South Africa's Low Carbon Society

Low Carbon Scenario for 2000-2050 Time Horizon
Residential and Power Generation Sector

Outline

- Background
- Focus
- Actions & Options & Barriers
- BCM Modelling results
- Discussion & Comments

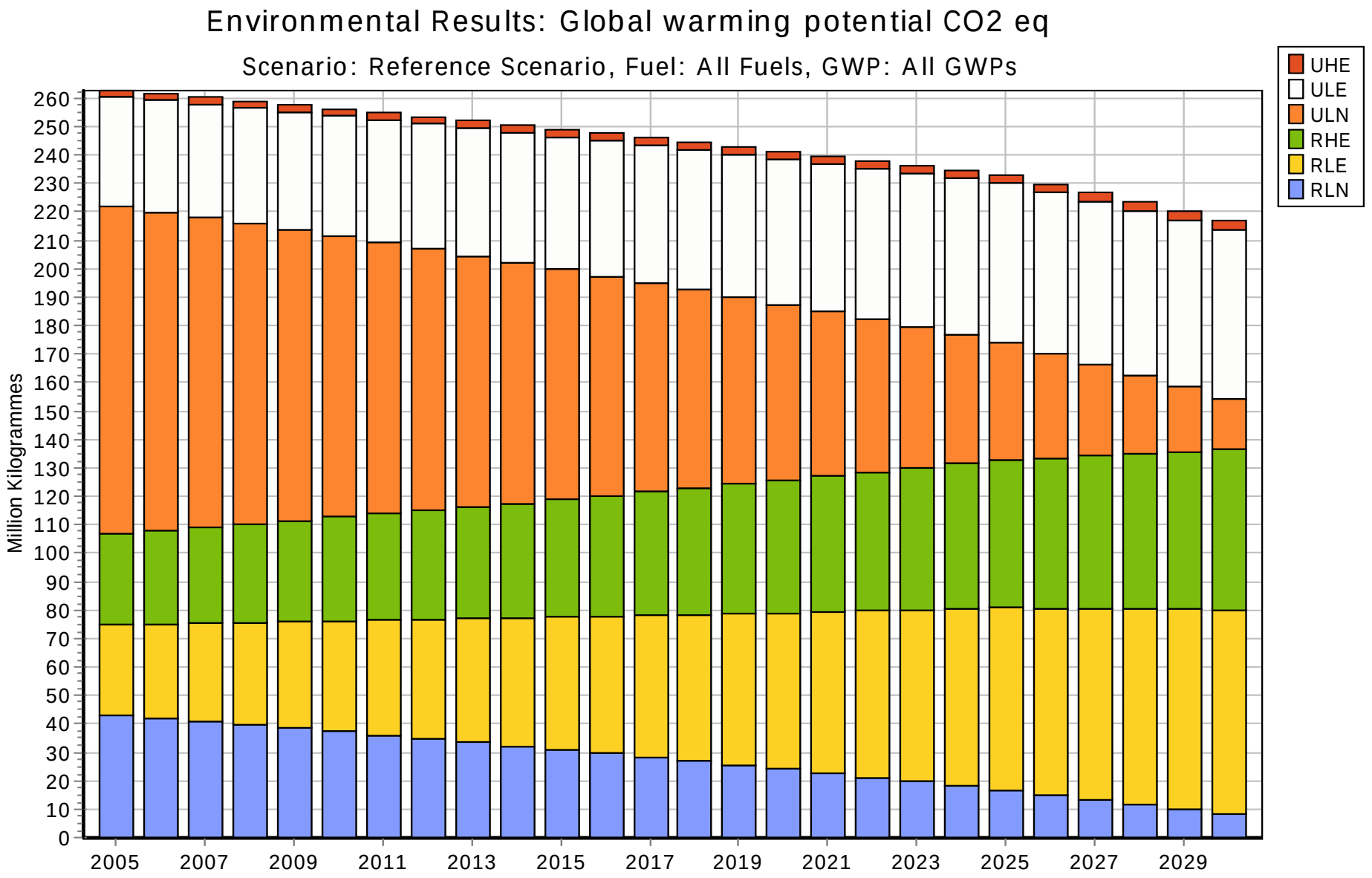
Background

- South Africa is a developing country, population approx 45 million with 40% unemployment.
- 60% urban, and 70% reliance on coal for energy. 70% homes are electrified and building standards are inefficient. One of the highest emissions per capita (7.9 tonnes)
- 160-200 years worth of coal reserves left
- Strong need for sustainable development, particularly in household energy use and Energy Sector.
- How can the country's governance and technological capability best be used to foster sustainable development and a low carbon society?

Focus

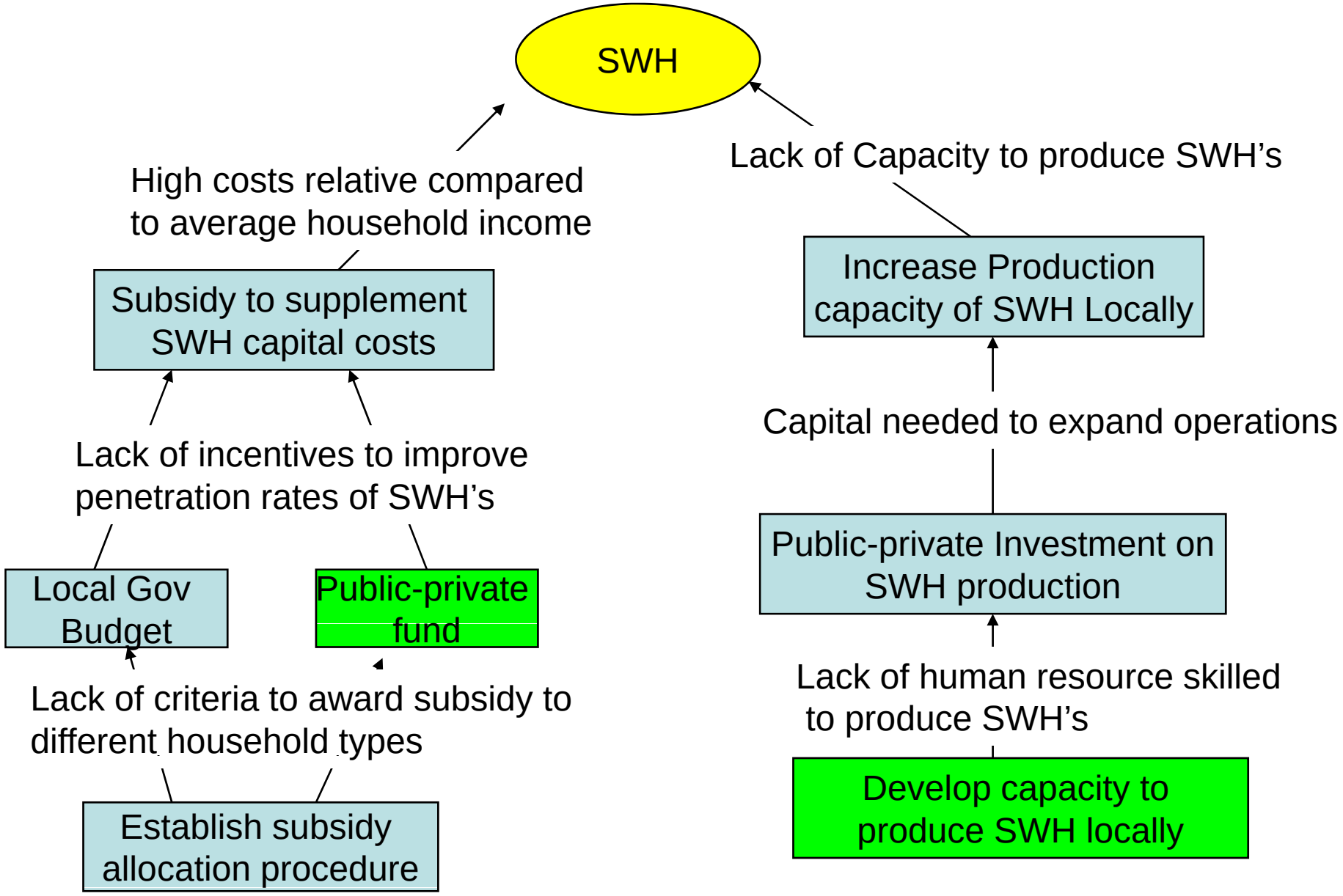
- Residential Sector
  - Solar Water Heaters (SWH)
- Power Generation
  - PBMR (50%)
  - More aggressive scenario (50 PBMR, 27% Solar)
- Energy Generation
  - Carbon Capture & Storage

Why SWHs

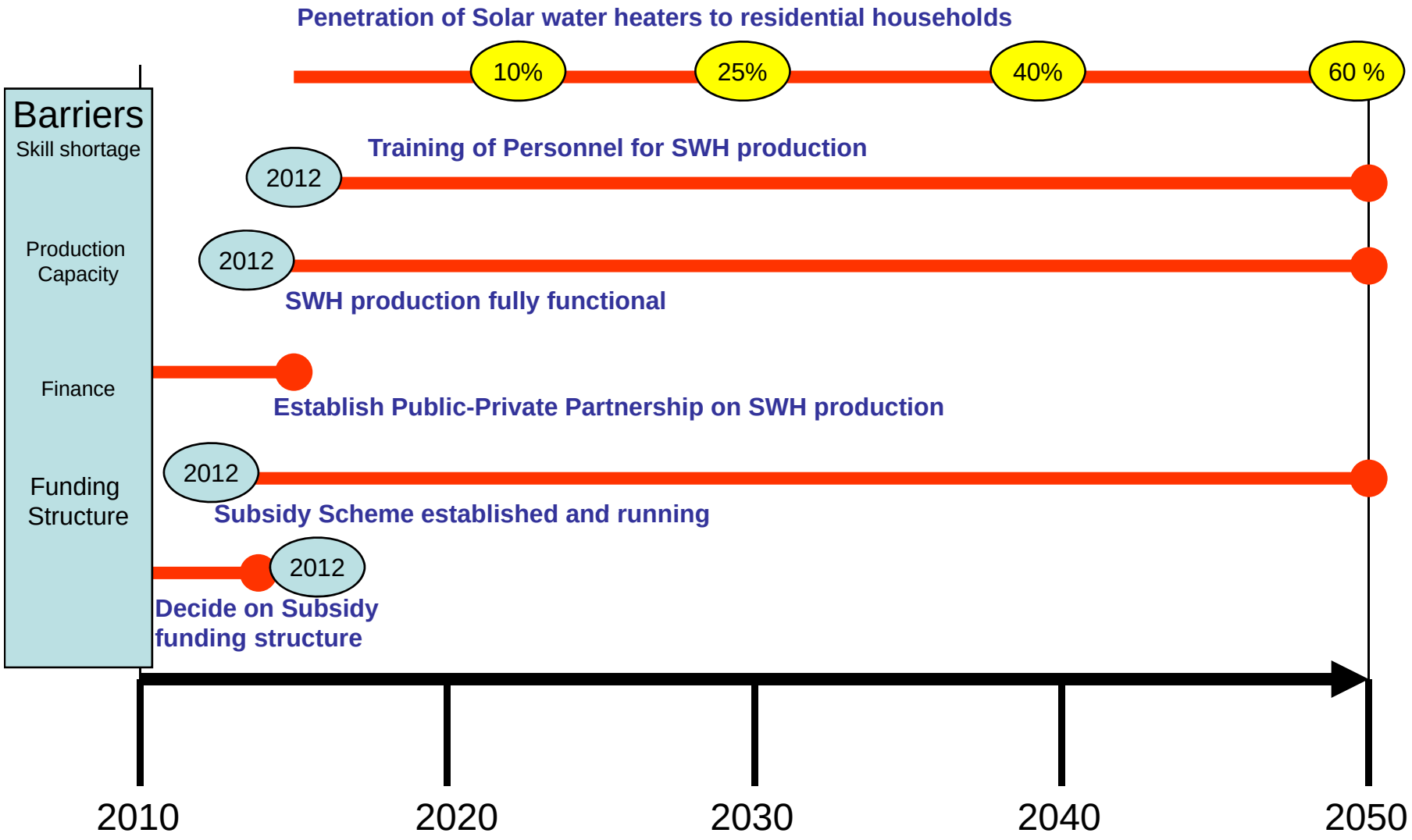

Environmental Results: Global warming potential CO2 eq
Scenario: Reference Scenario, Fuel: All Fuels, GWP: All GWPs
Million Kilogrammes
UHE
ULE
ULN
RHE
RLE
RLN
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029

About SWH

- Sun is abundant
- Ideal for off-grid areas


SWH
High costs relative compared to average household income
Lack of Capacity to produce SWH's
Subsidy to supplement SWH capital costs
Increase Production capacity of SWH Locally
Capital needed to expand operations
Lack of incentives to improve penetration rates of SWH's
Public-private Investment on SWH production
Local Gov Budget
Public-private fund
Lack of human resource skilled to produce SWH's
Lack of criteria to award subsidy to different household types
Develop capacity to produce SWH locally
Establish subsidy allocation procedure

Gantt Chart for SWH

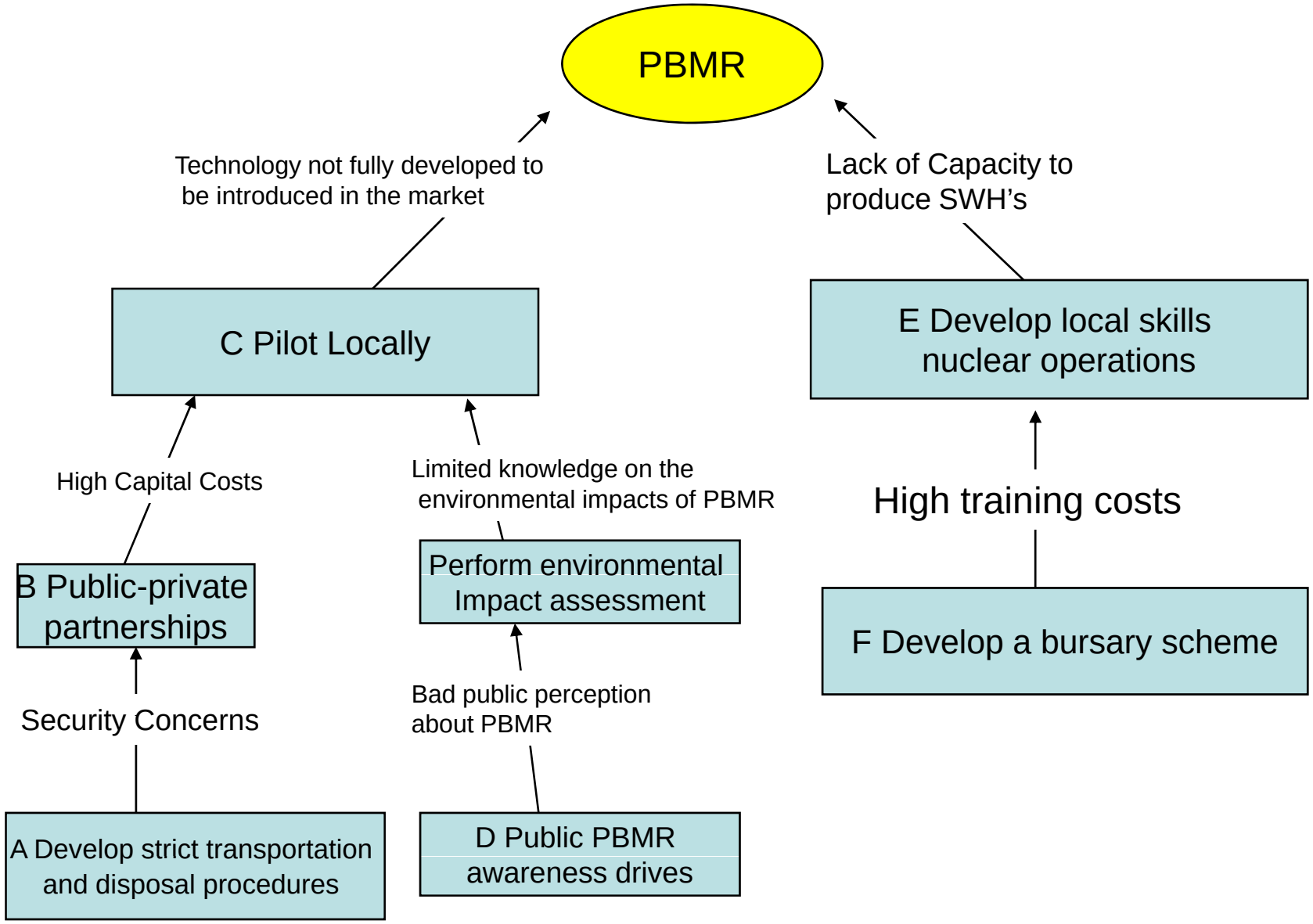


About Electricity Generation

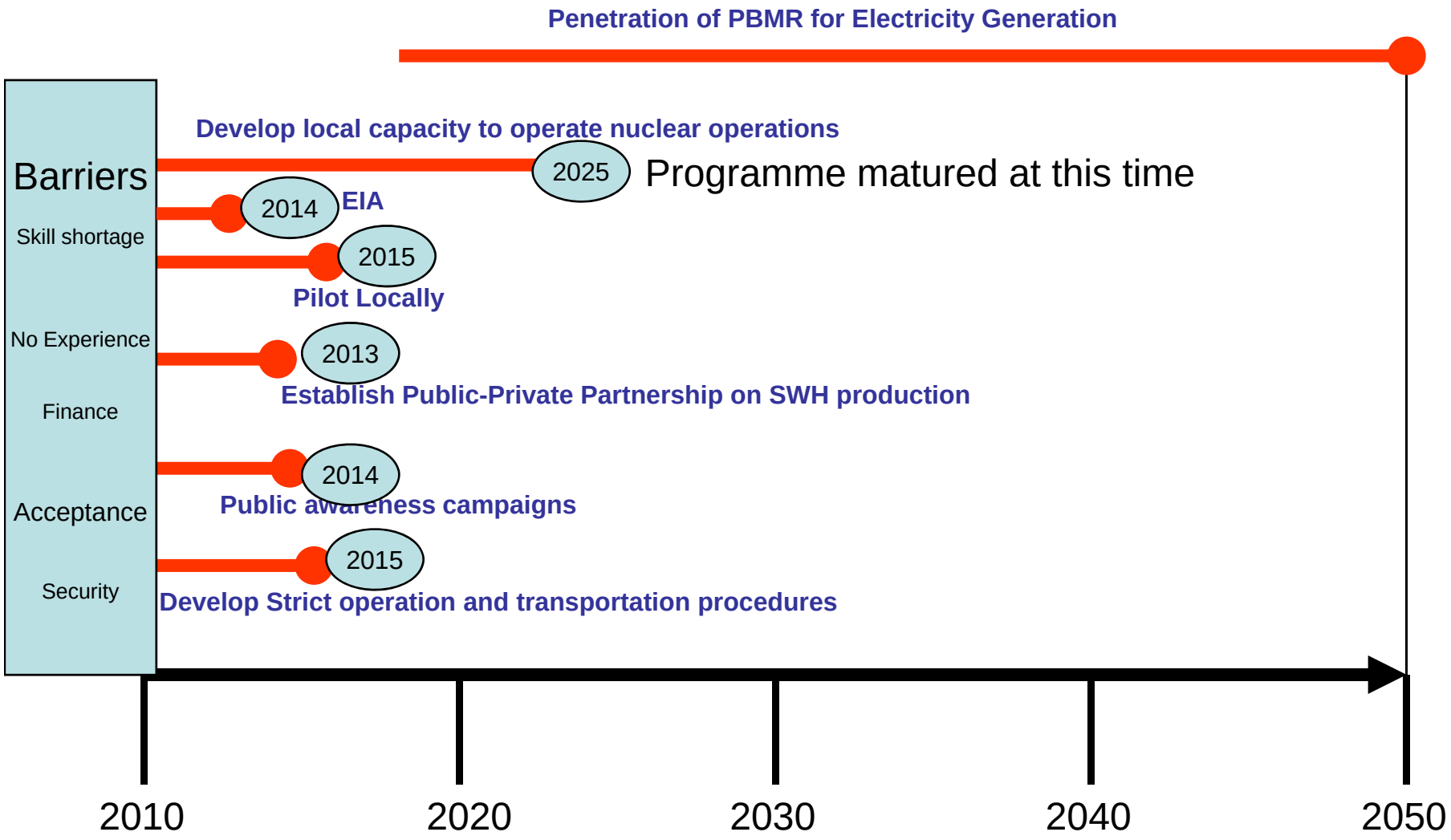
- Just survived an electricity crisis in January 2008
- 80% of power plants have exceeded their lifetime expectancy
- Nuclear is seen as plausible solution
- Ideally it should be used for buying time to develop renewable energies (more sustainable approach)
- Policy target (Nuclear) – 50% by 2050

  (Solar) - 27% by 2050

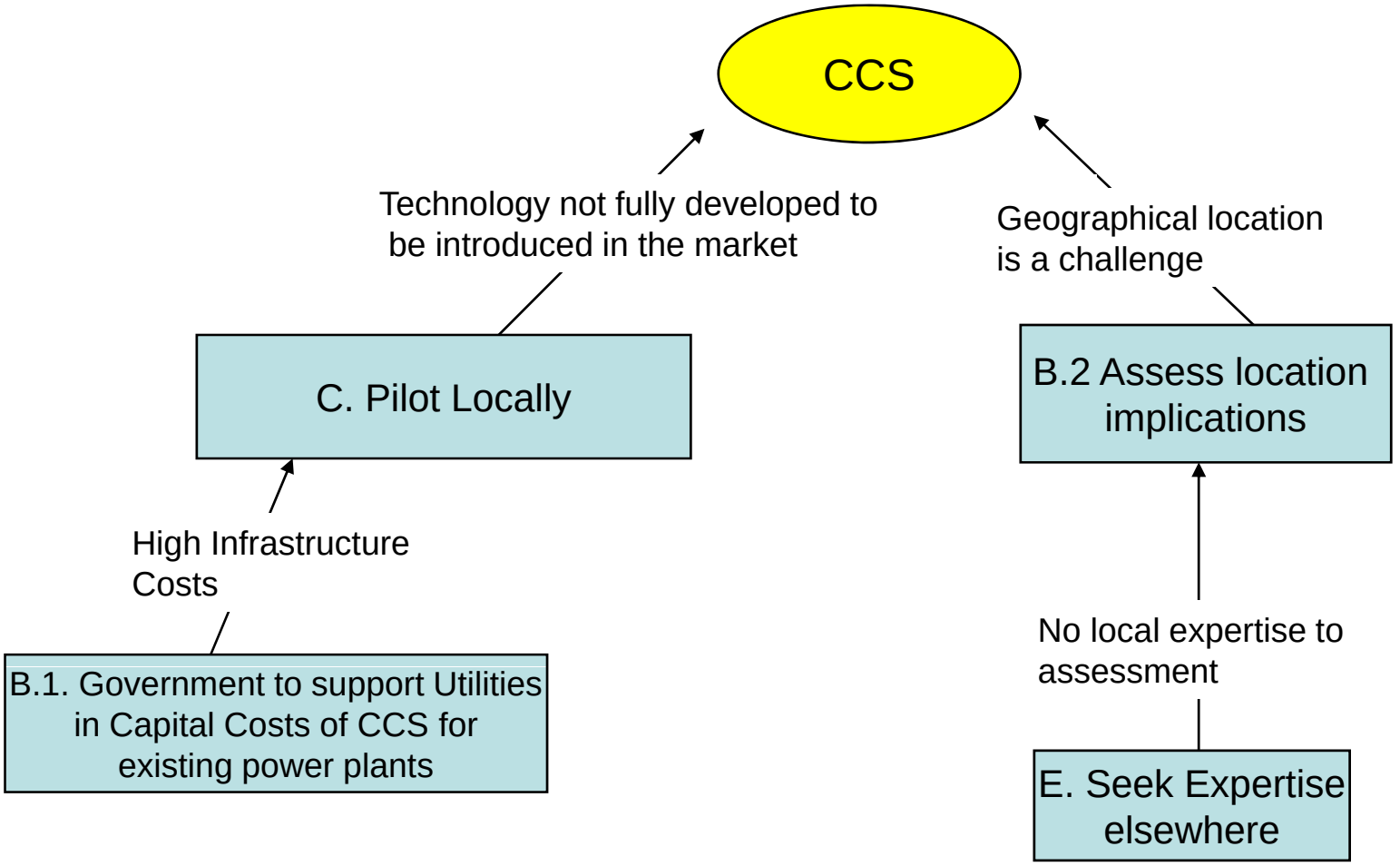
SUMMARY OF ACTIONS: PBMR



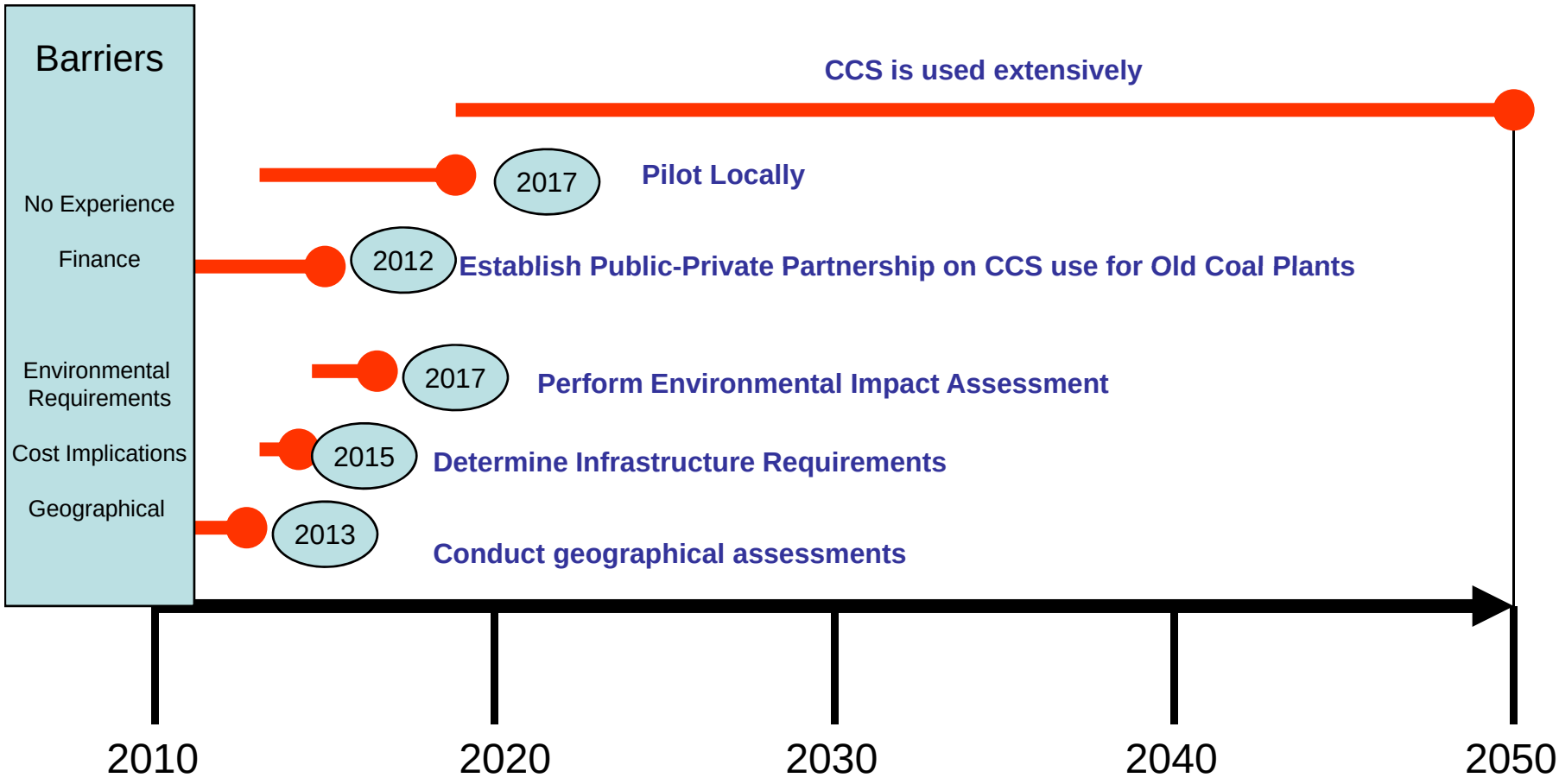
Gantt chart for PBMR



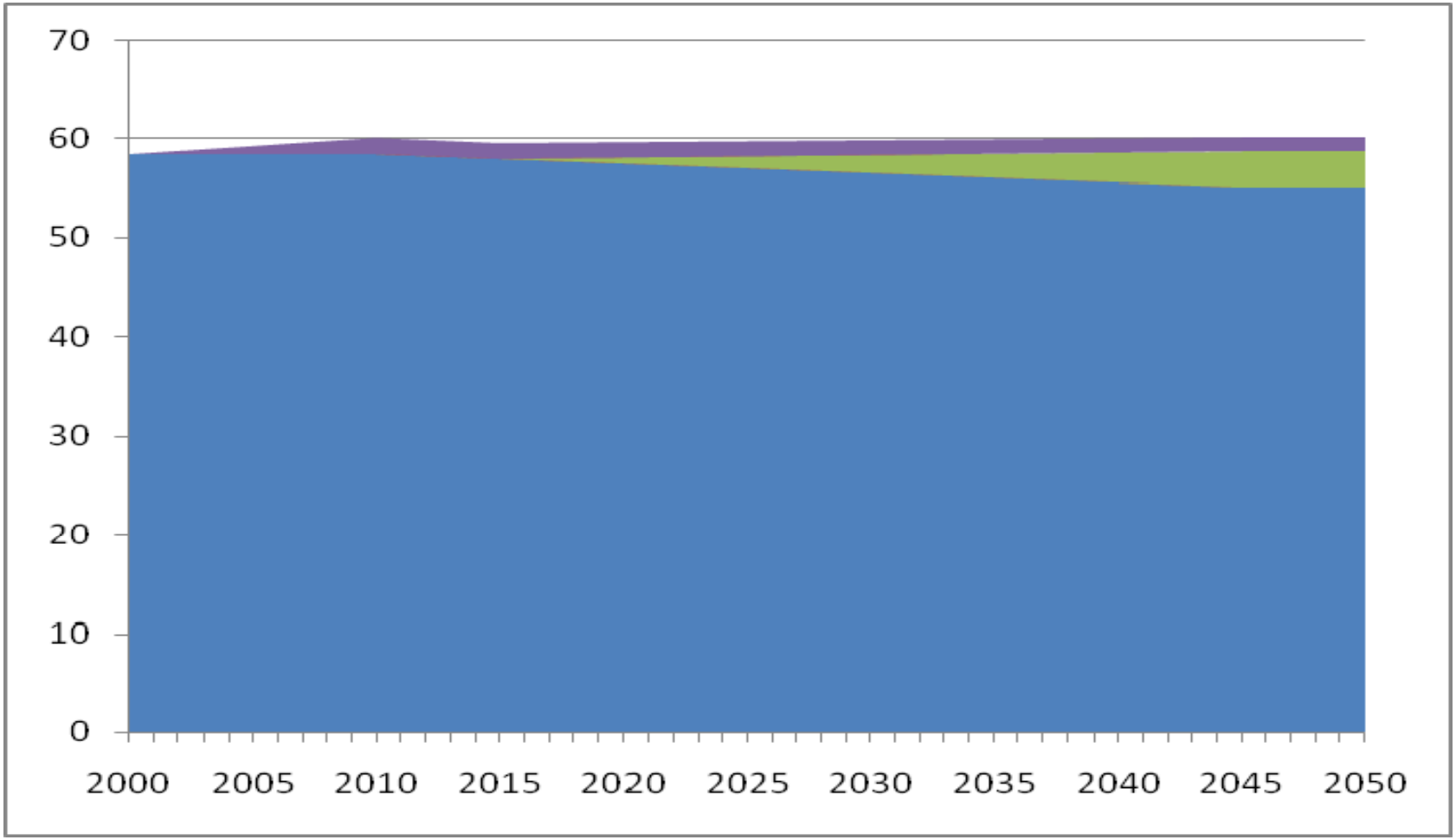
Summary of Actions: CCS



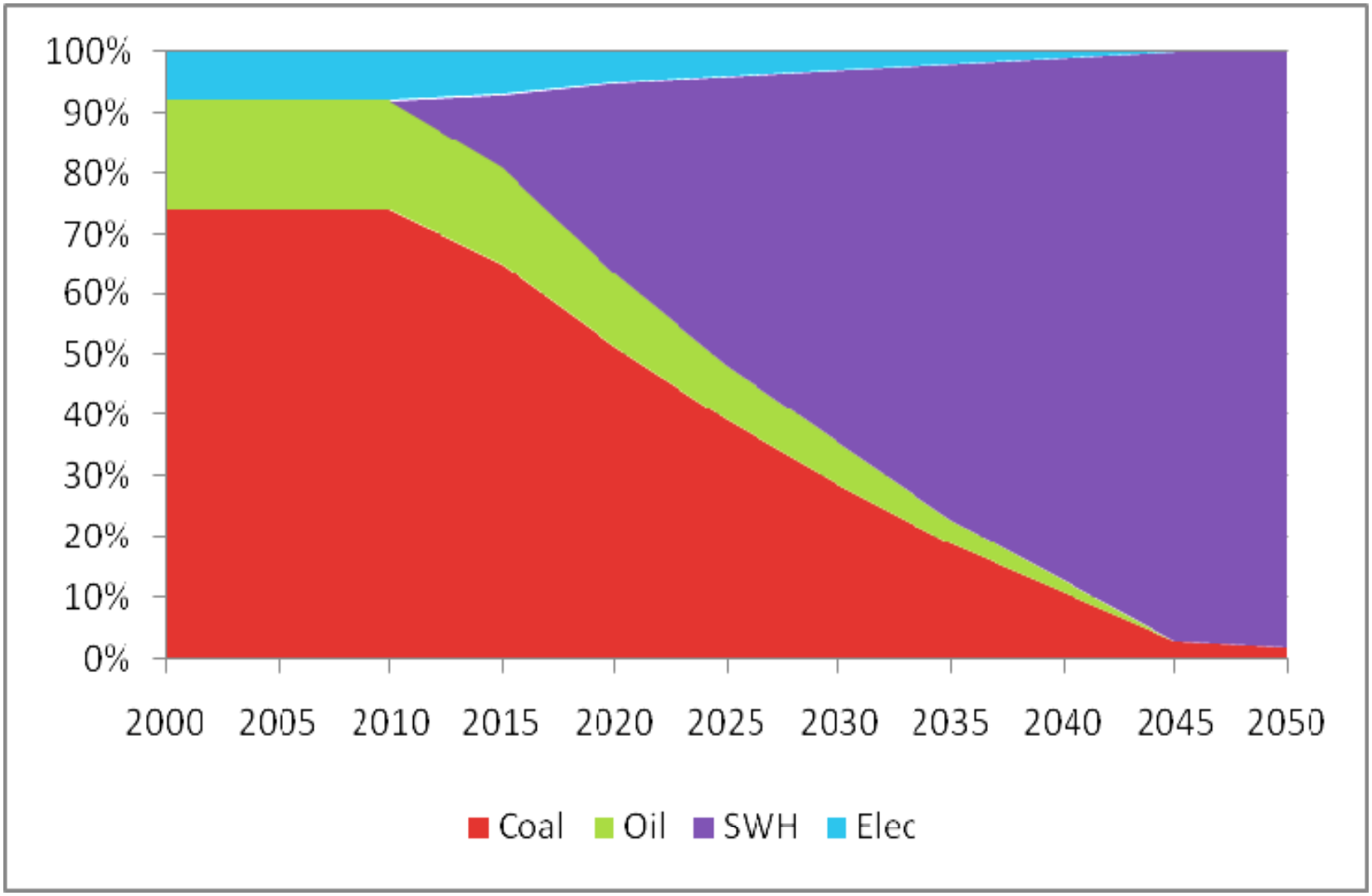
Gantt chart for CCS



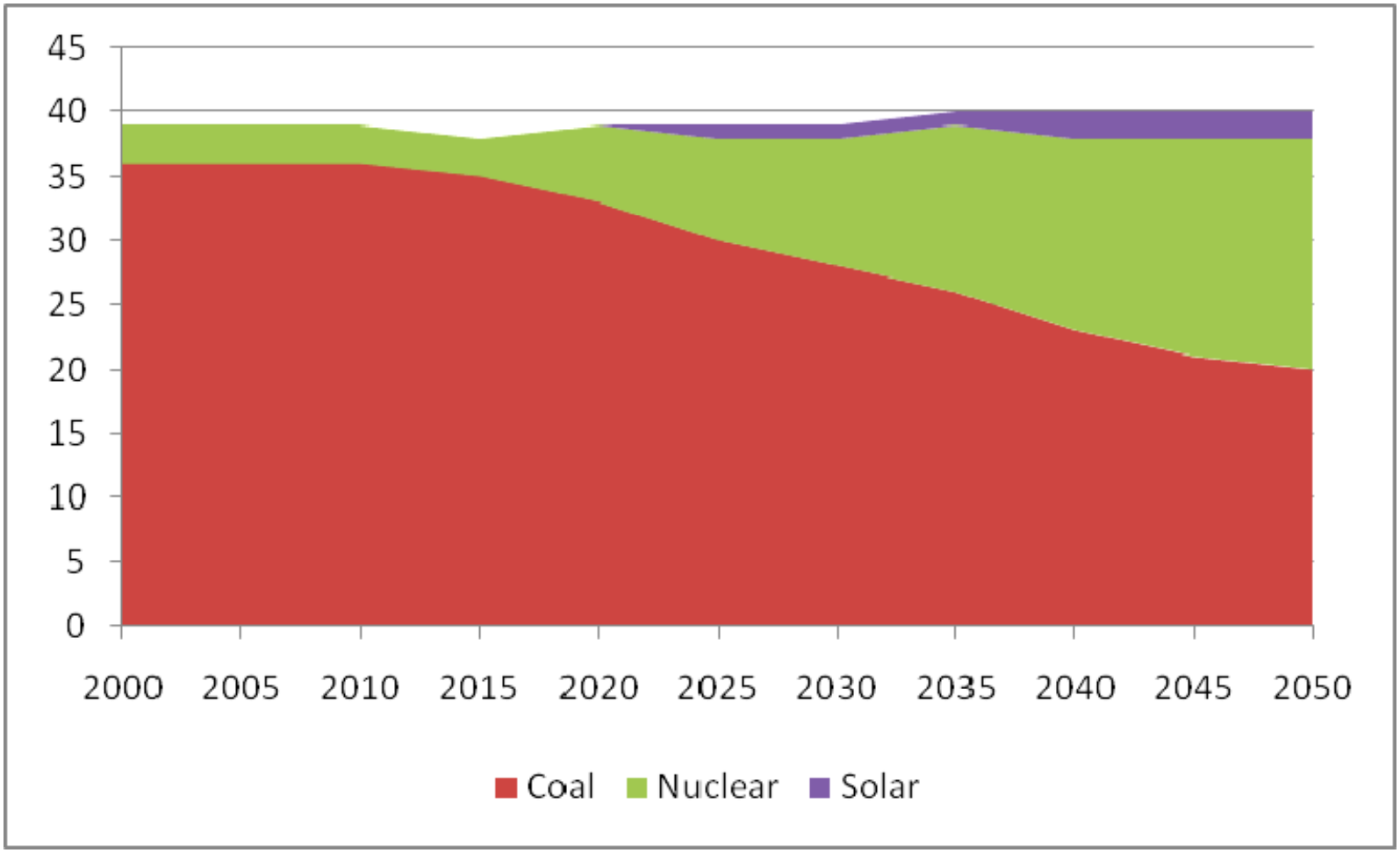
CO2 Emissions (SWH)



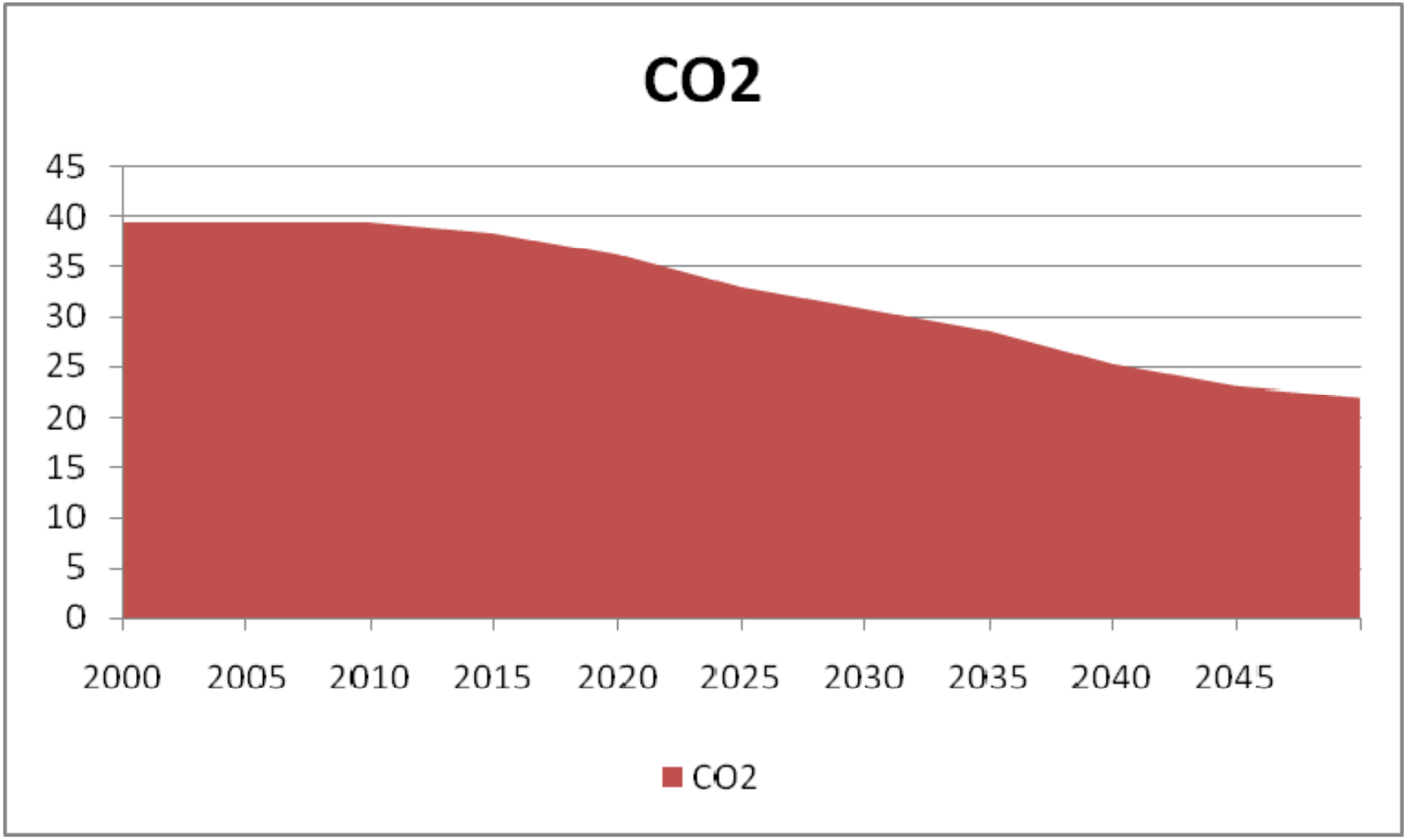
BCM Results: SWH Penetration



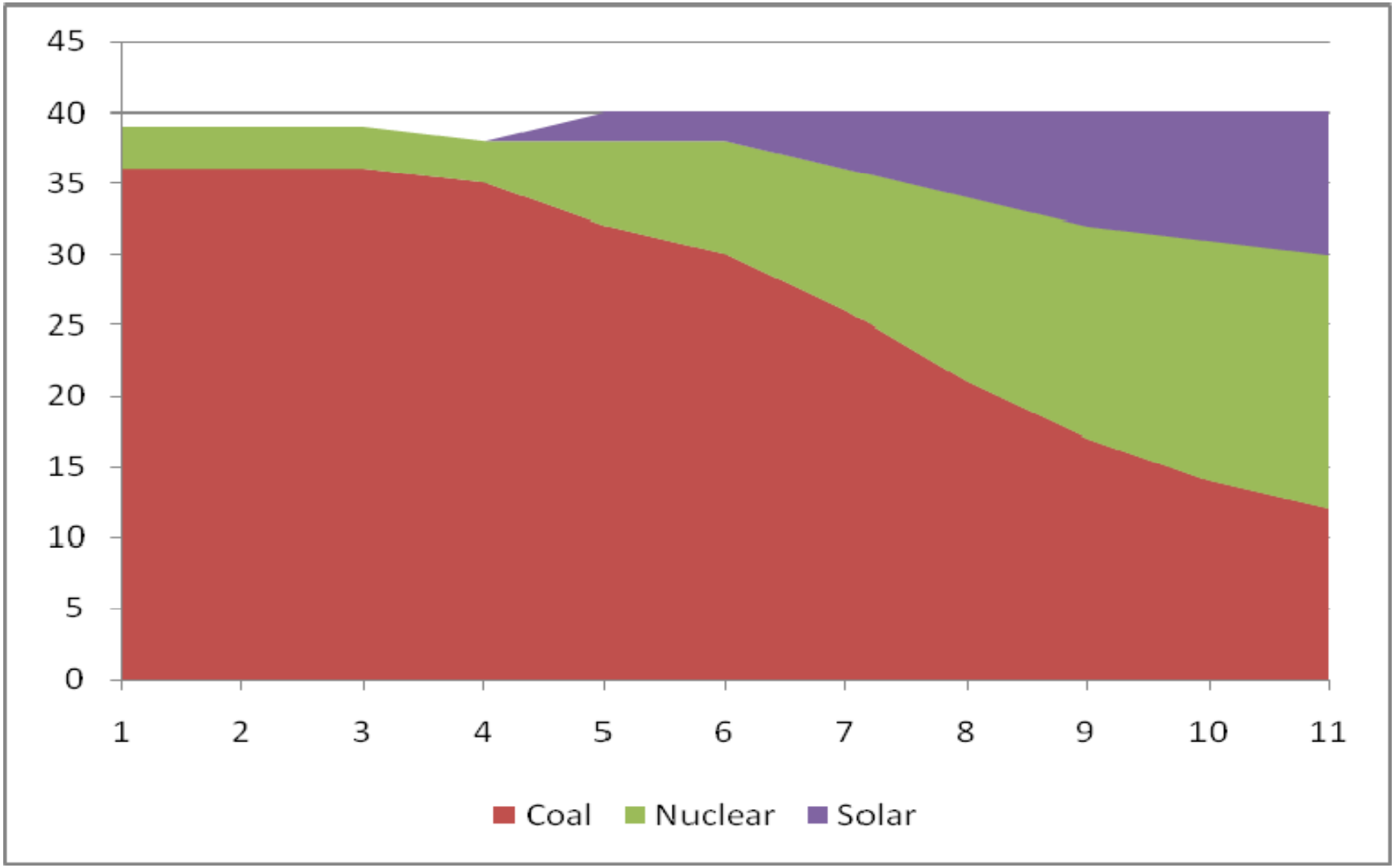
BCM Results: PBMR (Nuclear)



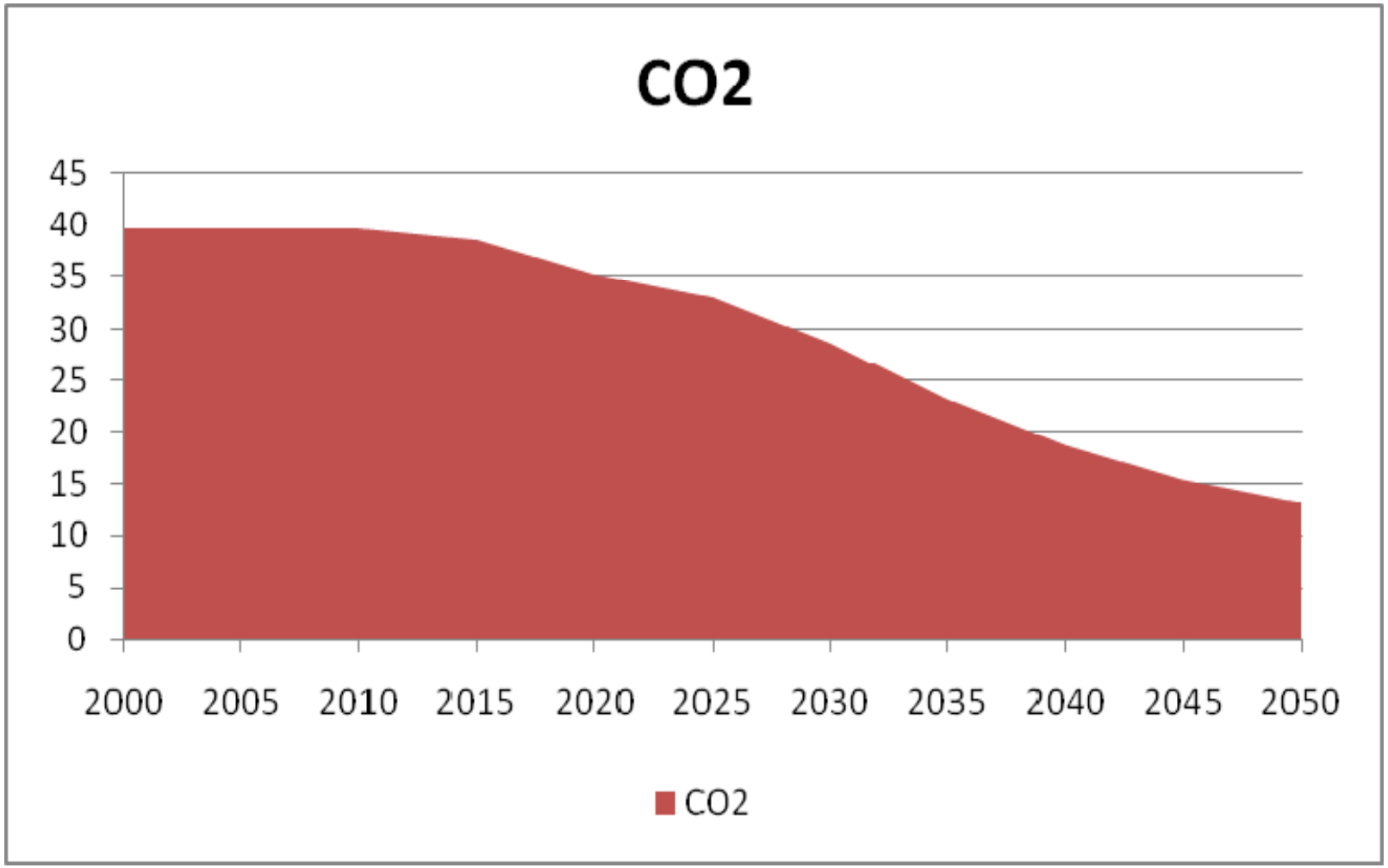
CO2 emission Reductions (PWR)



Scenario: Nuclea50Rew27



CO2 Reduction implications



Discussion & Comments

- Large potential to achieve LCS through aggressive interventions in the PWR generation sector
- Projections should also be based on exponential functions as well
- I think high resolution unit should be used to pick up low-to-medium changes.
- I would like to see connection between this model and other accounting models (e.g. LEAP)
- Additive approach to Scenario building