Global Challenges and Local Opportunity

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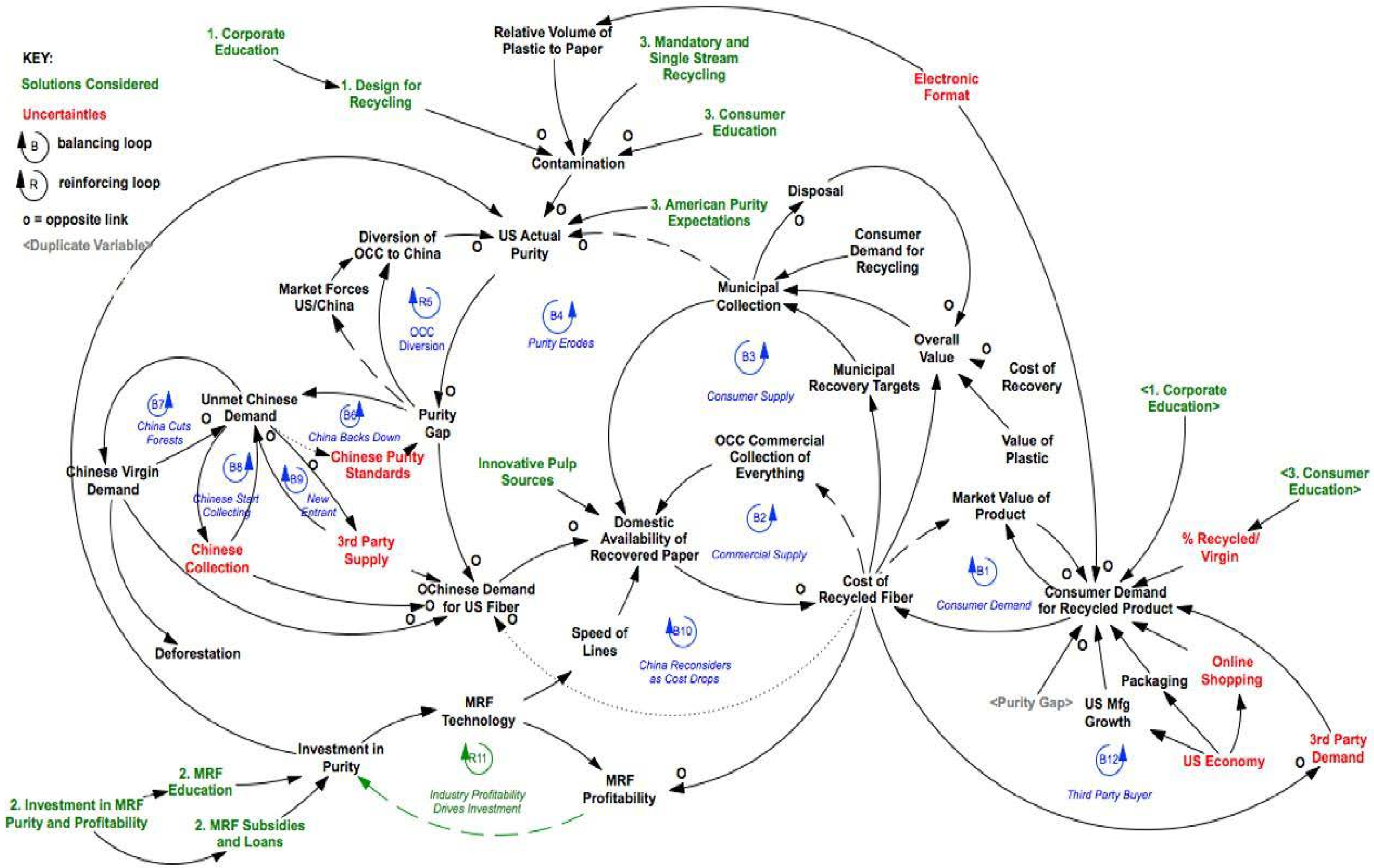
Fiber Flows as a Global System



Size and Scope of the Challenge: China National Sword

- In 2016, 52.6 million tons of recovered fiber consumed
    - 30.8 million tons domestic, 21.8 exported
    - China accounted for 14.5 million tons, about 67% of the total U.S. export volume of recovered paper
    - 2.4 million tons was mixed paper
- Late 2017/Early 2018 -- China bans import of all mixed paper and plastics
- Modeling shows domestic mill ability to absorb 30% (~741, 000 tons) of the mixed paper no longer exported to China

Options To Address Remaining (~1.6 million tons) Mixed Paper

- Improve quality of residential mixed paper
    - Consumer education and processing improvements at MRFs
- More mixed paper use at existing mills
- Additional domestic capacity coming online
- New export markets

Using More Mixed Paper

- Lower prices make mixed paper a more attractive feedstock
- Recovered fiber consumption at U.S. mills increased 1.1% in 2017
- Domestic consumption of mixed paper projected to increase in 2018 and 2019
- Best suited for containerboard, away-from-home tissue, and recycled paperboard
- Improved quality will allow more mills to consider using mixed paper
- Processing improvements
- Technological advancement

Publicly Announced New Capacity

- Midwest Paper – Combined Locks, WI
- Pratt – Wapakoneta, OH
- Green Bay Packaging – Green Bay, WI

Regional Challenges in Mixed Paper Consumption

Change in Regional Consumption of Mixed Paper in the U.S. (2016-2017)

U.S. Region	2017 Consumption (000 tons)	% Change (2016-2017)
New England	97.8	+32.9%
Middle Atlantic	562.2	+0.6%
North Central	1455.5	+1.5%
South Atlantic	681.4	-0.7%
East South Central	245.3	-12.2%
West South Central	582.0	+0.1%
Mountain States and California	78.8	-13.8%
Pacific Northwest	20.8	-23.7%

Mill Closures Reduce Domestic Capacity on West Coast

- 18 paper mills have closed in WA and OR since 1995
- 16 mills have closed in California since 2002 and current pulp and paper production is 44% of what it was in 2002
- Closures typically attributed to comparative high cost of doing business on west coast
  - More economical to ship products to West coast
  - Further uncertainty created by costly state carbon pricing proposals
  - Cost/uncertainty make west coast mills less competitive and disadvantages them in competition for capital investment

New Export Markets

- In first six months of 2018:
  - Exports of recovered fiber to other countries were up 114 percent versus their year-ago tonnage volume to 4.1 million tons
  - Exports of mixed paper to those countries was up 100 percent to 1.1 million tons

Where is this all headed?

- All of the various options will contribute toward rebalancing the situation
- Markets are adapting rapidly
- New technology is improving mill capabilities
- Mills are increasing their use of recovered fiber
- New capacity is coming online
- New export markets are being identified
- The west coast faces stronger headwinds vs other regions due to local factors