Dec 1, 2016

Clean Power Plan State Compliance

WestRock Presentation to EO 57 Workgroup

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Key Principles

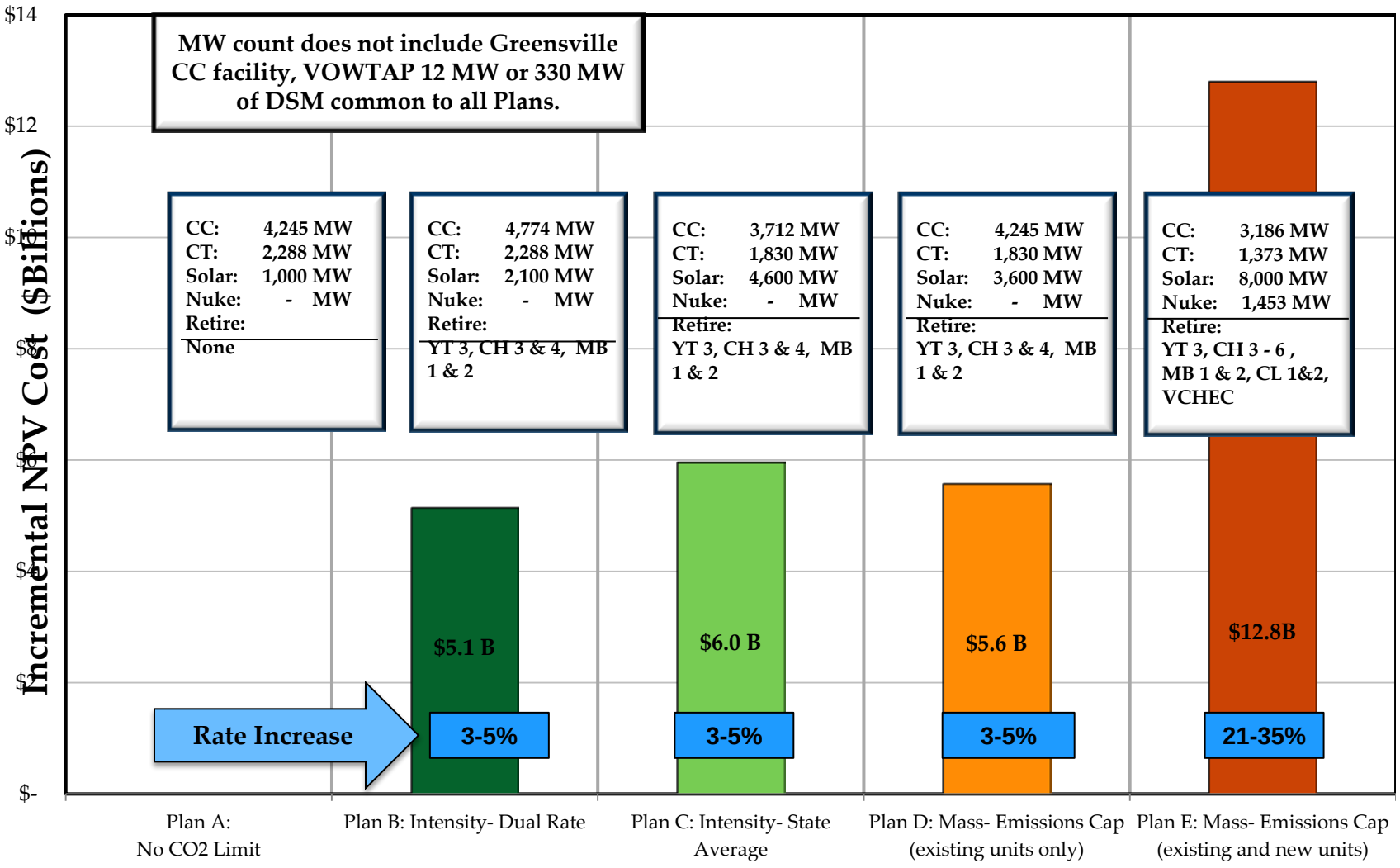
- Least Cost Approach to pursue only if CPP survives
- Recognize biomass as carbon neutral
- Provide credit for GHG reductions associated with Combined Heat and Power (CHP)

Least Cost Approach

- Minimize cost to ratepayers
- Consider all costs (direct and indirect)
  - Short and long term
  - Reliability
  - Harm to Energy Intensive Trade Exposed Industries
  - Job displacement
  - GHG leakage from displacement of EITE industries
- Detailed analysis of current and future energy demand
- Impact on businesses and jobs
- Ability to trade is critical regardless of whether mass or rate based approach is selected

Compliance Cost for each Plan

Incremental NPV cost vs No CO_2 Limit Plan



Source: DVP April 29, 2016 IRP (Case PUE-2016-00049)

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Mitigate Harm to EITE Industries

- Options for Mass-Based Approach
  - Auction allowance proceeds to EITEs
  - Direct allocations
  - Set aside for new, incremental CHP or industrial EE
  - Expanding leakage set aside for CHP or industrial EE
- ERCs for Rate-Based Approach

EPA CPP Guidance on Biomass

- The final CPP states that not all forms of biomass will qualify as carbon neutral energy feedstocks.
- Biomass offers carbon benefits when feedstocks are sourced responsibly and attributes of the carbon cycle related to the biomass feedstock are taken into account.
- EPA suggests the development of a predetermined or “qualified” list of biomass feedstocks that would be considered carbon neutral.
- EPA indicates that it will consider whether biomass residuals have an alternative market in determining whether they are fully carbon neutral (leakage test).
- Despite six years of work on this issue, neither EPA nor EPA’s Scientific Advisory Board has developed an explicit methodology to assess potential leakage, citing its complexities.

Alternative market test?

Under a literal interpretation…if non-energy (e.g. product) market exists for biomass, then not automatically carbon neutral. For example:

- round wood, clean sawdust and chips, bark often have alternative markets and therefore are not automatically deemed carbon neutral
- black liquor, forest residuals, C&D debris have no alternative markets, and therefore would be carbon neutral

Not practical for biomass markets

- Static test not appropriate for dynamic biomass markets
- Level of complexity not warranted
- Results highly dependent on geographic location

How should we treat biomass?

Recognize that underlying impetus for “alternative markets” test is to consider aspects of CO_2 emissions frequently covered in a Life Cycle Analysis.

Life Cycle Analysis has already been completed by NCASI that shows carbon neutrality for waste and residual feedstocks.

Roundwood from timberlands should be considered carbon neutral where the growth rate of timberlands is greater than or equal to harvest levels on a broad regional scale, based on data produced by the Forest Inventory and Analysis (FIA) program administered by the U.S. Forest Service.

Many states leaning toward “responsibly or sustainably sourced” as simple way to support carbon neutrality determination. However, majority of US forestland is owned by small family landowners and is not certified to a Sustainable Forestry certification. FIA data is a better measure of forest carbon stocks and flows.

Pre-Qualified List for Biomass Energy

- Support the development of a pre-determined list of “qualified” feedstocks that includes all forest product residuals that are automatically carbon neutral and do not need to undergo alternative market tests.

- Carbon Neutral and “Qualified” when:
  - From forest-derived industrial byproducts
    - “Anyway emissions”
    - Include black liquor and self-generated residuals combusted on site
  - Harvest Residuals
  - Waste Derived Feedstocks
  - Forest Derived Feedstocks

Calculating CO_2 Savings from CHP Systems – EPA Approach Components We Support

- Compare the CO_2 emissions from the CHP system to

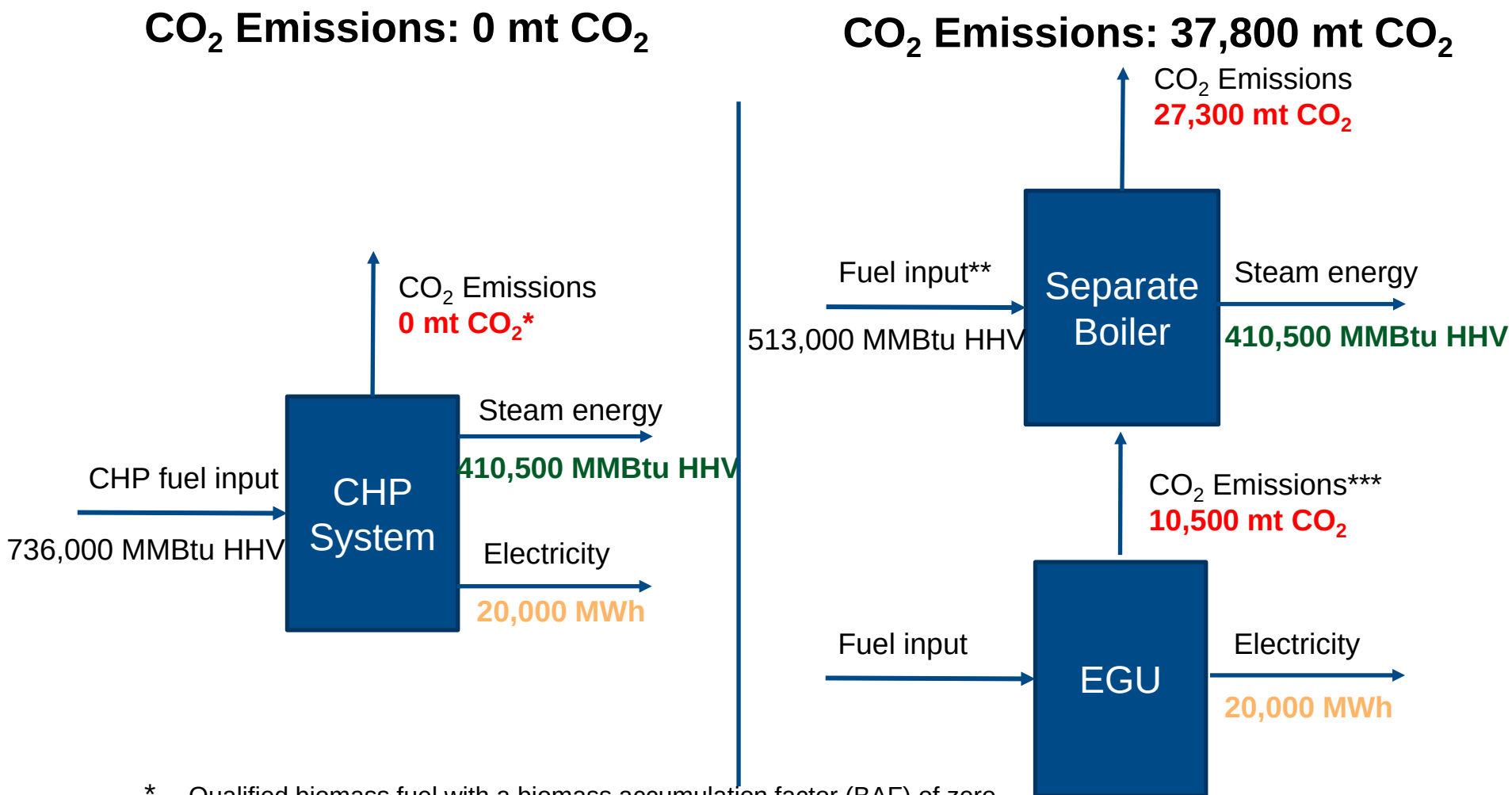
  - The CO_2 emissions from a separate boiler that would be necessary to generate the equivalent amount of heat produced in the CHP system

  - The CO_2 emissions from purchasing electricity from an EGU, equivalent to the amount of electricity produced in the CHP system

Calculating CO_2 Savings from CHP Systems – How to Fix Problems with EPA Approach

- Problems with EPA approach
  - It specifically compares CHP output to natural gas generation, rather than to the generation that is most likely to be avoided due to CHP deployment
  - It compares the CHP output to future emissions target rates for a combustion turbine, rather than real-time emissions rates
- Acceptable Solution
  - Compare the emissions from the CHP to actual emissions from affected EGUs from the previous calendar year
  - Use the average of the affected EGU emission rates for the subregions in the Commonwealth of Virginia

Example 1 – CO_2 Savings from CHP system firing wood waste



* Qualified biomass fuel with a biomass accumulation factor (BAF) of zero

** Natural gas

*** Using the latest, 2012, average eGRID emission rate from the SRVC and RFCW eGRID sub-regions of 1,156 lb CO_2/MWh

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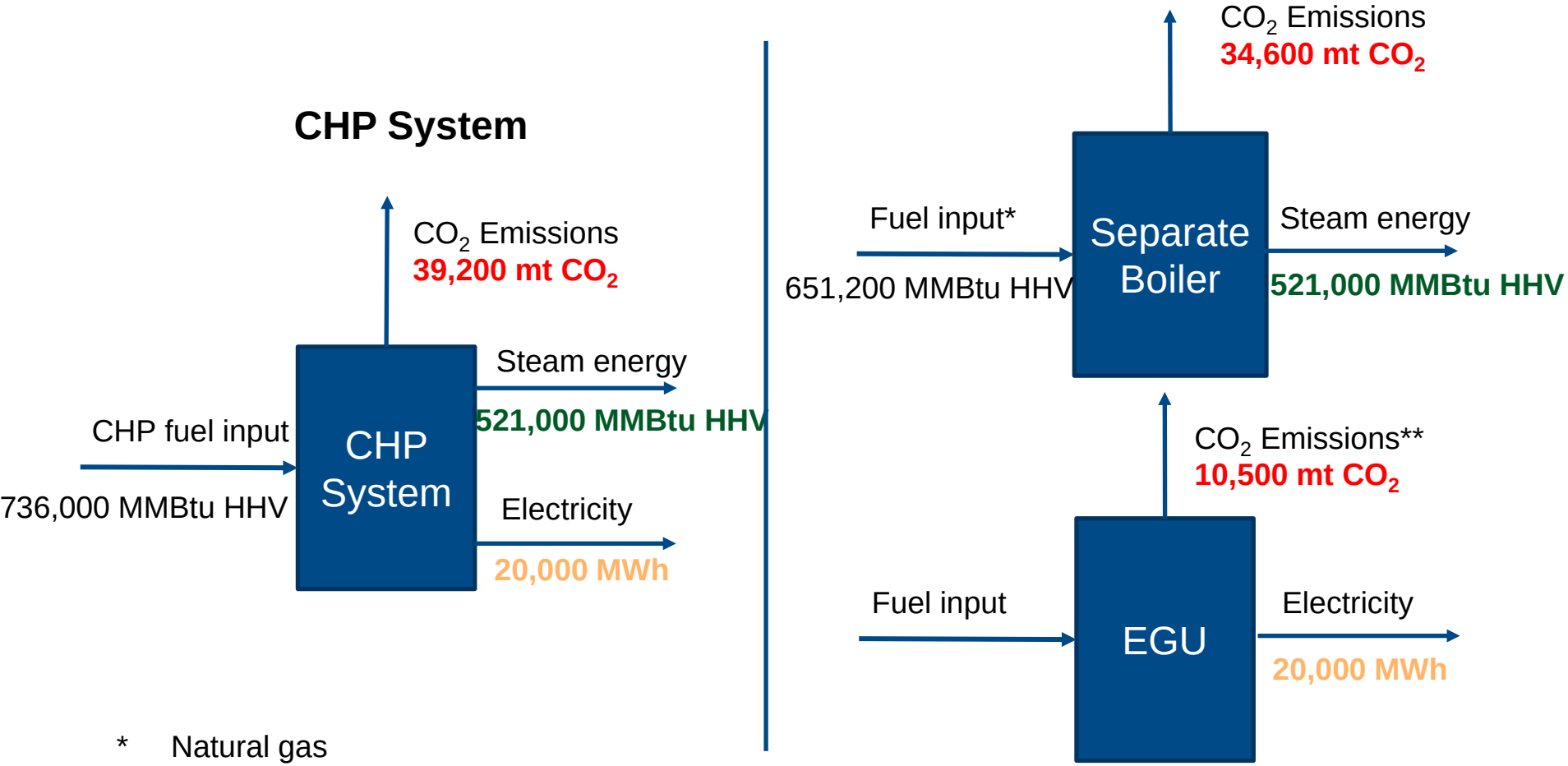
Example 2 – CO_2 Savings from CHP system firing natural gas

CO_2 Emissions: 39,200 mt CO_2

CO_2 Emissions: 45,100 mt CO_2



* Natural gas

** Using the latest, 2012, average eGRID emission rate from the SRVC and RFCW eGRID subregions of 1,156 lb CO_2/MWh

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