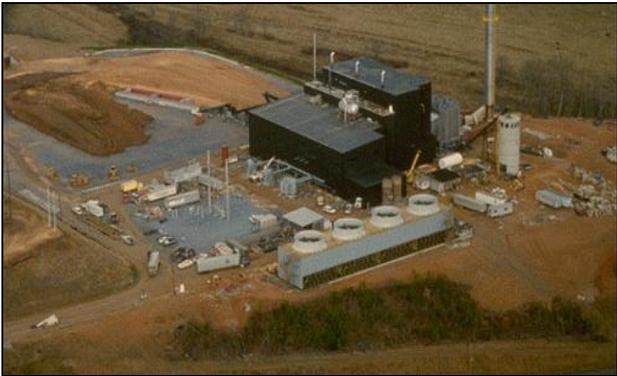


Forest Products Opportunities

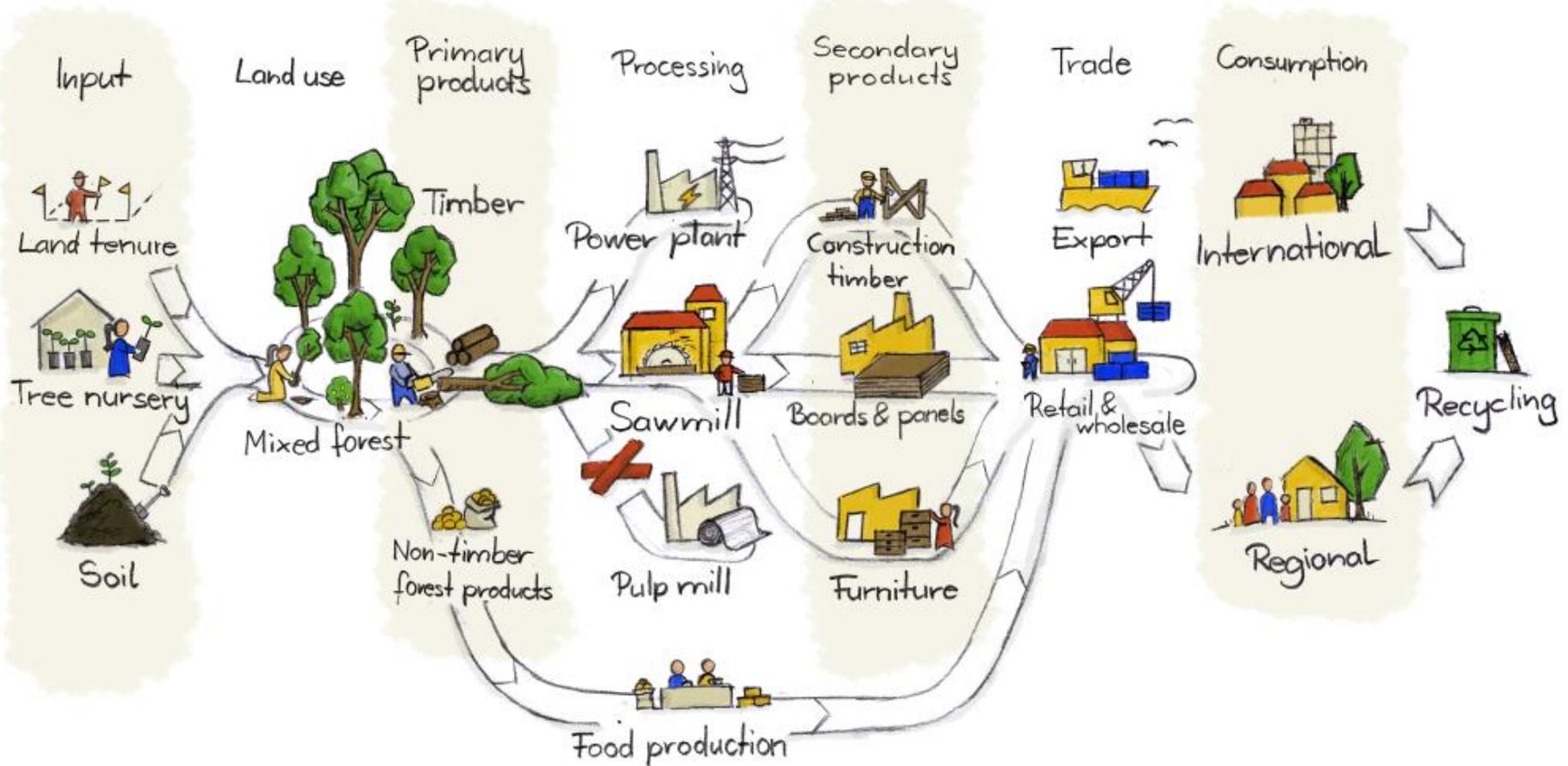
- Yellow Poplar CLT's – down the road
- Hardwood Exports – now and future for medium and upper grade hardwood logs and lumber
- Housing – OSB, Truss systems, flooring, millwork – depends on housing market – medium to lower grade lumber
- Low grade hardwoods – Pallets, pulp, OSB, Pellets and fuel
- Logging and other residues – pellets and fuel

Forest Products Opportunities

- Phil Araman, SRS-Blacksburg, VA



THE VALUE CHAIN OF TIMBER – Adopted from fairventures.org





Dominion Biomass Energy

Ruth Prideaux P.E.
Director of Generation
Projects

Virginia Tech
Nov. 21, 2013



Dominion[®]
It all starts here.[®]

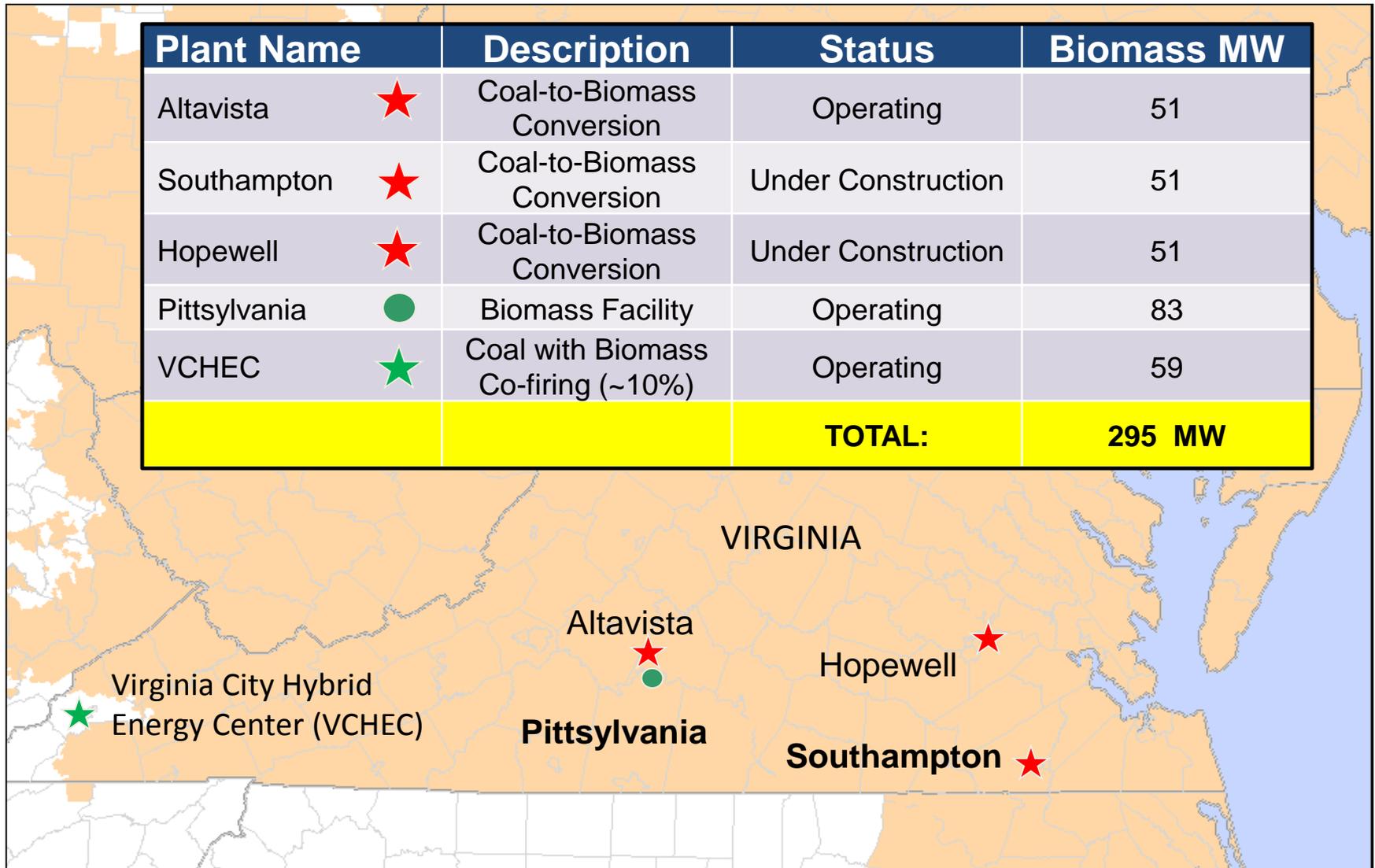
Pittsylvania Power Station: Dominion's Proven Experience with Biomass Fuel

- State of VA pushing for 15% of power from renewable sources
- Converting 3 coal plants to biomass plus this facility



- All Biomass Power
- Wood burning
- Mostly logging waste wood
- 150 trailers/day (20 tons each)
- Uses 2,500 tons/day (650,000 tons/year)
- 83 megawatt
- 2nd largest biomass power plant
- Power for about 20,000 homes

Dominion's Biomass Facilities: Operating & Under Construction



Coal-to-Biomass Conversions: Photos

Stacker / Reclaimer



Biomass Truck Tipper



Biomass Fuel Yard in Operation



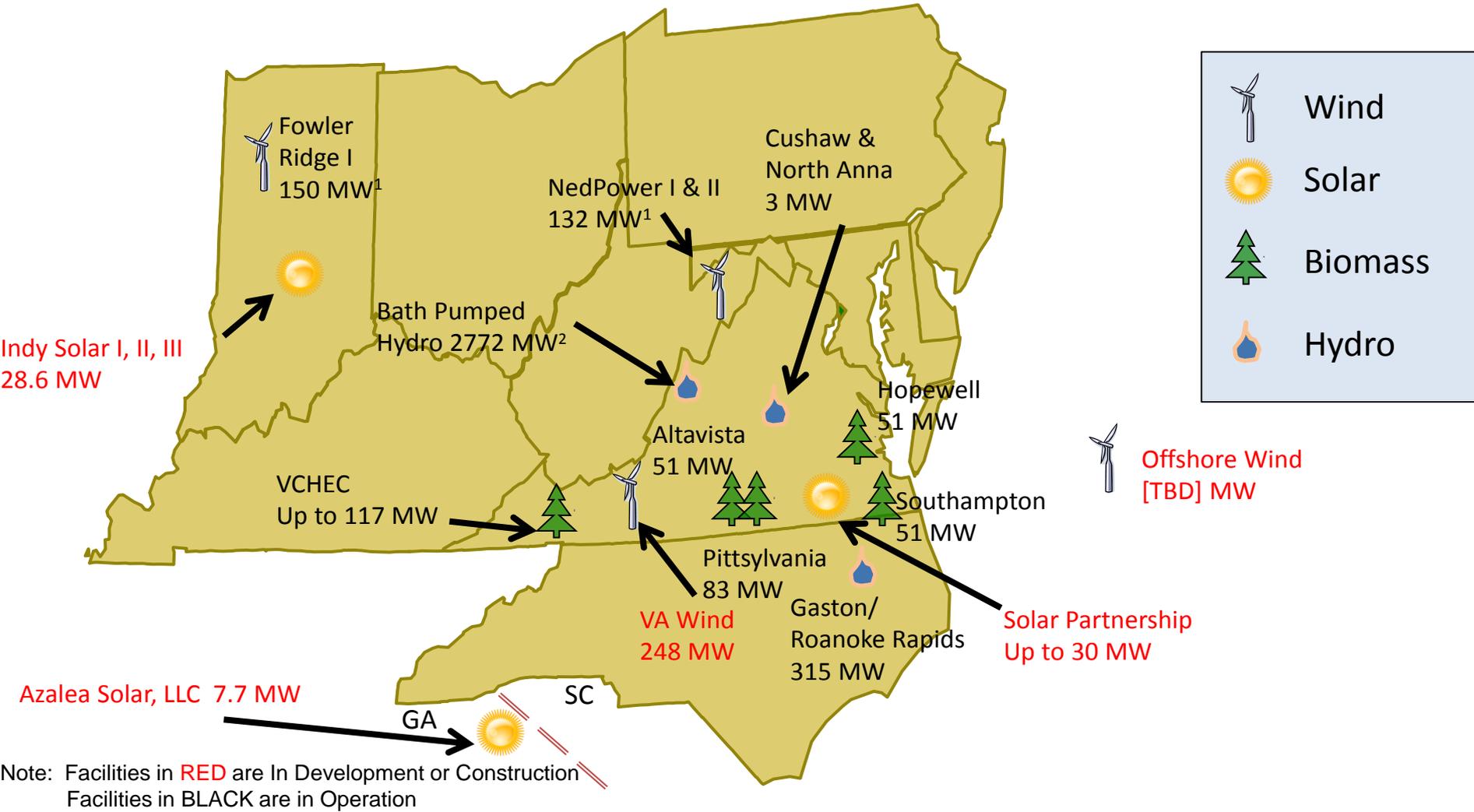
Virginia City Hybrid Energy Center



Virginia City Hybrid Energy Center -- BIOMASS TIPPER AND YARD



Dominion's Renewable Energy Facilities: Wind, Solar, Biomass and Hydro



Are coal to pellet power plants next?



Potential next big wood product -- **Cross-Laminated Timber (CLT) Panels** – a new engineered wood product



Factory built and assembled at the construction site

- Spruce/Pine/Fir
- Southern Pine
- Yellow Poplar?
- Active R&D at Virginia Tech
- Potential for massive amounts of wood needed
- Potential plant in Stuart, VA



Seattle, WA

CLT Benefits

Strength

- Allows wood to be used in never before seen buildings like 30 story high rises
- Cross lamination creates perfectly uniform strength properties like steel and concrete
- Creates new possibilities in cantilevers and load bearing

Fire

- Low surface area doesn't sustain a flame so fires burn themselves out
- Airtight construction lowers the fires' oxygen supply, gas does not travel through the panel
- Heat does not conduct from one side of the panel to the other

Seismic

- Combination of strength, ductility and light weight form the ideal earthquake-proof system
- Shake table tests up to 7 storeys prove that CLT buildings have excellent performance
- No loss of life or structural damage even against the strongest earthquakes

Acoustic and Vibration

- Solid wood panels give excellent acoustic insulation
- Vibration design can satisfy the strictest building codes
- Construction process is nearly soundless, perfect for urban projects

Thermal Insulation

- Ideal building system for Passive Homes - that don't require heating systems
- Can trap 90% of the heated air that escapes from normal homes
- High thermal mass of timber keeps home warm in the winter and cool in the summer

Durability

- Has the best long-term stability of any wood building system
- CLT eliminates swelling, shrinkage, warp, and creep – main barriers to normal wood construction
- The stability allows for precision building and new higher wood towers

Installation Efficiency

- Manufacturing process minimizes on-site labour with off-site efficiency automation
- Panel connections are based on simplified self-tapping screws
- Can build a 9 storey building in 9 weeks instead of 27, even with a 4 person crew

Sustainability

- Building a CLT home can be a carbon positive project where more carbon is saved than emitted
- The only fully renewable heavy duty building material, requires a fraction of carbon to produce