What is WAFERx?
- Water, Agriculture, Food, Energy, Research Nexus (WAFERx) is a regional interdisciplinary team including Montana State University, University of South Dakota, and the University of Wyoming.
- WAFERx address important topics of a BECCS (defined below) economy on food, water, energy, biodiversity, and society in our region.

What is the region that WAFERx will explore?
- The Upper Missouri River Basin which contains parts or most of four states – Montana, Wyoming, South Dakota, and North Dakota – and more than 20 Indian reservations.
- Agriculture in the Basin produces 30 percent of the wheat, 13 percent of the soybeans, 11 percent of the cattle, and 9 percent of the corn in the United States.

What is bioenergy and carbon capture storage (BECCS)?
- BECCS couples bioenergy production (BE) with carbon capture and storage (CCS).
- Current bioenergy production is primarily from corn grain, but future bioenergy production may use dedicated energy crops or other materials.
- CCS is the storage of atmospheric carbon dioxide (CO$_2$) either deep underground or in soils.

What is the project plan?
- WAFERx team will meet with people who live and work in the region to hear their questions, concerns and opinions about BECCS.
- WAFERx team will use computer models to better understand what might happen economically, socially, and environmentally if land uses change due to increases in BECCS.

What are the project goals?
- WAFERx team want to make recommendations for strategies that can reduce CO$_2$ in the atmosphere without negatively impacting farmers’ and ranchers’ livelihoods and regional access to food, water, wildlife habitat and other attributes that we value.

What are BECCS impact on climate change?
- BECCS are processes that have the potential to lower CO$_2$ concentrations in the air (or atmosphere).
- A BECCS systems involves growing plants that remove CO$_2$ from the air (an important greenhouse gas), using those plants as an energy source while also capturing the CO$_2$ produced when generating energy and storing it underground.

What are concerns with BECCS?
- BECCS approaches could have unforeseen and possibly negative consequences on regional food, energy and water systems.
- Transforming current energy systems to BECCS systems could mean massive changes on many fronts, including agricultural land use; building or retrofitting power plants with complex technologies to harvest the CO$_2$ before it enters the atmosphere; and implementing geologic carbon storage.

The research will focus on the Upper Missouri River Basin (UMRB), which refers to the Missouri River and all its tributaries upstream of Sioux City, Iowa. The basin contains parts or most of Montana, Wyoming, South Dakota, North Dakota and Nebraska and more than 20 Indian reservations.
What are WAFERx researches most excited about?
- WAFERx explores the impact of BECCS to ecosystem services.
- Working with a new colleague in a very unfamiliar way.
- The large regional scale of the modeling effort and making informed projections reliable based on realistic land use patterns.
- Implementing impacts of future practices into understanding impacts to conservation.
- Trying to create future land use scenarios that pass the laugh test.
- Finding which crops are most likely to succeed in our area.
- Conducting research that has the potential to influence global climate change modeling and policy recommendations.

How will a BECCS economy affect me as a Policy Maker?
- A BECCS economy has large implications on water, agriculture, food, and energy.
- WAFERx will inform public policy choices to best meet economic and carbon demands in an optimized manner.
- WAFERx will help us to discover if our current policies and land-use decisions are in alignment with what people want to see on the landscape.

How will a BECCS economy affect me as a University Administrator?
- Agriculture is an important component of our state’s economy.
- WAFERx positions the institutions and partners to be leaders in the field of BECCS.
- This grant is helping the partnering Universities to become more relevant in topics of high importance to the state (agriculture, food, water, energy).

How will a BECCS economy affect me as an Industry Representative?
- A BECCS economy impacts our agriculture, food, and energy industries.
- What happens when and if bioenergy influences all parts of agriculture (crop prices, livestock prices).
- WAFERx will explore the idea that new carbon capture technology can help us use coal and other power sources in a more environmentally safe manner.

- BECCS research offers opportunities for industry engage in interdisciplinary research fields that are of interest to national funding agencies.