

# Chapter 7

**Unavoidable Adverse Impacts; Short-Term  
Uses and Long-Term Productivity; Irreversible  
and Irretrievable Commitments of Resources**

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## **7. UNAVOIDABLE ADVERSE IMPACTS; SHORT-TERM USES AND LONG-TERM PRODUCTIVITY; IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES**

In accordance with the *National Environmental Policy Act* (NEPA), Section 102 (42 U.S.C. 4332) and the Council on Environmental Quality NEPA implementing regulations (40 CFR 1502.16), this chapter addresses:

- Any adverse environmental impacts U.S. Department of Energy (DOE or Department) and/or the U.S. Department of Agriculture (USDA) would not be able to avoid if the Department implemented the *Proposed Action* or Action Alternative.
- The relationship between local short-term uses of the environment within the region of influence and the maintenance and enhancement of long-term productivity.
- Any irreversible and irretrievable commitments of resources if DOE implemented the Proposed Action or Action Alternative.

During the engineering and site evaluation and planning phases for the *biorefinery*, the Department and the USDA considered many factors to avoid or minimize the potential environmental impacts and would continue to consider these factors in deciding whether to provide federal funds for the design, construction, and startup of the biorefinery. DOE and/or USDA would require the Abengoa Biorefinery Project to meet all applicable regulatory requirements during construction and operations and would require an array of *best management practices* to ensure compliance with requirements (see Chapter 6 of this Abengoa Biorefinery Project EIS). Further, as described in Chapter 6, DOE and/or the USDA could require the implementation of measures to *mitigate* any impacts remaining after final design and compliance with regulatory requirements and implementation of best management practices.

However, there could be unavoidable adverse impacts; impacts to short-term uses and long-term productivity resources; and/or irreversible and irretrievable commitment of resources, for example:

- Abengoa Bioenergy could mitigate most of the potential impacts described in Chapter 4, but there would be some unavoidable impacts, for example, the use of farmlands for the Biorefinery Project site;
- Construction would involve a short-term peak in employment for biorefinery construction and startup. This peak would recover to a normal operations employment level after construction and startup are completed; and/or
- There could be an irreversible commitment of resources such as consumption of *fossil fuel*.

This chapter summarizes and consolidates information from Chapters 4 and 6 of this EIS.

### **7.1 Unavoidable Adverse Impacts**

Engineering and site evaluation and planning are the first steps in undertaking a proposed action. Next follows compliance with all laws, regulatory requirements, and stipulations and conditions of associated

permits to minimize environmental- and health-related impacts. Best management practices are implemented to maintain compliance with these requirements. Where analyses identify potential environmental impacts, mitigation measures are implemented to avoid, minimize, rectify, reduce, or compensate for those impacts. Finally, unavoidable adverse impacts may arise where there are no reasonably practicable mitigation measures to entirely eliminate impacts, and there are no reasonably practicable alternatives to the Abengoa Biorefinery Project that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

Unavoidable adverse impacts would not vary substantially between the Proposed Action and Action Alternative. The following sections describe unavoidable adverse impacts, if any, for each environmental resource area evaluated in this EIS.

### 7.1.1 LAND USE

Use of land for construction and operation of the biorefinery would involve some long-term changes in land use. The Proposed Action would include the direct conversion of land due to the construction of the biorefinery. The 385-acre (1.6-square kilometer) *biorefinery parcel* is currently used for dryland row-crop farming and grazing, but has been conditionally rezoned to Heavy Industrial. Therefore, construction and operation of the biorefinery would not conflict with local land use plans or goals. The 425-acre (1.7-square-kilometer) *buffer area* would remain in agricultural production and the Agricultural District zoning would not change. DOE would need to implement best management practices to avoid or minimize potential adverse impacts related to construction of the biorefinery.

Approximately 235 acres (0.95 square kilometer) of the total biorefinery parcel is *prime farmland if irrigated*. All *prime farmland* in Stevens County is qualified “if irrigated.” The biorefinery parcel is not irrigated and represents 0.17 percent of all prime farmland within Stevens County alone. The percentage is substantially lower compared with all prime farmland within the *region of influence*. Similarly, the biorefinery parcel represents approximately 0.01 percent of all cropland within the region of influence. While minor relative to the region of influence, the loss of cropland is unavoidable. However, this loss of cropland is expected to have a beneficial economic impact.

Crop *residue* removal at the magnitude needed to meet biorefinery demand is largely unprecedented. Therefore, there is no consensus on sustainable crop *residue* removal rates. DOE would need to implement best management practices to avoid, minimize, or mitigate adverse impacts to *feedstock* production land. The Proposed Action includes best management practices to minimize wind erosion, which is the predominant soil resource concern within the region of influence. The best management practices would also serve to minimize, but may not sufficiently minimize, adverse impacts to *soil organic matter* content. Though the current state of the industry recognizes potential adverse impacts to soil organic matter content, it does not support specific mitigation measures for soil organic matter content. On a regional basis, the Department anticipates crop residue removal based on soil erosion rates would have a negligible impact on soil organic matter content. On a field-by-field basis, the Department anticipates crop residue removal would have a beneficial to minor adverse impact on soil organic matter content. Any adverse impact to soil organic matter content would be limited to the individual producer’s land that would be compensated for residue removal.

## 7.1.2 AIR QUALITY

Construction of the biorefinery near Hugoton, Kansas, would cause unavoidable impacts to the regional *air quality*. During the construction phase, land disturbance and vehicle traffic on unpaved roads would produce temporary *fugitive dust* emissions. Construction equipment and other machinery would emit tailpipe emissions including diesel *particulate matter*, nitrogen dioxide, sulfur dioxide, and carbon monoxide. Abengoa Bioenergy would reduce the emissions through good operational practices such as watering or *chemical* stabilization of unpaved roads and disturbed surfaces, avoiding vehicle trackout from the site, posting speed limits, practicing reduced equipment idling time, scheduling construction activities to reduce multiple emission sources occurring simultaneously, and using well-maintained, modern equipment with exhaust controls. The unavoidable emissions generated during construction would therefore be minimized and occur on a temporary basis.

Operations of the biorefinery would also cause unavoidable impacts to the regional air quality. During the operations phase, air pollutant concentrations of regulated pollutants, including carbon monoxide, nitrogen oxide, sulfur dioxide, and particulate matter with aerodynamic diameter less than or equal to 10 micrometers (PM<sub>10</sub>), would be generated. *Best available control technologies* and best management practices would be in place to reduce the emissions significantly and to meet air quality regulatory standards as conditions of an air quality permit required prior to construction through the Kansas Department of Health and Environment, Bureau of Air and Radiation. However, the emissions cannot be controlled completely and therefore would result in unavoidable impacts. The modeled ambient pollutant concentrations from the operations of the biorefinery, summarized in Tables 4.2-3 and 4.2-6 in Chapter 4, in addition to existing background concentrations, are well below the *National Ambient Air Quality Standards*. Therefore, any unavoidable *ambient air* quality impacts resulting from the operation of the biorefinery would not be significant.

## 7.1.3 HYDROLOGY

### 7.1.3.1 Surface Water

The Proposed Action would involve the presence of *hazardous materials* that otherwise would not be at the *Biorefinery Project site*. These materials could be released accidentally and subsequently be transported by surface water runoff. During the construction phase, potential contaminants would consist mostly of petroleum fuels and lubricants. During the operations phase, hazardous materials present would involve acid and *caustic* solutions, liquid ammonia, urea, enzymes, and several other process chemicals, as well as the ethanol, gasoline denaturant, and diesel fuel that would all be stored onsite. The potential for releases or spills to occur, and their severity, would be minimized by incorporating secondary containment features into the biorefinery and by following planned actions in the facility's Spill Prevention, Control, and Countermeasures Plan. In addition, the biorefinery would be designed so that under most storm conditions, no runoff could leave the biorefinery parcel. In the event runoff was great enough to flood the low areas within this parcel, overflow would run to adjacent properties to the south or to the buffer area to the east. These adjacent areas are internally drained, so there would be no mechanism to move contamination far from the Project site.

### 7.1.3.2 Groundwater

Operation of the biorefinery would cause irreversible and irretrievable commitment of *groundwater* resources, as the water rights would consume an allocation of the usable volume of the *aquifer* storage and, to some extent, restrict additional use within the area while the biorefinery was in operation and the water rights were valid.

### 7.1.4 BIOLOGICAL RESOURCES

Construction and operation of the biorefinery for either the Proposed Action or Action Alternative would result in some minor adverse impacts; however, these impacts would be only to common wildlife species at the Biorefinery Project site and immediately adjacent areas. There are no *endangered or threatened species* present within or immediately adjacent to the Project site.

Adverse impacts to threatened and endangered species from *biomass offsite storage locations* could be avoided with proper screening and placement. Therefore, no direct impacts to threatened and endangered species within the 30-mile (48-kilometer) region of influence are expected from the Proposed Action or Action Alternative.

### 7.1.5 UTILITIES, ENERGY, AND MATERIALS

Construction and operation of the biorefinery would result in the unavoidable use of energy and materials. Under the Proposed Action, energy use would consist of natural gas and diesel fuel; under the Action Alternative (without the electrical co-generation component), electrical energy from the regional power grid would also be used. Materials would include general construction materials such as concrete, asphalt, and earthen fill materials, but would also include various manufacturing materials, including steel and stainless steel. The consumption of energy and construction material would not be large enough to affect national or regional supplies. Further, the electrical co-generation component of the Proposed Action would add electrical energy into the regional grid for use by other entities.

### 7.1.6 WASTES, BYPRODUCTS, AND HAZARDOUS MATERIALS

The generation of *solid wastes* (that is, construction/demolition debris, plastics, papers, cartons, steel waste, pipes, cables, metal containers, and inorganic municipal solid wastes) would be unavoidable during the construction phase. Abengoa Bioenergy would handle all wastes in accordance with applicable regulations and would implement best management practices and pollution prevention and waste minimization programs. As described in Chapter 4, Section 4.6.1.1, DOE estimated that 35,000 tons (32,000 metric tons) of solid waste would be generated during the 18-month construction phase of the biorefinery, for a daily rate of about 78 tons (71 metric tons). Further, the estimated solid waste generated due to the increase in worker population during the construction phase would be 1.2 tons (1.1 metric tons) per day. The non-recycled construction wastes would be disposed of in active, permitted solid waste disposal facilities within the region of influence. Permitted municipal solid waste facilities in Kansas are allowed to receive the construction wastes listed above. The wastes meeting the Kansas definition of *construction and demolition waste* could also be disposed of at a *construction and demolition waste landfill*. The Stevens County landfill would not have adequate capacity to receive the construction wastes generated under the Proposed Action and maintain its small arid landfill exempt status [20-ton (18-metric ton) daily operating limit]. The non-recycled construction waste streams could be split among various permitted landfills and transfer stations within the region of influence, and the

bulk of the construction and demolition waste could be received by the Grant County construction and demolition landfill. Splitting the construction waste among landfills would require permission from the selected facilities to receive the wastes.

As described in Chapter 4, Section 4.6.1.3, DOE estimated that 33,600 tons (30,500 metric tons) of dirt and *finer* resulting from biomass processing and 33 tons (30 metric tons) of municipal solid waste and construction debris would be generated annually during the operations phase, for a daily rate of 96.1 tons (87.2 metric tons) (350 operating days per year). Further, the estimated solid waste generated due to the increase in population during the operations phase would be 0.3 ton (0.27 metric ton) per day. This additional solid waste would increase the waste stream to the Stevens County landfill from 13.3 to 109.7 tons (12.1 to 99.5 metric tons) per day. Based on these observations, DOE concludes there is not adequate capacity at the Stevens County landfill to receive solid waste generated during the operations phase of the biorefinery without modification of its small arid landfill exempt status. The operations phase waste stream could be split among various permitted landfills and transfer stations within the region of influence. Splitting the operations phase solid waste among landfills would require permission from the selected facilities to receive the wastes.

The *solid biomass boiler* would generate about 80,000 tons (72,600 metric tons) per year [228 tons (207 metric tons) per operating day] of ash under the Proposed Action. Abengoa Bioenergy would market and sell the ash *byproduct* to biomass producers as a lower-cost, value-added nutrient replacement co-product. If Abengoa sold the nutrient replacement ash, it would not require disposal as a solid waste in a permitted solid waste disposal facility. If the solid boiler ash was not sold as a nutrient replacement byproduct, it would require disposal at a permitted solid waste disposal facility. Stevens County landfill would not have adequate capacity to receive this quantity of ash without a permit modification. This waste stream could be split among permitted landfills and transfer stations within the region of influence, but this would require permission from the selected facilities to receive the waste.

The biorefinery would generate approximately 1 ton (0.9 metric ton) per year of *hazardous waste* (such as, gasoline, spent solvents, laboratory packs, paint wastes, used oil, waste ethanol, acids, caustics, cleaners, waste lamps, and batteries). All hazardous wastes generated at the biorefinery would be treated by incineration or disposed of at a licensed treatment or disposal facility.

Although the use of those treatment or disposal facilities would be unavoidable, existing disposal facilities have ample capacity to handle all additional wastes.

### **7.1.7 TRANSPORTATION**

During the construction and anticipated 30-year operations phases, there would be an estimated 32 traffic fatalities under the Proposed Action and 13 traffic fatalities under the Action Alternative. The majority of these fatalities would be due to shipments of biomass, chemicals, *denatured ethanol* product, and waste. For perspective, over the expected 30-year operations phase, there would be an estimated 13,400 traffic fatalities in Kansas and 820 traffic fatalities in the nine counties surrounding the Biorefinery Project site. While these impacts are small relative to the number of traffic fatalities in Kansas and the nine counties surrounding the Project site, they would not be completely unavoidable.

## **7.1.8 AESTHETICS**

### **7.1.8.1 Visual Resources**

The biorefinery would cause unavoidable visual impacts. During the construction phase, land disturbance and vehicle traffic on unpaved roads would produce temporary visual impacts from the increased equipment and vehicles and resulting dust emissions. Abengoa Bioenergy would control the visible dust emissions with dust suppression methods such as chemical stabilization and watering. Once the biorefinery was constructed and operational, the structures would be visible from Hugoton and elsewhere, but would be similar in height and appearance to existing, nearby structures. Water vapor plumes from the biorefinery would also be visible, especially during winter.

### **7.1.8.2 Noise**

The Proposed Action would lead to an unavoidable increase in *ambient noise* from construction of the biorefinery. This would be a temporary adverse impact because of the temporary nature of the construction phase. During operations, noise from truck traffic would be an unavoidable adverse impact. Noise from truck traffic would adversely impact residences, including a residential area in the northwest corner of the city of Hugoton and a residence at the northwest Biorefinery Project site boundary. The truck bypass would alleviate impacts to the residential area in the northwest corner of Hugoton. However, the two residences on Road Q just west of U.S. Highway 56 would be along the bypass and would then experience these impacts. The Stevens County Hospital and several residences, schools, and places of worship along Kansas State Highway 51 in the city of Hugoton would also experience some unavoidable adverse impacts from truck noise.

### **7.1.8.3 Odor**

Construction and operations of the biorefinery would cause unavoidable emissions of some odorous compounds. During the construction phase, tailpipe emissions from diesel equipment would be a source of temporary odors, as well as odorous emissions from the application of asphalt during road construction. During the operations phase, unavoidable emissions of odorous compounds would occur. Based on a modeling analysis, the concentrations of odorous compounds would dissipate below referenced threshold levels beyond the fence line at locations where people would most likely be located, including the nearby businesses, golf course, houses, parks, and schools. Although the biorefinery would cause unavoidable emissions of odorous compounds, the offsite impacts would be small.

## **7.1.9 SOCIOECONOMICS**

Unavoidable impacts from construction and operations of the biorefinery would affect, to a small degree, population, housing, employment, education, and public services in Morton, Seward, and Stevens counties, Kansas, and in Texas County, Oklahoma. *Socioeconomic* changes during the construction phase would include a brief elevation in project-related employment, temporary population increases, including increases in the school-aged population, and proportional and immediate impacts on existing levels of public services (such as law enforcement, fire protection, and medical services). Impacts on housing would be unavoidable but small because of the nature of housing often selected by construction workforces and the large inventory of vacant housing in the region. Abengoa Bioenergy has determined that the greatest impacts would be economic, and, although unavoidable, would be generally viewed as beneficial and not adverse. As outlined in Chapter 4, Section 4.9 of this Abengoa Biorefinery Project

EIS, construction-related impacts in Morton, Seward, Stevens, and Texas counties would result in small increases in peak employment. Increase in employment would result in increased spending of wages, which in turn would create indirect jobs and increase tax revenues. Socioeconomic changes during operations would include increases in direct project-related employment and indirect positions created by operational worker wages being spent. The greatest impacts during operations would also be economic and, although unavoidable, would be generally viewed as beneficial and not adverse. There would be very small long-term population increases. Because the population increases would be small, impacts to public services, including educational services, would also be small albeit unavoidable.

#### **7.1.10 CULTURAL RESOURCES**

Based on DOE review of published information, coordinating with the State Historic Preservation Office and the results of the Phase I/II investigation, construction and operation of the biorefinery, including the buffer area, would not result in adverse impacts to State or National Historic register sites within the 1-mile (1.6-kilometer) region of influence. The specific locations of offsite storage are not yet known; however, the storage sites would not be located within or immediately adjacent to any sites listed with the National Historic Register or Kansas State Historical Society.

DOE does not expect any impacts to graves or American Indians concerns as a result of the Proposed Action or Action Alternative.

#### **7.1.11 HEALTH AND SAFETY**

There would be a potential for injuries or fatalities to workers during construction and operation of the biorefinery due to common industrial hazards and accidents. Common industrial accidents and their associated injuries would not be completely avoidable. Safety programs and best management practices would reduce, but not eliminate, the potential for worker injuries or fatalities.

#### **7.1.12 ENVIRONMENTAL JUSTICE**

No impacts to communities with high percentages of *minority* and *low-income* populations were identified that would exceed impacts identified for the general population. In addition, the Department identified no unique exposure pathways, sensitivities, or cultural practices would result in different impacts on minority or low-income populations. Disproportionately high and adverse impacts would be unlikely as a result of the Proposed Action and Action Alternative.

### **7.2 Relationship Between Short-Term Uses and Long-Term Productivity**

Council on Environmental Quality regulations that implement the procedural requirements of NEPA require consideration of “the relationship between short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). This includes using “... all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generation of Americans” (NEPA, Section 101, 42 U.S.C. 4331).

This section discusses the short-term use of the environment and the maintenance of its long-term productivity. Chapter 4 of this EIS provides more-detailed discussions of the impacts and resource utilization associated with the Proposed Action and Action Alternative.

The Proposed Action supports long-term productivity of land use relative to the current conditions. Most of the land within the region of influence is utilized for agricultural production. The Proposed Action would primarily utilize crop residues, a byproduct of existing grain production. The long-term use of crop residues for energy production is largely unprecedented. The Proposed Action includes best management practices to minimize adverse impacts associated with crop residue removal. However, the extent of the impact to soil conditions is the subject of ongoing research.

The increased water demand during the projected life of the biorefinery would have a small impact on the Hugoton water system. Use of groundwater for facility operations would not adversely affect groundwater supplies from the High Plains aquifer, as the biorefinery demand would be a reduction over that which would have occurred if the four wells and associated demand were to have remained a source of irrigation water.

### **7.3 Irreversible and Irretrievable Commitments of Resources**

NEPA Section 102 (42 U.S.C. 4332) and Council on Environmental Quality regulations that implement the procedural requirements of NEPA (40 CFR 1502.16) require that environmental analyses include identification of "... any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." An irreversible commitment of resources represents a loss of future options. It applies primarily to nonrenewable resources, such as minerals or *cultural resources*, and to those factors that are renewable only over long time spans, such as soil productivity; whereas, an irretrievable commitment of resources represents opportunities that are foregone for the period of the Proposed Action. Examples include the loss of production, harvest, or use of renewable resources. The decision to commit resources is reversible, but the utilization of opportunities foregone is irretrievable.

This section describes irreversible and irretrievable commitments of resources associated with implementation of the Proposed Action and Action Alternative. Irreversible and irretrievable commitments of resources would not meaningfully vary between the Proposed Action and Action Alternative.

#### **7.3.1 LAND USE**

Construction of the biorefinery and resultant infrastructure and development construction is considered an irreversible commitment of land use. However, construction of the biorefinery is consistent with local land use goals.

Biorefinery consumption of biomass is considered an irretrievable commitment of resources. Consumption by the biorefinery could effectively reduce available livestock feed within the region of influence. Livestock producers that control use of the land from which their feed is derived are expected to be largely unaffected. Livestock producers that rely on biomass from land not under their control could be impacted by a reduction in available livestock feed. DOE does not consider this indirect *opportunity cost* to a non-landowner an adverse impact. Replacement of nutrients removed through biomass

harvesting is common agricultural practice and supported by Abengoa Bioenergy's optional Nutrient Replacement Program. The decision to irretrievably commit biomass to the biorefinery would be made by individual producers. Producers that willingly enter the biomass purchase contract would have deemed the compensation adequate for the loss of conservation functions (such as soil moisture management). To the unlikely extent that producers would jeopardize their own long-term soil productivity, the Proposed Action includes best management practices for residue removal.

### **7.3.2 AIR QUALITY**

Operation of the biorefinery would cause irretrievable commitments of air quality resources, as it would consume allowable air quality increments even though the air quality impacts would be well below the National Ambient Air Quality Standards and required best management practices would be implemented. Air quality increments, along with baseline concentrations from the area of interest, define air quality impact levels that all sources in the baseline area of interest cannot exceed in order to prevent degradation of air quality in the area of interest.

### **7.3.3 HYDROLOGY**

#### **7.3.3.1 Surface Water**

DOE has not identified any *jurisdictional wetlands* that would be affected by the Proposed Action. Surface water drainage would be limited to areas within the Biorefinery Project site, which encompasses the buffer area. Offsite storage locations would not be in areas of *depressions*, where runoff might accumulate. Therefore, DOE did not identify any associated irreversible and irretrievable commitments of surface water resources.

#### **7.3.3.2 Groundwater**

The Proposed Action would consume 2,170 acre-feet (2.7 million cubic meters) of water per year, and the Action Alternative would consume 850 acre-feet (1.0 million cubic meters) of water per year. The *consumptive use* is less than the currently approved quantity of 7,240 acre-feet (8.9 million cubic meters) per year for the Proposed Action and 2,200 acre-feet (2.7 million cubic meters) per year for the Action Alternative. The use of groundwater could be considered an irretrievable commitment of resources (see discussion in Chapter 4, Section 4.3.1.2).

### **7.3.4 BIOLOGICAL RESOURCES**

Construction and operation of the biorefinery under the Proposed Action and Action Alternative could result in some minor adverse impacts. Any impacts, although irreversible, would be only to common wildlife species on and immediately near the Biorefinery Project site.

### **7.3.5 UTILITIES, ENERGY, AND MATERIALS**

Construction and operation of the biorefinery would result in the unavoidable use of energy and materials. Under the Proposed Action, energy use would consist of natural gas and diesel fuel; under the Action Alternative (without the electrical co-generation component), electrical energy from the regional power grid would also be used. Materials would include general construction materials such as concrete, asphalt, and earthen fill materials, but would also include various manufacturing materials, including steel

and stainless steel. The consumption of energy and construction material would not be large enough to affect national or regional supplies. Further, the electrical co-generation component of the Proposed Action would add electrical energy into the regional grid for use by other entities. These impacts, though minor, would be irreversible.

### **7.3.6 WASTES, BYPRODUCTS, AND HAZARDOUS MATERIALS**

DOE identified the irreversible loss of land used for landfills. DOE did not identify any other irreversible and irretrievable commitments of resources related to the Proposed Action or Action Alternative for wastes, byproducts, and hazardous materials.

### **7.3.7 TRANSPORTATION**

For the Proposed Action and the Action Alternative, fossil fuels such as diesel fuel and gasoline would be consumed during the transport of materials for the construction and operations phases. Under the Proposed Action, there would be about 150 million round-trip miles (240 million round-trip kilometers) of truck and rail traffic and about 39 million round-trip miles (63 million round-trip kilometers) of commuting worker traffic during the construction and operations phases. This would consume about 24 million gallons (91 million liters) of diesel fuel and gasoline. Under the Action Alternative, there would be about 100 million round-trip miles (160 million round-trip kilometers) of truck and rail traffic and about 32 million round-trip miles (51 million round-trip kilometers) of commuting worker traffic during the construction and operations phases. This would consume about 16 million gallons (61 million liters) of diesel fuel and gasoline.

### **7.3.8 AESTHETICS**

#### **7.3.8.1 Visual Resources**

The visual contrast of the biorefinery to the existing agricultural land would cause irreversible and irretrievable changes in the *viewshed* in the Hugoton area. The structures of the biorefinery would be similar in height and appearance to some existing, nearby structures that are visible from Hugoton, the industrial park, and the Forewinds Golf Course.

#### **7.3.8.2 Noise**

DOE did not identify any irreversible and irretrievable commitments of resources related to the Proposed Action or Action Alternative for noise.

#### **7.3.8.3 Odor**

DOE did not identify any associated irreversible and irretrievable commitments of resources due to the presence of odorous compounds emitted from the biorefinery because there are no regional odor restrictions and the odors naturally dissipate with time and distance.

### **7.3.9 SOCIOECONOMICS**

DOE did not identify any irreversible and irretrievable commitments of resources related to the Proposed Action or Action Alternative for socioeconomics.

### **7.3.10 CULTURAL RESOURCES**

DOE did not identify any irreversible and irretrievable commitments of resources related to the Proposed Action or Action Alternative for cultural resources.

### **7.3.11 HEALTH AND SAFETY**

There would be a potential for injuries or fatalities to workers during construction and operation of the biorefinery due to common industrial hazards and accidents. Common industrial accidents and their associated injuries could not be completely avoidable. Safety programs and best management practices would reduce, but not eliminate, the potential for worker injuries and fatalities.

### **7.3.12 ENVIRONMENTAL JUSTICE**

DOE determined that constructing and operating the biorefinery would not cause high or adverse impacts to, or fall disproportionately on, minority or low-income populations. Thus, DOE did not identify any associated irreversible and irretrievable commitments of resources related to the Proposed Action or Action Alternative that would present an *environmental justice* concern.