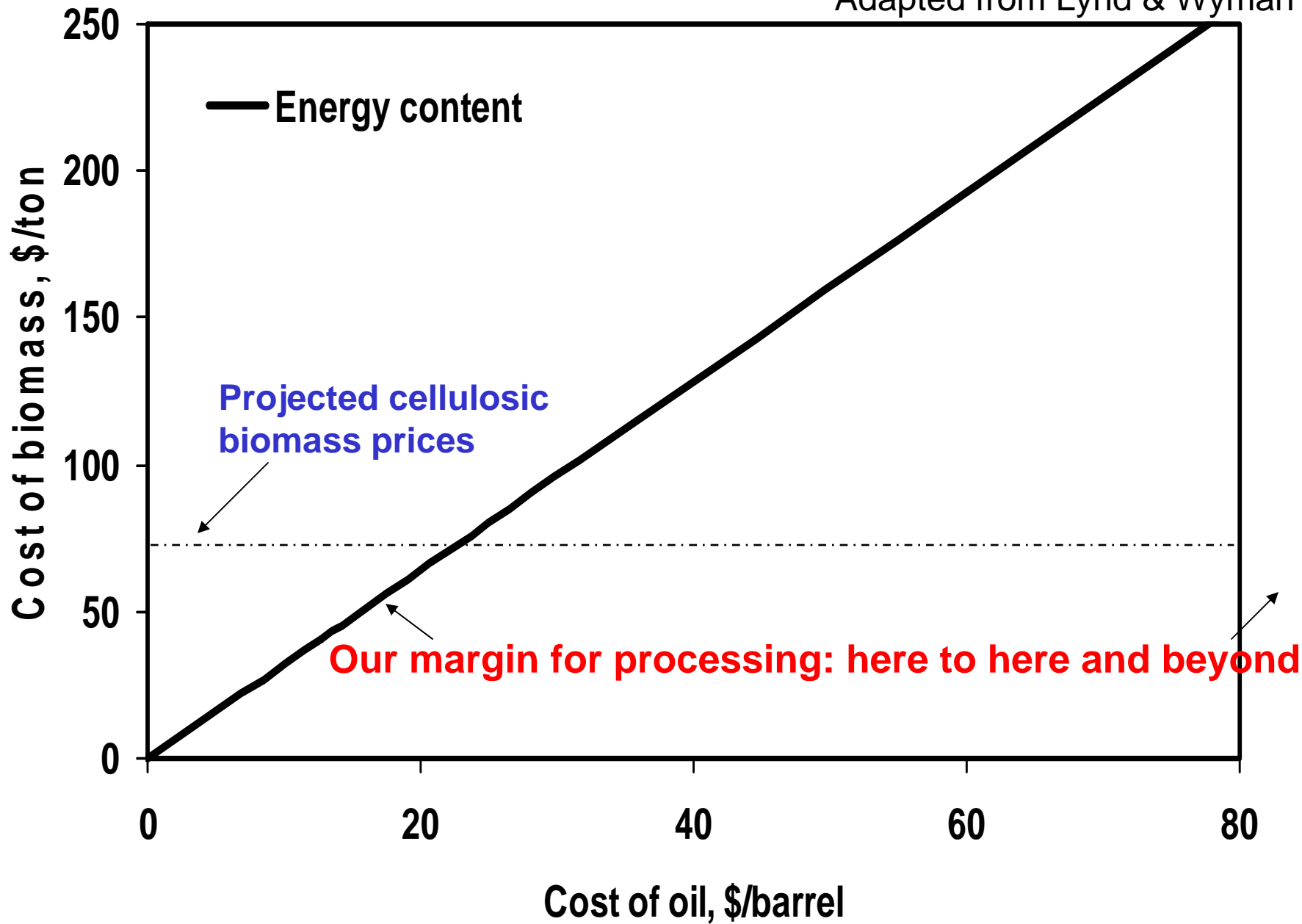


Renewable Energy: Big Questions, Big Opportunities for Agriculture & the Land Grants

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ESS/SAES/ARD Meeting and Workshop
September 14-16, 2009
Oklahoma City, Oklahoma



Biomass is the cheapest carbon, especially in a carbon-constrained world

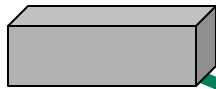
Questions for a Biofuels Future

- Premise: *the biofuels industry will continue to grow rapidly in coming years.*
- Some resulting questions:
 - How will supply chains develop?—**big** issue
 - How will society/interest groups, etc. react?
 - How will related environmental issues (carbon sequestration, water, soil quality, landscape values, biodiversity, etc.) be addressed?
 - Given a large biofuel demand, what will the implications be for food/feed/fiber markets?
 - Can we coproduce fuels (& foods/feeds)?
 - How can farmers & local communities benefit?
 - Will the agricultural research system rise to its huge opportunity?

Biofuels: Changing Balance between Processing and Feedstock

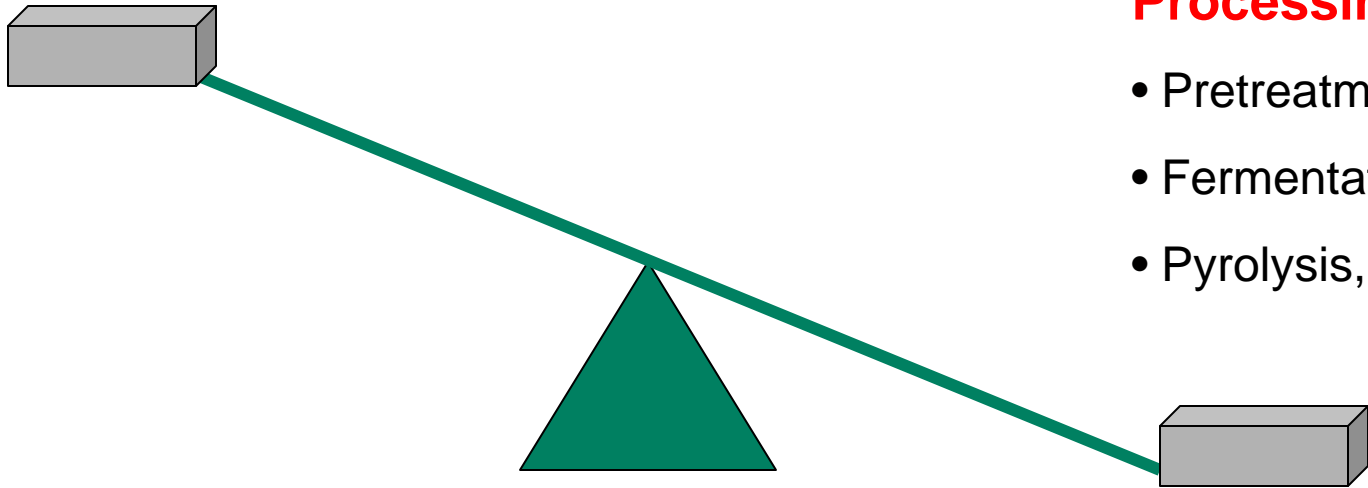
Today

Feedstock



Processing

- Pretreatment
- Fermentation
- Pyrolysis, etc.

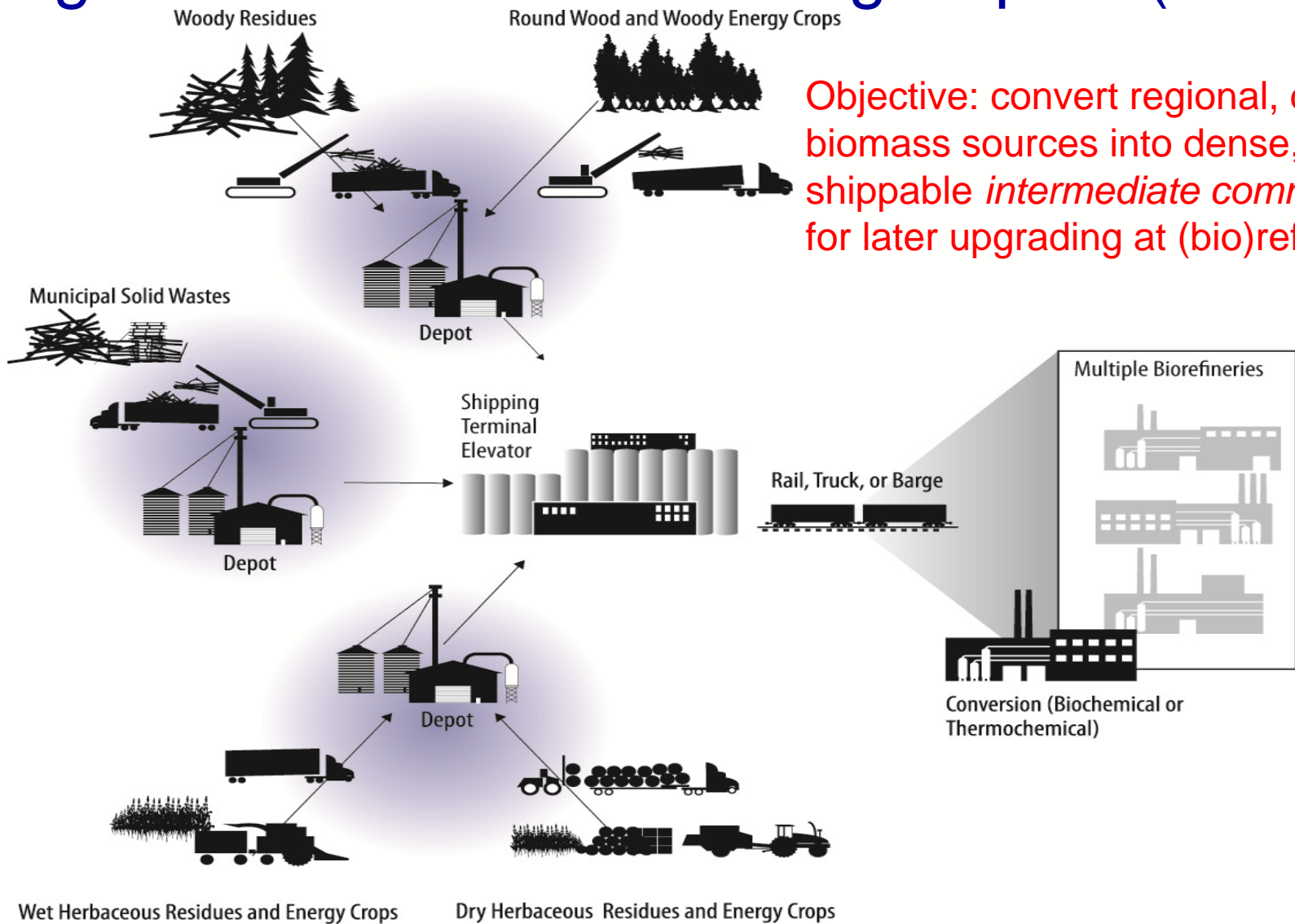


Changing Balance between Processing & Feedstock: *Opportunities for Research*

Near Future



Attacking Biomass Supply Challenges: Regional Biomass Processing Depots (RPBDs)



Objective: convert regional, distinct biomass sources into dense, stable, shippable *intermediate commodities* for later upgrading at (bio)refineries

Advantages and R&D Needs for Regional Biomass Processing Depots

- Advantages of RBPDs
 - Address biomass variability near point of production
 - Produce dense, stable, shippable *intermediate commodities* for biofuel producers (“biorefineries”)
 - Reduce transaction costs & capital risks for biorefineries
 - Benefit rural communities through job creation & ownership
 - Address “food vs. fuel” and sustainability issues directly
- Research needs to implement RBPDs
 - Optimize in field harvest/storage/logistical systems
 - Optimize supply chain for “best” intermediate products
 - Conduct techno-economic and life cycle studies
 - Develop processing technology/property data for biofuel *intermediates* & coproducts (eg, biochar, animal feeds)