SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL **SUSTAINABILITY:** COMMUNITY ISSUES

NORTH CENTRAL SARE Sustainable Agriculture Research & Education

UW Extension

Matrix Tool for Community Participation

DRAFT Document: May, 2010

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LESSONS LEARNED

The following are suggestions of ways to encourage community involvement in decision-making about the development of bioenergy facilities.

1. **Hold community conversations about energy use, conservation, and renewable energy generation prior to making decisions about a specific project development.**

    a. Information sessions can provide a context to learn about and discuss issues for the community, including:

    - what is renewable energy/bioenergy?,
    - what are energy conservation and/or generation goals for this community?,
    - how can bioenergy fit with economic development in the community?,
    - What are the pros and cons for various forms of renewable energy?

    b. Community discussions provide opportunities for a community to propose specific activities to conserve or generate energy:

    - how can our community move toward energy conservation and/or energy generation?
    - what are the perceived issues with particular forms of energy generation?
    - what impact would specific types of energy generation have on our community (social, economic, environmental)?
    - what types of initiatives or projects would fit with community goals and plans?

2. **Communicate information about specific proposals using an open and transparent process.**

    a. Develop an process to engage the community in discussion about specific proposals that are being proposed.

    - early opportunities for discussion provide a safe context for issues to be aired and can help identify areas where further studies are needed (e.g., feasibility, engineering, environmental impact, etc.).
    - providing a context for discussion will help alleviate the perception that decisions are being made behind closed doors.

    b. Post notices about meetings in advance of meeting.

    c. Meetings where both sides (if there are sides) have opportunity to present their information (through informational booths, etc.) are important ways to communicate information and show that various opinions are taken seriously.

    d. Meetings organized by a town board or other ‘public’ entity will have more validity than meetings conducted by the developer or a party with a vested interest.

- Public meetings of the developer don't count for active engagement; this is the industry proposal but will not be comprehensive in answering community questions.

- County level hearings are for permitting, and that's too late in the process for getting effective public participation.

e. Conflict of interest (real or perceived) must be dealt with openly (Individuals should excuse themselves if there is a conflict of interest).

3. Public meetings should be well organized and offer a systematic way for people to comment

a. Well-organized public comment process/protocol allows community residents to participate in ways that are recognized and understood.

b. Make sure that there is a formal way to take comment, and that this process is followed in an organized, and consistent manner.

c. Have comment cards for those who do not want to make oral comments at meeting.

d. Develop a process to look at social and environmental impacts systematically.

4. Conduct the business of project proposal review with professionalism and due diligence.

a. Board members should conduct business and interactions with professional demeanor.

b. Opposition comments or organizations should be listened to and taken seriously.

5. Pre-existing zoning plans are a pre-requisite for an open decision making process

a. Does the town have a plan? Does a particular proposal fit with the existing zoning plan?

b. Communities should stick to already established zoning decisions, when possible.

c. What is the rezoning process, if this is necessary?

6. Allow for negotiation around difficult issues

a. The community is an equal partner in negotiation with a developer; community leaders should demand that community concerns are addressed.

b. Provide means to assure community about points of concern

- Community Benefits Agreements can be established to provide assurances.

This checklist was derived from conversations with people who have researched the social components of bioenergy development and with individuals who have been involved in either opposition to or development of a bioenergy facility.

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL **SUSTAINABILITY:** COMMUNITY ISSUES

Introduction to the matrix tool for community participation

As the U.S. transitions to renewable energy, new opportunities and challenges are emerging as well. Federal and State policies are driving renewable energy markets, but however well designed they often have unintended consequences. Local communities must find ways to proactively address the issues that surround renewable energy development if they wish to embrace these new technologies. **The purpose of the energy matrices toolkit is to help communities engage in a healthy dialogue about the status and future of local energy production.**

Renewable energy can provide a means for communities to grow their local economies, reduce their carbon footprints, maintain their working lands, and become more energy independent and secure. But renewable energy, like any type of development, also impacts existing businesses, the environment and the broader community.

By proactively embracing and managing the issues surrounding renewable energy development, communities increase their odds of successfully developing the types of projects that make sense for the community, the environment, and the local economy.

How to Use the Matrices

The matrices are intended to be used as a facilitation tool for community discussions. The matrices can be used in conjunction with other tools and techniques employed by local leaders, planners, community and economic development professionals. Depending on the situation the matrices might be used in a variety of different settings and by various users, including:

- As handouts at public meetings where a diversity of opinions are being sought
- As an educational tool for local planning boards and decision makers to make them aware of the issues
- As a reference tool for local decision makers to identify parties potentially affected by a new/proposed development
- As a checklist for local landowners and entrepreneurs investing in renewable energy development - to help them think holistically about their proposals and anticipate community concerns

Funding for the development of the community based assessment tool was provided by NC-SARE Professional Development Program.

PROJECT COLLABORATORS: SHARON LEZBERG, ANDREW DANE, ALAN TURNQUIST, DIANE MAYERFELD

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL **SUSTAINABILITY:** COMMUNITY ISSUES

Corn Grain Ethanol

Community Checklist Matrix: Potential Impacts of Bioenergy Development

DRAFT Document: May, 2010

Project Collaborators: Sharon Lezberg, Alan Turnquist, Diane Mayerfeld, Andrew Dane
For comments on this draft, please contact Sharon Lezberg at slezberg@wisc.edu

Corn Grain Ethanol

Environmental Dimensions Matrix 1: Producing/Harvesting the Feedstock

ENV 1

	Increase corn prdn. on current ag. lands through intensification	Increase corn prdn. on current ag. lands through displacement of other crops	Convert Conservation reserve lands to croplands	Grow corn on marginal lands (grazing, fallow lands)
Biodiversity conservation				
Soil nutrient depletion				
Soil Health				
Water quality and quantity				
Carbon sequestration				

Corn Grain Ethanol

Environmental Dimensions Matrix 2: Processing and Converting the Feedstock

ENV 2

extension more mind reach	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Impacts on wetlands, forests, other natural assets				
Traffic, additional road construction				
Water quality and quantity				
Waste storage, processing, and disposal				
Air quality (emissions, particulate matter, dust)				
Odors				
Noise				
GHG emissions				
Energy use; potential for conservation or cogeneration				

Corn Grain Ethanol

Economic Dimensions Matrix 1: Producing the Feedstock

ECON 1

extension more mind reach	Increase corn prdn. on current ag. lands through intensification	Increase corn prdn. on current ag. lands through displacement of other crops	Convert Conservation reserve lands to croplands	Grow corn on marginal lands (grazing, fallow lands)
Direct start up costs				
Medium & long term profit potential				
Economic risk/volatility of commodity market				
Impact on farmers: cost of learning & integrating new production practices				
Impact on farmers: flexibility in land use & management				
Impact on crop commodity prices				
Effect on commodity prices of other crops				
Economic impact on other farmers (livestock)				
Impact on land purchase prices				
Availability of Federal/State incentives				
Other economic factors of biofuel corn production				

Corn Grain Ethanol

Economic Dimensions Matrix 2: Processing and Converting the Feedstock

ECON 2

extension more mind reach	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Job Creation and employment characteristics				
Effect on labor market (wages, benefits)				
Direct economic impact				
Secondary and induced economic impacts				
Changes in local tax base and land prices				
Cost to community (incentives), infrastructure development				
Profits/Risks for local investors				
Risk of adequate supply of biomass feedstock				
Impact on local economic development plans				
Impact on existing business				
Impact on tourism and recreational industries				

Corn Grain Ethanol

Social Dimensions Matrix 1: Producing the Feedstock

SOC 1

	Increase corn prdn. on current ag. lands through intensification	Increase corn prdn. on current ag. lands through displacement of other crops	Convert Conservation reserve lands to croplands	Grow corn on marginal lands (grazing, fallow lands)
Land use changes (cultural, historical, neighborhood considerations)				
Impact on community character				
Impact of land-owner economic security on community				
Distribution of benefits amongst participating land-owners				
Distribution of benefits to entire community				
Sustainability impacts - energy independence				
Anticipated impact on international markets				
Anticipated impact on food availability internationally				

Corn Grain Ethanol

Social Dimensions Matrix 2: Processing and Converting the Feedstock

SOC 2

	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Community Decision Making: changes in cohesion & conflict				
Demand for increased community services				
Worker health effects/risks				
Changes in workforce development needs				
Traffic patterns and impacts				
Demand for emergency response capability				
Impact on sewerage services				
Noise impacts				
Air quality, dust particles, emissions				
Quality of life impacts				
Impact on community character				

Addendum to Corn Grain for Ethanol Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Corn Grain for ethanol, Environmental Dimensions, Matrix 1

Biodiversity Conservation: Will corn production and harvest activities have an impact on plant species mix, wildlife habitat and food availability, impact of activities on wildlife communities, or prevalence of pest populations?

Soil nutrient depletion: Will corn production and harvest activities significantly reduce nutrient availability and soil organic matter of agricultural soils? Will change in crop mix impact soil nutrients or nutrient availability?

Soil health: Will harvesting activity cause compaction, erosion, or run-off? Consider ways that potential impacts on soil health can be mediated or buffered.

Water quality and quantity: Will corn production and harvest activities have any impacts on groundwater or surface water quality or quantity? Will increases in corn production draw-down on aquifers in areas with irrigated agriculture? Will anticipated climate change variables (e.g., periods of drought or flooding) impact availability of water for irrigation of more land in corn production?

Carbon sequestration: Will corn production and harvest activities either reduce or increase the amount of carbon sequestration occurring from cropland? Consider the way crops or residues are harvested, and ways to maximize sequestration.

Corn Grain for ethanol, Environmental Dimensions, Matrix 2

Impact on wetlands, forests, other natural assets: Will ethanol processing facility be built on sensitive lands or on land that is deemed valuable for agriculture or forestry?

Traffic, additional road construction: Will ethanol production significantly increase traffic or require additional road construction? Will there be increased rail traffic? If so, how will this affect road traffic?

Water quality and quantity: Will ethanol production utilize municipal water resources? Will these be recycled? Will water used in a production process be pre-treated before discharge? Where will waste water be discharged? If ethanol production facility is located in regions with limited water (or that draw from aquifers), will there be competition for use of water resources between ethanol production facility and other industries or irrigated agriculture?

Waste storage, processing, and disposal: Will ethanol production produce any waste products? Will these be recycled? Are there potential by-products from processing that can be utilized (e.g., ash)?

Air quality: Will ethanol production emit any particulate matter, dust, or emissions that could impact human or animal health?

Odors: Will ethanol production emit dangerous or unpleasant odors?

Noise: Will there be any significant increase or change in noise from ethanol production?

GHG emissions: Will ethanol production produce additional greenhouse gas emissions (from the transportation and processing/burning activities)?

Energy use: Is there potential with the facility for conservation or co-generation? What will the energy balance of the facility be? When corn production is taken into consideration, what is the life cycle analysis for energy use for production of ethanol from corn grain?

Addendum to Corn Grain for Ethanol Production Matrix:
Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Corn Grain for ethanol, Economic Dimensions, Matrix 1

Direct start up costs including technology and skill investments: Will growing or harvesting of corn grain for ethanol require specialized equipment? Will growers need new skills to manage woodlots or forests for biomass?

Medium & long term profit potential: How long will it take for land owners/managers to realize a profit on their investment? How does this profit potential compare with opportunities for other crops?

Economic risk/volatility of commodity market: Is there anticipated volatility in the corn grain for ethanol market, or any reason to suspect volatility? What is the economic risk of devoting agricultural land to corn grain for ethanol? Do land-owners have alternative markets if the ethanol market proves unstable or unprofitable?

Impact on farmers: flexibility in land use & management: Once land is dedicated to an corn grain for ethanol crop is the land-owner locked in to that crop, management strategy or market?

Impact on crop commodity prices: What price impact will diversion of corn grain for ethanol have on corn prices? Will this be a positive or negative impact for those who grow corn for sale as food or feed?

Effect on commodity prices of other crops: Will increased production of corn grain for ethanol have an impact on the commodity price of other crops? What impact will the demand for corn grain for ethanol have on crop production (and crop availability) in the region?

Economic impact on other farmers or industries: Will demand for corn grain for ethanol reduce supply of fiber or feed? Will grazing lands be converted to growing corn grain for ethanol? What impact will this have on farmers who rent land at lower prices for grazing?

Impacts on land purchase prices: Will increased demand for corn grain for ethanol have an impact on land prices?

Availability of Federal/State incentives: Are there federal or state incentives (e.g., BCAP or similar programs) that make dedicating land to corn grain for ethanol economically feasible?

Other economic factors of biomass production: address any local or regional potential economic impacts of producing corn grain for ethanol that have not yet been considered.

Corn Grain for ethanol, Economic Dimensions, Matrix 2

Job Creation and employment characteristics –

(a) local/non-local employment: Will there be new jobs created from a market for corn grain for ethanol and/or the establishment of facilities to produce ethanol? Will these jobs be available for local residents?

(b) short term vs. long term: Will jobs created be short-term (e.g. construction) or long-term (e.g., new ethanol & by-product businesses)?

Effect on local labor market (wages, benefits): Are the jobs likely to be paying high, living, or low wages? What impact will wage structure have on the economic impact of the facility?

Direct economic impact: Will there be an economic gain or loss for the community from ethanol facilities (e.g., tax dollars going to the municipality, more people in community with jobs in construction, the forestry sector, or directly employed by bioenergy facility)?

Secondary and induced economic impact: Will there be increased demand for other local business goods/services related to project? Will spending for the project increase the number of dollars circulated locally? Is the community well-positioned to capture any new markets that an ethanol industry might present? Will any increases in jobs likely be met with increased economic security, earning power, and household expenditures of labor force?

Changes in local tax base and land prices: What anticipated tax revenue will an ethanol facility bring in? Will there be any impact on land prices?

Cost to community (incentives, infrastructure development): Is the project eligible for TIF financing? Is the community being asked to supply services (water, sewerage, other) or to develop any additional infrastructure?

Profits/Risks for local investors: If the industry is being financed by local investment capital, how risky is the investment? What mechanisms are in place to assure that investments can be recouped if the facility is not built or not operational? Is this level of risk healthy for the community?

Risk of adequate supply of biomass feedstock: Is there risk of inadequate supply of feedstock or temporary disruption of feedstock availability? Could plant shut down or slow down for this reason? How would this impact the community?

Impact on local economic development plans: Does the facility fit with economic development for the community? Will the community need to reevaluate its development plans?

Impact on existing businesses: Will facility have any impact (negative or positive) on existing businesses? Is there potential for conflict?

Impact on tourism and recreational industries: Will an ethanol processing facility have any impact on tourism and recreational industries, due to aesthetics of the plant, air quality, truck traffic, or other variable?

Addendum to Corn Grain for Ethanol Production Matrix:
Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Corn Grain for ethanol, Social Dimensions, Matrix 1

Land use changes (cultural, historical, neighborhood considerations): Will corn production and harvest activities either reduce or increase the amount of land in agriculture? Will this be of benefit or detriment to the community? Will corn production take land out of other land uses (wetlands, forests, grazing land)? On a landscape level, will the increased production and harvesting of corn grain for ethanol have a significant impact on the landscape and people's relationship to the landscape?

Impact on community character: Are there potential conflicts around the use of agricultural land for corn grain for ethanol production? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Impact of land-owner economic security on community: will potential improvement in economic security of land-owners have an impact on the community as a whole?

Distribution of benefits amongst participating landowners: is the benefit equitable for participating land-owners? Does an increase in a market for corn grain for ethanol similarly benefit those farmers who are not participating in this market?

Distribution of benefits to entire community: does the non-farming community/non-land owning community benefit from changing land use practices? If so how?

Sustainability impacts – energy independence: Will the facility contribute to the community's goal of reducing imports of energy (fuel or electricity)? Will the facility contribute to the community's goal of reducing greenhouse gases?

Anticipated impact on international markets: Will the production of corn for ethanol have an impact on international grain markets? Will a significant diversion of corn to energy production cause fluctuations in corn pricing, availability, or futures markets?

Anticipated impact on food availability internationally: Will the production of corn for ethanol impact food availability and cost in international markets? What is the anticipated consequence of diverting a traditional food & feed crop to an energy crop? Is there adequate supply of corn to avoid unintended consequences?

Corn Grain for ethanol, Social Dimensions, Matrix 2

Community Decision Making: changes in cohesion & conflict: Will a biomass collection or refining facility affect community cohesion? Is there potential for conflict around the facility? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Demand for increased community services: Will changes in employment patterns necessitate any increases or changes in social services (schools, health care, translation, emergency svcs.)? Does the community have the capacity to deliver these services?

Worker health effects/risks: Will ethanol refining have impacts on worker health (e.g., through emissions, exposure to hazardous substances, dangerous work assignments)?

Changes in workforce development needs: Will any jobs created require training or retraining of the work force?

Traffic patterns and impacts: Will collection, aggregation, and transport of materials have an impact on traffic patterns and roads?

Demand for emergency response capability: Will aggregation of materials and/or conversion activities pose risks of fire or hazardous spills? Does the community have the capability to respond to potential hazards at the industrial facility?

Impacts on sewerage services: Will waste water or other effluents drain into the sewerage system? Is the system able to handle an increased load? Does the facility have a storm water management plan?

Noise impacts: Will the facility cause any noise disturbance?

Air quality, dust particles, emissions: Are there emissions associated with the facility? Have the developers taken care of necessary permitting applications? Will the industry utilize smokestack scrubbers?

Quality of life impacts: Will the existence of a ethanol facility impact the quality of life of community residents?

Impact on community character: Will biomass collection and energy production significantly alter the landscape or sense of community? Could the siting of a facility have any aesthetic impacts? Is the siting of a facility contentious due to neighboring institutions, facilities or operations?

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL **SUSTAINABILITY:** COMMUNITY ISSUES

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Community Checklist Matrix: Potential Impacts of Bioenergy Development

DRAFT Document: May, 2010

Project Collaborators: Sharon Lezberg, Alan Turnquist, Diane Mayerfeld, Andrew Dane
For comments on this draft, please contact Sharon Lezberg at slezberg@wisc.edu

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Environmental Dimensions Matrix 1: Producing/Harvesting the Biomass

ENV 1

	Grow energy biomass crop on current agricultural lands.	Grow energy biomass crop on ag. lands as conservation strips/ buffer zones	Convert Conservation reserve lands or marginal lands to energy biomass crop.	
Biodiversity conservation				
Soil nutrient depletion				
Soil Health				
Water quality and quantity				
Carbon sequestration				

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Environmental Dimensions Matrix 2: Processing and Converting the Biomass

ENV 2

	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Impacts on wetlands, forests, other natural assets				
Traffic, additional road construction				
Water quality and quantity				
Waste storage, processing, and disposal				
Air quality (emissions, particulate matter, dust)				
Odors				
Noise				
GHG emissions				
Energy use; potential for conservation or cogeneration				

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Economic Dimensions Matrix 1: Producing the Biomass

ECON 1

extension more mind reach	Grow energy biomass crop on current agricultural lands.	Grow energy biomass crop on ag. lands as conservation strips/ buffer zones	Convert Conservation reserve lands or marginal lands to energy biomass crop.	
Direct start up costs				
Medium & long term profit potential				
Economic risk/volatility of commodity market				
Impact on farmers: cost of learning & integrating new production practices				
Impact on farmers: flexibility in land use & management				
Impact on crop commodity prices				
Impact on other farmers (e.g., if land was used for grazing, other)				
Impact on land purchase prices				
Availability of Federal/State incentives				
Other economic factors of biomass production				

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Economic Dimensions Matrix 2: Processing and Converting the Biomass

ECON 2

extension more mind reach	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Job Creation and employment characteristics				
Effect on labor market (wages, benefits)				
Direct economic impact				
Secondary and induced economic impacts				
Changes in local tax base and land prices				
Cost to community (incentives), infrastructure development				
Profits/Risks for local investors				
Risk of adequate supply of biomass feedstock				
Impact on local economic development plans				
Impact on existing business				
Impact on tourism and recreational industries				

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Social Dimensions Matrix 1: Producing the Biomass

SOC 1

extension more mind reach	Grow energy biomass crop on agricultural lands.	Grow energy biomass crop on ag. lands as conservation strips/ buffer zones	Convert Conservation reserve lands or marginal lands to energy biomass crop.	
Land use changes (cultural, historical, neighborhood considerations)				
Impact on community character				
Impact of land-owner economic security on community				
Distribution of benefits amongst participating land-owners				
Distribution of benefits to entire community				
Sustainability impacts - energy independence				

Annual/Perennial Biomass (non-woody) for Heating or Electricity

Social Dimensions Matrix 2: Processing and Converting the Biomass

SOC 2

	Facility development: Environmental Impact	Facility operation: Environmental Impact (note discharges)	Transportation of feedstocks to facilities & of products away from facility	
Community Decision Making: changes in cohesion & conflict				
Demand for increased community services				
Worker health effects/risks				
Changes in workforce development needs				
Traffic patterns and impacts				
Demand for emergency response capability				
Impact on sewerage services				
Noise impacts				
Air quality, dust particles, emissions				
Quality of life impacts				
Impact on community character				

Addendum to Annual/Perennial Biomass for Energy Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Annual/Perennial Biomass, Environmental Dimensions, Matrix 1

Biodiversity Conservation: Will annual or perennial crop production and harvest activities have an impact on plant species mix, wildlife habitat and food availability, impact of activities on wildlife communities, or prevalence of pest populations?

Soil nutrient depletion: Will annual or perennial crop production and harvest activities significantly reduce nutrient availability and soil organic matter of agricultural soils? Will change in crop mix impact soil nutrients or nutrient availability?

Soil health: Will harvesting activity cause compaction, erosion, or run-off? Consider ways that potential impacts on soil health can be mediated or buffered.

Water quality and quantity: Will annual or perennial crop production and harvest activities have any impacts on groundwater or surface water quality or quantity?

Carbon sequestration: Will annual or perennial crop production and harvest activities either reduce or increase the amount of carbon sequestration occurring from cropland? Consider the way crops or residues are harvested, and ways to maximize sequestration.

Annual/Perennial Biomass, Environmental Dimensions, Matrix 2

Impact on wetlands, forests, other natural assets: Will processing facility be built on sensitive lands or on land that is deemed valuable for agriculture or forestry?

Traffic, additional road construction: Will biomass collection and energy production significantly increase traffic or require additional road construction? Will there be increased rail traffic? If so, how will this affect road traffic?

Water quality and quantity: Will biomass collection and energy production utilize municipal water resources? Will these be recycled? Will water used in a production process be pre-treated before discharge? Where will waste water be discharged?

Waste storage, processing, and disposal: Will biomass collection and energy production produce any waste products? Will these be recycled? Are there potential by-products from processing that can be utilized (e.g., ash)?

Air quality (emissions, particulate matter, dust): Will biomass collection and energy production emit any particulate matter, dust, or emissions that could impact human or animal health?

Odors: Will biomass collection and energy production emit dangerous or unpleasant odors?

Noise: Will there be any significant increase or change in noise from biomass collection and energy production?

GHG emissions: Will biomass collection and energy production produce additional greenhouse gas emissions (from the transportation and processing/burning activities)?

Energy use: Is there potential with the facility for conservation or co-generation? What will the energy balance of electrical production be? When feedstock production is taken into consideration, what is the life cycle analysis for energy use for production of energy from biomass feedstock?

Addendum to Annual/Perennial Biomass for Energy Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Annual/Perennial Biomass, Economic Dimensions, Matrix 1

Direct start up costs including technology and skill investments: Will growing or harvesting of annual/perennial biomass require specialized equipment? Will growers need new skills to manage woodlots or forests for biomass?

Medium & long term profit potential: How long will it take for land owners/managers to realize a profit on their investment? How does this profit potential compare with opportunities for other crops?

Economic risk/volatility of commodity market: Is there anticipated volatility in the annual/perennial biomass market, or any reason to suspect volatility? What is the economic risk of devoted woodlots to biomass procurement? Do land-owners have alternative markets if the annual/perennial biomass market proves unstable or unprofitable?

Impact on farmers: cost of learning & integrating new production practices: Will farmers need to learn new production, establishment, and harvesting practices? Will this require investments in specialized equipment or inputs? Will land management practices change (e.g., rotations, buffer zones, integration of annual & perennial crops)?

Impact on farmers: flexibility in land use & management: Once land is dedicated to a biomass crop, is the land-owner locked in to that crop, management strategy or market?

Impacts on crop commodity prices: Will increased production of bioenergy crops have an impact on the commodity price of other crops?

Impact on other farmers: Will demand for bioenergy feedstock reduce supply of food, fiber, or feed? Will grazing lands be converted to growing bioenergy feedstocks? What impact will this have on farmers who rent land at lower prices for grazing?

Impacts on land purchase prices: Will increased demand for bioenergy feedstock have an impact on land prices?

Availability of Federal/State incentives: Are there federal or state incentives (e.g., BCAP or similar programs) that make dedicating land to annual/perennial biomass crops economically feasible?

Other economic factors of biomass production: address any local or regional potential economic impacts of producing the feedstock that have not yet been considered.

Annual/Perennial Biomass, Economic Dimensions, Matrix 2

Job Creation and employment characteristics –

(a) local/non-local employment: Will there be new jobs created from a market for annual/perennial biomass and/or the establishment of facilities to refine/pellitize/process the biomass? Will these jobs be available for local residents?

(b) short term vs. long term: Will jobs created be short-term (e.g. construction) or long-term (e.g., new businesses for pellet furnaces, jobs in trucking industry, sustainable forestry/harvesting jobs)?

Effect on local labor market including wages, benefits: Are the jobs likely to be paying high, living, or low wages? What impact will wage structure have on the economic impact of the facility?

Direct economic impact: Will there be an economic gain or loss for the community from bioenergy developments (e.g., tax dollars going to the municipality, more people in community with jobs in construction, the forestry sector, or directly employed by bioenergy facility)?

Secondary and induced economic impact: Will there be increased demand for other local business goods/services related to project? Will spending for the project increase the number of dollars circulated locally? Is the community well-positioned to capture any new markets that a bioenergy industry might present? Will any increases in jobs likely be met with increased economic security, earning power, and household expenditures of labor force?

Changes in local tax base and land prices: What anticipated tax revenue will a bioenergy facility bring in? Will there be any impact on land prices?

Cost to community (incentives, infrastructure development): Is the project eligible for TIF financing? Is the community being asked to supply services (water, sewerage, other) or to develop any additional infrastructure?

Profits/Risks for local investors: If the industry is being financed by local investment capital, how risky is the investment? What mechanisms are in place to assure that investments can be recouped if the facility is not built or not operational? Is this level of risk healthy for the community?

Risk of adequate supply of biomass feedstock: Is there risk of inadequate supply of feedstock or temporary disruption of feedstock availability? Could plant shut down or slow down for this reason? How would this impact the community? Is there a backup feedstock material for electricity generation?

Impact on local economic development plans: Does the facility fit with economic development for the community? Will the community need to reevaluate its development plans?

Impact on existing businesses: Will facility have any impact (negative or positive) on existing businesses? Is there potential for conflict?

Impact on tourism and recreational industries: Will an ethanol processing facility have any impact on tourism and recreational industries, due to aesthetics of the plant, air quality, truck traffic, or other variable?

Addendum to Annual/Perennial Biomass for Energy Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail potential impacts (the left-hand column of the matrix) for bioenergy development. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what concerns to community decision makers have regarding the impact area, and (3) suggestions on how to mitigate these concerns.

Annual/Perennial Biomass, Social Dimensions, Matrix 1

Land use changes (cultural, historical, neighborhood considerations): On a landscape level, will the increased production and harvesting of annual/perennial biomass have a significant impact on the landscape and people's relationship to the landscape?

Impact on community character: Are there potential conflicts around the use of agricultural land for energy crop production? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Impact of land-owner economic security on community: will potential improvement in economic security of land-owners have an impact on the community as a whole?

Distribution of benefits amongst participating landowners: is the benefit equitable for participating land-owners?

Distribution of benefits to entire community: does the non-farming community/non-land owning community benefit from changing land use practices? If so how?

Sustainability impacts – energy independence: Will the facility contribute to the community's goal of reducing imports of energy (fuel or electricity)? Will the facility contribute to the community's goal of reducing greenhouse gases?

Annual/Perennial Biomass, Social Dimensions, Matrix 2

Community Decision Making: changes in cohesion and conflict: Will a biomass collection or refining facility affect community cohesion? Is there potential for conflict around the facility? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Demand for increased community services: Will changes in employment patterns necessitate any increases or changes in social services (schools, health care, translation, emergency svcs.)? Does the community have the capacity to deliver these services?

Worker health effects/risks: Will the biomass collection or refining facility have impacts on worker health (e.g., through emissions, exposure to hazardous substances, dangerous work assignments)?

Changes in workforce development needs: Will any jobs created require training or retraining of the work force?

Traffic patterns and impacts: Will collection, aggregation, and transport of materials have an impact on traffic patterns and roads?

Demand for emergency response capability: Will aggregation of materials and/or conversion activities pose risks of fire or hazardous spills? Does the community have the capability to respond to potential hazards at the industrial facility?

Impacts on sewerage services? Will waste water or other effluents drain into the sewerage system? Is the system able to handle an increased load? Does the facility have a storm water management plan?

Noise impacts: Will the facility cause any noise disturbance?

Air quality, dust particles, emissions: Are there emissions associated with the facility? Have the developers taken care of necessary permitting applications? Will the industry utilize smokestack scrubbers?

Quality of life impacts: Will the existence of a bioenergy facility impact the quality of life of community residents?

Impact on community character: Will biomass collection and energy production significantly alter the landscape or sense of community? Could the siting of a facility have any aesthetic impacts? Is the siting of a facility contentious due to neighboring institutions, facilities or operations?

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL SUSTAINABILITY: COMMUNITY ISSUES

Woody Biomass for Energy Production

Community Checklist Matrix: Potential Impacts of Bioenergy Development

DRAFT Document: May, 2010

Project Collaborators: Sharon Lezberg, Alan Turnquist, Diane Mayerfeld, Andrew Dane
For comments on this draft, please contact Sharon Lezberg at slezberg@wisc.edu

Woody Biomass for Energy Production

Environmental Dimensions Matrix 1: Producing/Harvesting the Biomass

ENV 1

	Grow woody biomass crop on marginal or fallow lands.	Selectively thinning or harvesting residual biomass from existing forest stands	Utilizing mill residues, urban tree and woody yard residues, brush piles, demolition waste	
Biodiversity conservation				
Soil nutrient depletion				
Soil Health				
Water quality and quantity				
Carbon sequestration				
Land use				

Woody Biomass for Energy Production

Environmental Dimensions Matrix 2: Collecting/Refining the Biomass

ENV 2

extension more mind reach	Aggregating and transporting feedstocks and energy products to and from a bio-refining facility	Constructing a new facility or converting an existing one	Operating and maintaining a bio-refining facility	
Traffic, additional road construction				
Spread of disease/pests				
Odors				
Air quality (emissions, particulate matter, dust)				
Noise				
GHG emissions				
Water quality and quantity				
Waste disposal, processing				

Woody Biomass for Energy Production

Economic Dimensions Matrix 1: Producing/Harvesting the Biomass

ECON 1

	Grow woody biomass crop on marginal or fallow lands.	Selectively thinning or harvesting residual biomass from existing forest stands	Utilizing mill residues, urban tree and woody yard residues, brush piles, demolition waste	
Direct start up costs				
Medium & long term profit potential				
Economic risk/volatility of commodity market				
Impact on land owners: flexibility in land use & management				
Impacts on existing forest product industries				
Impact on crop land prices				
Availability of Federal/State incentives				
Other economic factors of biomass production				

Woody Biomass for Energy Production

Economic Dimensions Matrix 2: Collecting/Refining the Biomass

ECON 2

	Aggregating and transporting feedstocks and energy products to and from a bio-refining facility	Constructing a new facility or converting an existing one	Operating and maintaining a bio-refining facility	
Job Creation and employment characteristics				
Effect on labor market (wages, benefits)				
Direct economic impact				
Secondary and induced economic impacts				
Changes in local tax base and land prices				
Cost to community (incentives), infrastructure development				
Profits/Risks for local investors				
Impact on local economic development plans				
Impact on existing business				

Woody Biomass for Energy Production

Social Dimensions Matrix 1: Producing/Harvesting the Biomass

SOC 1

	Grow woody biomass crop on marginal or fallow lands.	Selectively thinning or harvesting residual biomass from existing forest stands	Utilizing mill residues, urban tree and woody yard residues, brush piles, demolition waste	
Land use changes; aesthetics				
Impact on community character				
Impact of land-owner economic security on community				
Distribution of benefits amongst participating land-owners				
Distribution of benefits to entire community				
Sustainability impacts - energy independence				

Woody Biomass for Energy Production

Social Dimensions Matrix 2: Collecting/Refining the Biomass

SOC 2

	Aggregating and transporting feedstocks and energy products to and from a bio-refining facility	Constructing a new facility or converting an existing one	Operating and maintaining a bio-refining facility	
Community Decision Making: changes in cohesion & conflict				
Demand for increased community services				
Changes in workforce development needs				
Traffic patterns and impacts				
Noise impacts				
Air quality, dust particles, emissions				
Quality of life impacts				
Aesthetics of facilities within community				

Addendum to Woody Biomass for Energy Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail on the "potential impacts" column. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what potential concerns residents have regarding the impact area, and (3) how to mitigate these concerns.

Woody Biomass, Environmental Dimensions, Matrix 1

Biodiversity Conservation: Will woody crop production and harvest activities have an impact on plant species mix, wildlife habitat and food availability, impact of activities on wildlife communities, or prevalence of pest populations?

Soil nutrient depletion: Will woody crop production and harvest activities significantly reduce the amount of material left to rot on the forest floor? Will change in species mix impact soil nutrients or nutrient availability?

Soil health: Will harvesting activity cause compaction, erosion, or run-off? Consider ways that potential impacts on soil health can be mediated or buffered.

Water quality and quantity: Will woody crop production and harvest activities have any impacts on groundwater or surface water quality or quantity?

Carbon sequestration: Will woody crop production and harvest activities either reduce or increase the amount of carbon sequestration occurring from forest resources? Consider the way crops or residues are harvested, and ways to maximize sequestration.

Land use: Will woody crop production and harvest activities either reduce or increase the amount of land in forest? Will this be of benefit or detriment to the community?

Woody Biomass, Environmental Dimensions, Matrix 2

Traffic, additional road construction: Will biomass collection and energy production significantly increase traffic or require additional road construction? Will there be increased rail traffic? If so, how will this affect road traffic?

Spread of disease/pests: Will biomass collection and energy production contribute to the spread of undesired tree-borne diseases or pests (such as emerald ash borer)?

Odors: Will biomass collection and energy production emit dangerous or unpleasant odors?

Air quality: Will biomass collection and energy production emit any particulate matter, dust, or chemicals that could impact human or animal health?

Noise: Will there be any significant increase or change in noise from biomass collection and energy production?

GHG emissions: Will biomass collection and energy production produce additional greenhouse gas emissions (from the transportation and processing/burning activities)?

Water quality and quantity: Will biomass collection and energy production utilize municipal water resources? Will these be recycled? Will water used in a production process be pre-treated before discharge? Where will waste water be discharged?

Waste disposal, processing: Will biomass collection and energy production produce any waste products? Will these be recycled? Are there potential by-products from processing that can be utilized (e.g., ash)?

Addendum to Woody Biomass for Energy Production Matrix:
Questions associated with "potential impacts" to guide discussions

This addendum provides further detail on the "potential impacts" column. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what potential concerns residents have regarding the impact area, and (3) how to mitigate these concerns.

Woody Biomass, Economic Dimensions, Matrix 1

Direct start up costs including technology and skill investments: Will growing or harvesting of woody biomass require specialized equipment? Will growers need new skills to manage woodlots or forests for biomass?

Medium & long term profit potential: How long will it take land owners/managers to realize a profit on their investment and/or land? How does this profit potential compare with opportunities in other forest product industries?

Economic risk/volatility of commodity market: Is there anticipated volatility in the woody biomass market, or any reason to suspect volatility? What is the economic risk of devoted woodlots to biomass procurement? Do land-owners have alternative markets if the woody biomass market proves unstable or unprofitable?

Impact on land owners: flexibility in land use & management: Once land is dedicated to a woody biomass crop, or to thinning/harvesting for woody biomass, is the land-owner locked in to that crop, management strategy or market? Will this create a hardship for land owners?

Impacts on existing forest product industries: What impact will demand for woody biomass for energy have on other forest product industries in the region? Is there enough supply to support existing and new industries? If there are shortages of supply, how will this affect the economics of the competing industries (and associated impacts, such as jobs, land-owner livelihood)

Impacts on crop land prices: Will increased demand for woody biomass have an impact on land prices (either of woodlots or other lands)?

Availability of Federal/State incentives: Are there federal or state incentives (e.g., BCAP or similar programs) that make dedicating land to woody biomass crops economically feasible?

Other economic factors of biomass production: address any local or regional potential economic impacts of producing the feedstock that have not yet been considered.

Woody Biomass, Economic Dimensions, Matrix 2

Job Creation and employment characteristics –

(a) local/non-local employment: Will there be new jobs created from a market for woody biomass and/or the establishment of facilities to refine/pellitize/process the biomass? Will these jobs be available for local residents?

(b) short term vs. long term: Will jobs created be short-term (e.g. construction) or long-term (e.g., new businesses for pellet furnaces, jobs in trucking industry, sustainable forestry/harvesting jobs)?

Effect on local labor market including wages, benefits: Are the jobs likely to be paying high, living, or low wages? What impact will wage structure have on the economic impact of the facility?

Direct economic impact: Will there be an economic gain or loss for the community from bioenergy developments (e.g., tax dollars going to the municipality, more people in community with jobs in construction, the forestry sector, or directly employed by bioenergy facility)?

Secondary and induced economic impact: Will there be increased demand for other local business goods/services related to project? Will spending for the project increase the number of dollars circulated locally? Is the community well-positioned to capture any new markets that a bioenergy facility might present?

Induced economic impact: Will any increases in jobs likely be met with increased economic security, earning power and increased household expenditures of the labor force?

Changes in local tax base and land prices: What anticipated tax revenue will a bioenergy facility bring in? Will there be any impact on land prices?

Cost to community (incentives, infrastructure development): Is the project eligible for TIF financing? Is the community being asked to supply services (water, sewerage, other) or to develop any additional infrastructure?

Profits/Risks for local investors: If the industry is being financed by local investment capital, how risky is the investment? What mechanisms are in place to assure that investments can be recouped if the facility is not built or not operational? Is this level of risk healthy for the community?

Impact on local economic development plans: Does the facility fit with economic development for the community? Will the community need to reevaluate its development plans?

Impact on existing businesses: Will facility have any impact (negative or positive) on existing businesses? Is there potential for conflict based on competition for labor, natural resources or community services?

Addendum to Woody Biomass for Energy Production Matrix: Questions associated with "potential impacts" to guide discussions

This addendum provides further detail on the "potential impacts" column. The questions posed can help guide discussions within communities, with attention paid to: (a) how important is the potential impact for the development being discussed, (b) what potential concerns residents have regarding the impact area, and (3) how to mitigate these concerns.

Woody Biomass, Social Dimensions, Matrix 1

Landscape changes; aesthetics: On a landscape level, will the increased production and harvesting of woody biomass have a significant impact on the landscape and people's relationship to the landscape?

Impact on community character: Are there potential conflicts around the use of forests and forest resources? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Impact of land-owner economic security on community: will potential improvement in economic security of land-owners have an impact on the community as a whole?

Distribution of benefits amongst participating land-owners: is the benefit equitable for participating land-owners?

Distribution of benefits to entire community:Does the non-farming community/non-land owning community benefit from changing land use practices? If so how? What about land-owners who are not managing their forest land?

Sustainability impacts – energy independence: Will the facility contribute to the community's goal of reducing imports of energy (fuel or electricity)? Will the facility contribute to the community's goal of reducing greenhouse gases?

Woody Biomass, Social Dimensions, Matrix 2

Community Decision Making: Will a biomass collection or refining facility affect community cohesion? Is there potential for conflict around the facility? Will discussion, negotiation, and/or conflict have any impact on community character, cohesiveness, inclusivity, and/or patterns of social capital?

Demand for increased community services: Will changes in employment patterns necessitate any increases or changes in social services (schools, health care, translation, emergency svcs.)? Does the community have the capacity to deliver these services?

Changes in workforce development needs: Will any jobs created require training or retraining of the work force?

Traffic patterns and impacts: Will collection, aggregation, and transport of materials have an impact on traffic patterns and roads?

Noise impacts: Will the facility cause any noise disturbance?

Air quality, dust particles, emissions: Are there emissions associated with the facility? Have the developers taken care of necessary permitting applications? Will the industry utilize smokestack scrubbers?

Quality of life impacts: Will the existence of a bioenergy facility impact the quality of life of community residents?

Aesthetics of facilities within community: Will biomass collection and energy production significantly alter the landscape or sense of community? Could the siting of a facility have any aesthetic impacts? Is the siting of a facility contentious due to neighboring institutions, facilities or operations?

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL SUSTAINABILITY: COMMUNITY ISSUES

On-Farm or Community Anaerobic Digester

Community Checklist Matrix: Potential Impacts of Bioenergy Development

DRAFT Document: May, 2010

Project Collaborators: Sharon Lezberg, Alan Turnquist, Diane Mayerfeld, Andrew Dane
For comments on this draft, please contact Sharon Lezberg at slezberg@wisc.edu

On-farm or Community Anaerobic Digester

Environmental Dimensions Matrix 1: Producing and Collection of Biomass

ENV 1

extension more mind reach	Utilizing existing animal manure – from farm or region	Digester allows for increase in number of existing animal units on farm or within region	Increased utilization of industry by-products including food and wood product manufacturing, crop residues, other organic matter	
Biodiversity conservation				
Soil nutrient balance (note phosphorus & nitrogen segregation and displacement)				
Soil Health				
Water quality and quantity				
Carbon sequestration				
Air emissions; greenhouse gas emissions				

On-farm or Community Anaerobic Digester

Environmental Dimensions Matrix 2: Processing and Converting the Feedstock

ENV 2

	Facility development: Siting and building the digester and related infrastructure	Facility operation	Transportation of feedstocks to anaerobic digester & of products/ energy away from facility	
Soil nutrient balance (note phosphorus & nitrogen segregation and displacement)				
Soil health				
Water quality and quantity (note phosphorus & nitrogen segregation and displacement)				
Carbon sequestration				
Energy use; potential for conservation or co-generation				
Air quality (emissions, particulate matter, dust)				
Noise				
Waste disposal, processing				

On-farm or Community Anaerobic Digester

Economic Dimensions Matrix 1: Producing and Collection of Biomass

ECON 1

extension more mind reach	Utilizing existing animal manure – from farm or region	Digester allows for increase in number of existing animal units on farm or within region	Increased utilization of industry by-products including food and wood product manufacturing, crop residues, other organic matter	
Start up costs for farmers/community members				
Medium & long term profit potential				
Economic risk/volatility				
Impact on farmers: flexibility in land use & management				
Effect on standard costs of operation				
Impact on land purchase/rental prices				
Impact on farm structure/size				
Federal/State economic incentive programs				
Other economic factors of manure/waste product production				

On-farm or Community Anaerobic Digester

Economic Dimensions Matrix 2: Processing and Converting the Feedstock

ECON 2

extension more mind reach	Facility development: Siting and building the digester and related infrastructure	Facility operation	Transportation of feedstocks to anaerobic digester & of products/ energy away from facility	
Direct costs for farmers/community members				
Medium & long term profit potential				
Economic risk/volatility with product markets (biogas, bedding, fertilizer, other products)				
Impact on farmers or community: long-term cost of facility management				
Direct economic impacts - jobs				
Indirect economic impacts – additional spending in community				
Cost to community (incentives, infrastructure development)				
Changes in tax base				
Other Economic factors of facility construction & operation?				

On-farm or Community Anaerobic Digester

Social Dimensions Matrix 1: Producing the Feedstock (manure, other)

SOC 1

extension more mind reach	Utilizing existing animal manure – from farm or region	Digester allows for increase in number of existing animal units on farm or within region	Increased utilization of industry by-products including food and wood product manufacturing, crop residues, other organic matter	
Landscape changes; aesthetics				
Potential for future development including tourism; other amenity-driven development				
Landscape changes: equity & distribution of costs/benefits				
Landscape changes; sense of community & identity of community				
Farmer livelihood effects; impact on community				
Impact on farm structure/size				
New management practices				
Supply chain issues				
Equity of access: is technology available to all producers?				

On-farm or Community Anaerobic Digester

Social Dimensions Matrix 2: Processing and Converting the Feedstock

SOC 2

	Facility development: Siting and building the digester and related infrastructure	Facility operation	Transportation of feedstocks to anaerobic digester & of products/ energy away from facility	
Community Decision Making: changes in cohesion & conflict				
Changes in labor force; community services needed (schools, health care, translation svcs.)				
Changes in labor force; workforce development needs				
Changes in need for emergency response capacity				
Impact on road construction and maintenance				
Impact on sewerage services				
Siting issues: impact on quality of life				
Transportation changes: impact on quality of life				
Impact of related infrastructure development (e.g. establishment of pipelines)				

SARE Professional Development Program

BIOENERGY GENERATION AND ENVIRONMENTAL **SUSTAINABILITY:** COMMUNITY ISSUES

Wind Energy

Community Checklist Matrix: Potential Impacts of Bioenergy Development

DRAFT Document: May, 2010

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Wind Energy

Environmental Dimensions Matrix 1: Wind Tower and Transmission Line Siting & Construction

ENV 1

extension more mind reach	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Changes in land use for property owner and at regional scale				
Soil health				
Fragmentation of land				
Biodiversity conservation; species habitat and range (flora/fauna)				
Water quality and quantity, impact on wetlands, hydrology				

Wind Energy

Environmental Dimensions Matrix 2: Wind Tower and Transmission Line Operations

ENV 2

	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Changes in use of agricultural & forest land; impact on field contiquity				
Fragmentation of land – impact on farming practices				
Impact on migratory bird populations				
Impact on other wildlife (biodiversity, population size)				
Impact on GHG emissions (CO2 & N2O)				
Impacts of herbicide use – transmission line rights of way				
Health concerns: impact on humans and animals				

Wind Energy

Economic Dimensions Matrix 1: Wind Tower and Transmission Line Siting & Construction

ECON 1

extension more mind reach	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Direct startup costs for land-owners				
Federal/State economic incentive programs				
Availability of viable power company that will buy energy				
Impact on land owners: loss of land in production				
Impact on land owners: flexibility in land use & management				
Impacts on existing businesses/farms - profitability				
Cost of transmission line and effect on consumer utility rates				
Direct economic impacts – jobs				
Indirect economic impacts – additional spending in community				

Wind Energy

Economic Dimensions Matrix 2: Wind Tower and Transmission Line Operations

ECON 2

extension more mind reach	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Direct and indirect economic impacts (maintenance, operation)				
Federal/State economic incentive programs – stability, changes in policy				
Medium & long term profit potential for land owner				
Changing dynamics of wind markets				
Risk management impact				
Quality, quantity of electricity available for businesses, residents				
Equity of power purchase agreements				
Long-term costs of equipment maintenance				

Wind Energy

Social Dimensions Matrix 1: Wind Tower and Transmission Line Siting & Construction

SOC 1

	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Siting issues: impact on quality of life (e.g., noise, disturbance)				
Landscape changes; sense of community and aesthetics				
Appropriateness of public subsidies				
Community Decision Making: changes in cohesion & conflict				
Community understanding of development process; transparency of process				
Equity: distribution of costs and benefits				
Equity: Terms of land contract with developer (lease agreement, sale, easements)				
Neighbors willingness to grant access for power lines, honor wind easements?				

Wind Energy

Social Dimensions Matrix 2: Wind Tower and Transmission Line Operations

SOC 2

	Company owned wind turbines on privately owned property (incl. ag. lands)	Company owned wind turbines on public lands (e.g., offshore)	Privately owned wind tower (for individual assessment)	
Energy independence and energy security				
Community Decision Making: changes in cohesion & conflict				
Equity: distribution of costs and benefits (medium/long-term)				
Equity: does 'wind shadow' prevent neighbors from developing future projects?				
Impact on future development patterns; ability to develop other assets for economic development (for example, tourism)				
Neighbor agreement: are neighbors willing to grant access for power lines, honor wind easements?				