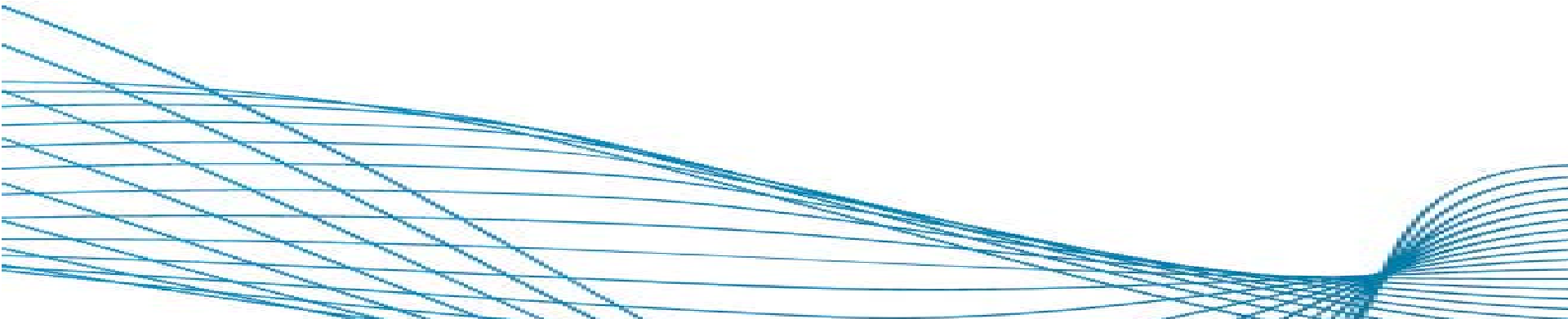
CO₂ PIPELINE.

A large industrial turbine, painted in a reddish-brown color, is being moved by a yellow overhead crane in a massive industrial facility. The turbine is suspended by cables and is positioned vertically. The facility has a high ceiling with a complex steel truss structure and several levels of walkways. In the background, other large industrial components, some painted blue, are visible. The overall scene is one of heavy industrial activity.

UNIT 3 TURBINE.

FULL SPECTRUM

CCUS.



SECURING OFF-TAKERS.



- Sale of CO₂ to oil company for EOR.

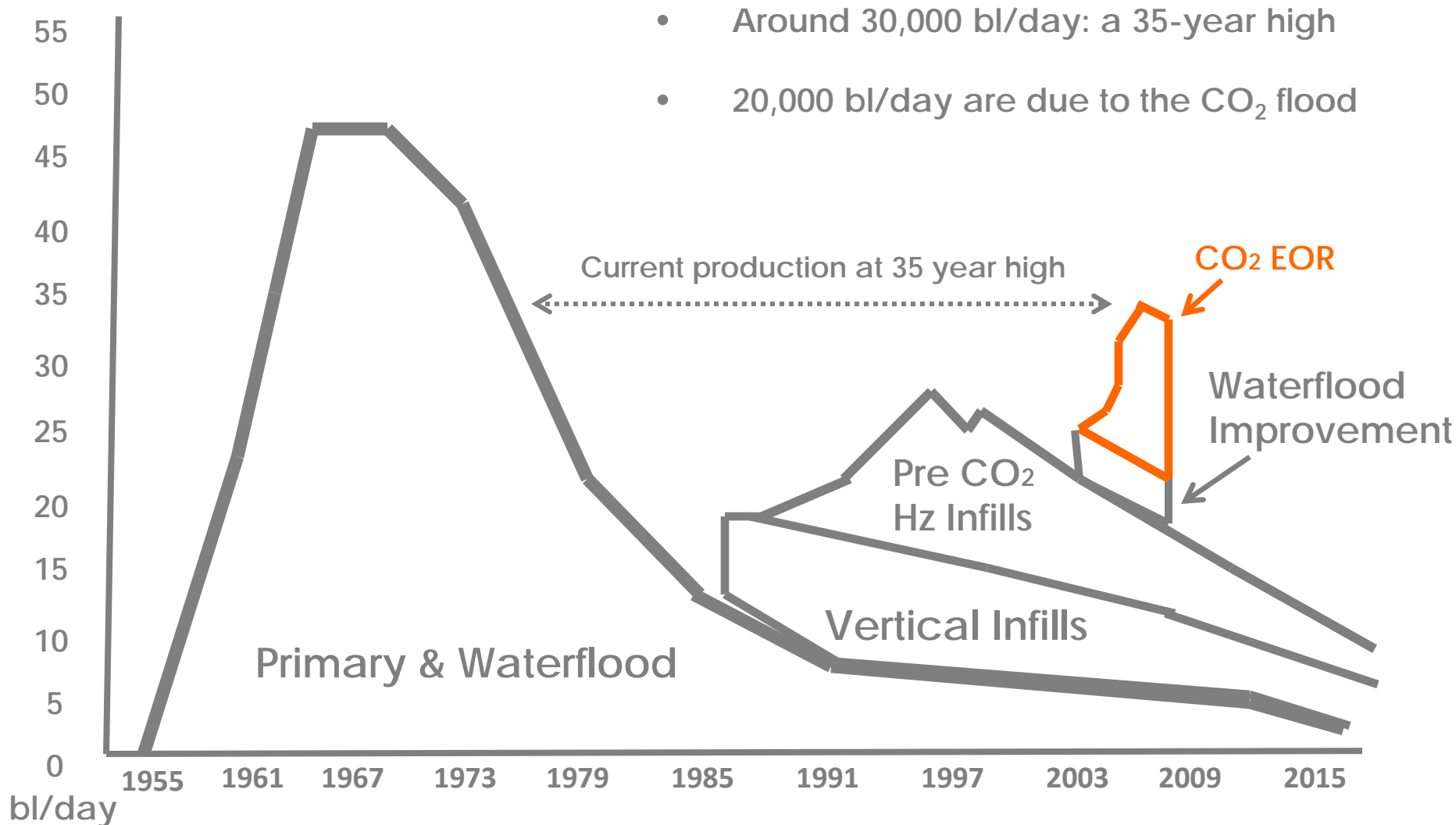


- Sale of sulphuric acid, used primarily for industrial purposes including fertilizer.



- Sale of flyash for concrete production 100%.

ENHANCED OIL RECOVERY.



STORAGE.

Pure CO₂ storage with SaskPower's Carbon Storage and Research Centre's host project, Aquistore.

Independent monitoring project that identifies feasibility of injecting CO₂ into a deep saline reservoir in an effort to reduce GHG emissions.

Aquistore will receive approximately 350,000 tonnes of CO₂ over its life. Storage is regulated by the Ministry of Environment.

Will be measured, monitored, verified and audited.

Saskatchewan has experience with storage due to the Weyburn Midale project. Approximately 20 million tonnes of CO₂ stored and monitored.



MAKING THE NEW REALITY.



Complex Commissioning



Unprecedented Simulator
Training



Detailed SOP



Vendor Contract Negotiations



WHERE WE ARE GOING

WHERE ARE WE GOING.



CCTF



Amine Chemistry Lab



University Collaboration



Boundary Dam 4+5



TOURS





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