

FINDING OF NO SIGNIFICANT IMPACT**DEPARTMENT OF ENERGY LOAN GUARANTEE FOR
SUNIVA INC'S
ARTISUN PROJECT
IN THOMAS TOWNSHIP, SAGINAW, MICHIGAN**

AGENCY: U.S. Department of Energy, Loan Guarantee Program Office

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) is adopting an environmental assessment (EA) completed by the County of Saginaw, Michigan, performing as the responsible entity for the U.S. Department of Housing and Urban Development (HUD). The HUD EA was completed in February 2010 and analyzed the potential environmental impacts associated with the construction of Suniva, Inc.'s (Suniva) ARTisun Project located in Thomas Township, Saginaw, Michigan. The County of Saginaw, Michigan, is authorized to perform as the responsible entity for all environmental review, decision-making, and action that would otherwise apply to HUD under the National Environmental Policy Act of 1969 (NEPA), as specified in 24 Code of Federal Regulations (CFR) §58.5. DOE, through its Loan Guarantee Program Office (LGPO), proposes to provide a Federal loan guarantee pursuant to Title XVII of the Energy Policy Act of 2005 to Suniva to support the construction and startup of the proposed project. The purpose of Title XVII is to expedite the deployment of a new energy technology into commercial use in the U.S. and to reduce emissions of greenhouse gases and other air pollutants.

The Suniva ARTisun Project involves the construction and operation of a monocrystalline silicon-based solar cell manufacturing facility. The facility would be approximately 200,000 square feet in area, with the capability of producing an annual output of approximately 500 megawatts (MW) of Suniva ARTisun solar cells. The ARTisun solar cells would achieve electricity conversion efficiency rates of 18 to 20 percent or more. Suniva's monocrystalline photovoltaic cells will be assembled into modules by Suniva's customers and third party contract manufacturers. The ARTisun Project would create approximately 400 new permanent jobs directly in Saginaw, and an additional 250 temporary construction and 1,200 indirect jobs. For the ARTisun Project, Suniva would purchase 43 acres of land, construct the ARTisun manufacturing facility, and purchase and operate manufacturing and fabrication equipment consisting of hardware and software.

The project will be located at 1000 N. Graham Road, Thomas Township, Saginaw, Michigan. The Economic Development Corporation of the County of Saginaw, Michigan (EDC) has an option to purchase approximately 235 acres of land (the "Park Property") located in Thomas Township, Saginaw, Michigan. The EDC intends to develop and market the Park Property as a renewable energy park for companies in the solar and renewable energy industries to locate their facilities. The 43 acres to be used for the ARTisun Project is located within the Park Property.

Thomas Township has amended its zoning ordinance, zoning map, master plan, and future land use map to create a Solar Technology and Renewable Energy Overlay District, within which the Park Property is located. The EDC would sell the 43 acres to Suniva, Inc. and construct certain public infrastructure improvements required for the development of the Renewable Energy Park and the ARTisun Project. The 43 acres on which the ARTisun Project would be constructed was formerly used as agricultural land and has been previously disturbed.

Because the County of Saginaw applied for HUD Community Development Block Grants (CDBG) for both development of the Renewable Energy Park and manufacturing equipment for the ARTisun Project, it was required to complete an EA for the project pursuant to HUD NEPA regulations (24 CFR Part 58). As the responsible entity for completing the NEPA process, the County of Saginaw issued a Finding of No Significant Impact (FONSI) and Request for Release of Funds and Certification (RROF) in February 2010, which allowed the release of CDBG funds for the ARTisun Project.

All discussion and analysis related to the potential impacts of construction and operation of the proposed ARTisun Project are contained in the HUD EA (DOE/EA-1827), which DOE adopts and incorporates herein by reference. The HUD EA examined potential impacts on the following resources and found none to be significant: floodplains; wetlands; water resources and water quality; threatened or endangered species and critical habitats; prime or unique farmlands; geology and soils; visual, recreational, and aesthetic resources; land use; property of historic, archaeological, or architectural significance; Native American concerns; environmental justice; public health and safety; waste management; transportation; socioeconomic conditions; and noise. The DOE Loan Guarantee Program Office (LGPO) reviewed the HUD EA and found that the analysis adequately covered all areas of concern, but did not include a discussion of global climate change or intentional destructive acts, which DOE has a policy to include in all of its EAs. In addition, the LGPO requested that Suniva provide additional information concerning the ARTisun Project's air emissions to support conclusions regarding the significance of air quality impacts. Therefore, DOE is including discussions of global climate change and intentional destructive acts, and an analysis of air quality impacts, in this FONSI.

Air Quality

Affected Environment and Environmental Effects

The proposed project site is in an area (Saginaw County) currently in attainment with all criteria air pollutants for which National Ambient Air Quality Standards (NAAQS) have been established¹. During 2007 through 2009, pollutant concentrations at the nearest air quality monitoring station to the proposed site were well below the air quality standards, with the exception of ozone (Table 1). In 2007, the average 8-hour concentrations of ozone for the monitoring station used (Flint) were slightly above the 2008 standard of 0.075 part per million. The 1997 ozone standard, 0.080 part per million, remains in place for implementation purposes as the EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

¹ <http://www.epa.gov/oar/oaqps/greenbk/ancl.html#MICHIGAN>, as of June 15, 2010

Table 1. Ambient air quality monitoring data for criteria pollutants during 2007 to 2009 for the nearest air quality monitoring station to the proposed facility.

Pollutant	Monitor Location	Averaging Period	NAAQS ^a	Annual Design Value		
				2007	2008	2009
Carbon monoxide (ppm)	Grand Rapids	1-hour ^b	35	1.7	1.8	2.1
		8-hour ^b	9	1.1	1.1	NA
Lead ($\mu\text{g}/\text{m}^3$)	Flint (2007)	Rolling 3-month ^c	0.15	0.01		
	Dearborn (2008-2009)				0.0232	0.0155
Nitrogen dioxide (ppm)	Detroit-E.7 Mile	1-hour ^b	0.100	0.053	0.053	0.058
		Annual	0.053	0.0135	0.0127	0.0125
PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Flint (2007)	24-hour ^b	150	19		
	Grand Rapids-Monroe (2008-2009)				25	21
PM _{2.5} ($\mu\text{g}/\text{m}^3$)	Bay City	Annual ^d	15	11.02	9.7	9.1
		24-hour ^e	35	31.23	26	24.0
Ozone (ppm)	Flint	8-hour	0.075	0.078	0.074	0.072
Sulfur dioxides (ppm)	Detroit – W. Fort	Annual	0.03	0.0050	0.00204	0.0031
		24-hour ^b	0.14	0.029	0.011	0.029
		3-hour ^b	0.5	0.088	0.042	0.059
		1-hour	0.075	NA	NA	NA

^a NAAQS = National Ambient Air Quality Standards.

^b Values correspond to the second highest concentrations from the monitor for the averaging period indicated.

^c Values correspond to the maximum quarterly mean concentration from the monitor.

^d Values correspond to the three year average of the annual mean concentrations from the Bay City monitor.

^e Values correspond to the three year average of the 98th percentile of 24-hour concentrations at the Bay City monitor.

Sources:

Michigan Department of Environmental Quality, Air Quality Division, 2007 Annual Air Quality Report.

Michigan Department of Environmental Quality, 2008 Annual Air Quality Report.

Michigan Department of Natural Resources and Environment, Michigan 2009 Air Quality Report.

Regulated Air Pollutants

Construction

Particulate matter (PM) would be emitted during ground clearing, grading, and other construction activities, and diesel exhaust and other air pollutants would be emitted from bulldozers, land graders, and other construction vehicles. These emissions would be temporary and occur primarily during the approximately 3-month period when most earthwork and building pad construction would occur. These emissions would be controlled as required using best management practices, such as maintenance of equipment, spraying water on dry soil, and washing vehicles to remove excess soil before they leave the project site, to reduce emissions of PM to minor levels.

Operations

Operation of the project would result in emissions of regulated air pollutants from a number of sources, mainly including combustion sources and the use of chemicals in various processes.

The project would employ a number of wet and dry scrubbers to control the potential emissions of regulated pollutants. Because Suniva operates a smaller facility in Norcross, Georgia for which they recently submitted an air permit application, estimates of emissions for the ARTisun Project in Saginaw were extrapolated from the Norcross data. The Norcross facility produces approximately 75 MW of solar cell capacity per year, while the proposed facility near Saginaw is anticipated to produce approximately 500 MW of solar cell capacity per year. To estimate emissions for the proposed facility, the Norcross facility emissions were multiplied by the ratio of the proposed facility capacity to the Norcross facility capacity, or 500 divided by 75.

Based on this calculation methodology, the proposed facility is expected result in the following estimated potential emissions of regulated pollutants from the project:

- Volatile organic compounds – 181 tons (165 metric tons) per year
- Particulate matter – 0.87 tons (0.79 metric tons) per year
- Nitrogen oxides – 18.5 tons (16.8 metric ton) per year
- Carbon monoxide – 9.73 tons (8.84 metric ton) per year
- Sulfur dioxide – 1.27 tons (1.15 metric ton) per year
- Emissions of lead would be negligible.

Emissions of hazardous air pollutants (HAPs) regulated under the Clean Air Act (40 CFR Part 70) were estimated as follows:

- Ethylene glycol – 12.8 tons (11.6 metric tons) per year
- Hydrogen chloride – 20.5 tons (18.6 metric tons) per year
- Hydrogen fluoride – 78.5 tons (7.2 metric ton) per year
- Chlorine – 35.2 tons (32.0 metric tons) per year
- Phosphine – 5.4 tons (4.9 metric tons) per year
- Total HAPs – 152 tons (138 metric tons) per year

Based on these estimates, HAP emissions are above the major source threshold of 10 tons per year (9 metric ton) for a single HAP (ethylene glycol, hydrogen chloride, hydrogen fluoride, and chlorine) and 25 tons per year (23 metric tons) of total HAPs, as established by the EPA. These emission estimates are considered preliminary and will be refined as the facility design details are finalized.

Suniva would address these matters as part of more detailed planning and permitting for the proposed facility. Specifically regarding the HAP emissions, Michigan regulations require that any new source of air toxics apply the best available control technology for toxics (T-BACT) and demonstrate that the emissions of the compounds meet applicable health based screening levels. Therefore, even if the facility is a major source of HAPs, the actual impact on human health will

be minimized through the Michigan regulatory requirements. Suniva would also be permitted as a minor source of air emissions for other air pollutants by the State of Michigan.

Table 2 presents a comparison of the proposed facility's estimated criteria pollutant emissions to the total air pollutants emitted in Saginaw County. Review of the information shows that the proposed facility would emit a small portion of the total air pollutants emitted in Saginaw County during a year.

Table 2. Suniva facility Potential to Emit Compared to Saginaw County Emissions.

Pollutant	Potential to Emit with Emission Controls (tons/year)	Major Source Thresholds for Comparison		Total county Air Emissions in 2005 for Comparison
		Title V (tons/year)	PSD & Non-Attainment NSR (tons/year)	Saginaw County (tons/year)*
PM ₁₀	0.87	NA**	250	11,738
PM _{2.5}	0.87	NA	250	2,378
SO ₂	1.27	NA	250	2,245
NO _x	18.5	NA	250	8,697
VOC	181	NA	250	10,667
CO	9.73	NA	250	64,649
Total HAPs	>25	25	NA	2,353
Worst Single HAP (HF)	>10	10	NA	15

*Source: <http://www.epa.gov/ttn/chief/net/2005inventory.html#inventorydata>.

** Proposed Suniva facility would not be one of the EPA-listed source categories, therefore emissions would only be subject to the 250 tons/year limit for criteria pollutants.

CO = carbon monoxide.

HAP = hazardous air pollutant.

NO_x = nitrogen oxides.

NSR = new source review.

PM = particulate matter.

PSD = prevention of significant deterioration.

SO₂ = sulfur dioxide.

VOC = volatile organic compound.

In summary, emissions of air pollutants during construction of the proposed Suniva facility near Saginaw would be minor and temporary. Based on a comparison of facility emissions to total Saginaw County emissions, operation of the facility is not expected to cause significant impacts to air quality or otherwise impact the attainment status of Saginaw County. Even though facility emissions would be a major source of HAPs and a minor source of other air pollutants, the impacts on human health will be minimized because the facility would have to obtain air emissions permits from the State of Michigan and comply with the requirements of those permits in order to operate.

Global Climate Change

Affected Environment and Environmental Effects

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report stated that warming of Earth's climate is unequivocal, and that warming is very likely attributable to increases in atmospheric greenhouse gases (GHGs) caused by human activities (anthropogenic).² The Fourth Assessment Report indicates that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts are linked to changes in the climate system, and that some changes could be irreversible. GHGs, which include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), are chemical compounds in the Earth's atmosphere that trap heat. Of these gases, CO₂ is recognized by the IPCC as the primary GHG affecting climate change. Present atmospheric concentrations of CO₂ are believed to be higher than at any time in at least the last 650,000 years, primarily as a result of combustion of fossil fuels. It is also very likely that observed increases in CH₄ are partially due to fossil fuel use, according to the IPCC Report.

The environmental report submitted with Suniva's application for a DOE loan guarantee included a life cycle analysis (LCA) that estimated GHG emissions from the project and decreases in GHG emissions resulting from the use of Suniva's screenprinted ARTisun monocrystalline silicon solar cell technology. Emissions of GHGs during construction would be from exhaust of trucks, backhoes, graders, and other construction equipment, and would be temporary and minor.

The LCA was based on the production of 400 MW of solar cell capacity per year. Suniva's proposed facility is now anticipated to produce approximately 500 MW of solar cell capacity per year. To estimate GHG emissions for the proposed facility, the emissions estimated in the LCA were multiplied by the ratio of the currently proposed facility capacity to the LCA capacity, or 500 divided by 400. Using this methodology, a total of about 952,100 tons (863,800 metric tons) of carbon dioxide per year would be emitted in connection with production of Suniva's screenprinted ARTisun monocrystalline silicon solar cell technology. Most of these emissions would be associated with the manufacturing of the raw materials used by Suniva and will not occur at the proposed facility itself.

This analysis did not include emissions from vehicles driven by project employees while commuting to and from work, as most of those workers likely would be driving to other jobs if not employed on this project. The analysis also did not consider potential reductions in GHGs in the future as generators of electricity in the region switch to renewable and other sources of energy that emit fewer GHGs.

The solar cells produced by the proposed facility would generate electricity that would displace electricity currently produced by other sources, many of which are fossil-fuel fired. The

² Intergovernmental Panel on Climate Change, Fourth Assessment Report, Climate Change 2007: Synthesis Report, Summary for Policy Makers, released in Valencia, Spain, November 17, 2007.

electricity produced is projected to result in the avoidance of a total of 17,637,100 tons (16,000,000 metric tons) of carbon dioxide over their useful life of 25 years. Therefore, for each year of solar cell production, the proposed facility is anticipated to result in an overall decrease of 16,685,000 tons (15,136,200 metric tons) of carbon dioxide over their useful life of 25 years.

The release of anthropogenic GHGs and their potential contribution to global warming are inherently cumulative phenomena. However, emissions from the proposed action in combination with past and future emissions from all other sources would contribute incrementally to the climate change impacts described above. At present DOE is not aware of a methodology that would allow estimation of the specific impacts this increment of climate change would produce in the vicinity of the facility or elsewhere.

Emissions of GHGs associated with the production of the facility's raw materials and the energy required to operate the Suniva facility would be more than offset by the reduction of fossil fuels used to generate electricity that will result from use of the solar cells produced at the facility. Although the project would contribute incrementally to cumulative increases in GHGs and related climate change when combined with other projects globally, GHG emissions from the proposed action would be minimal increases in CO₂ and would not be significant.

Consideration of Intentional Destructive Acts

Affected Environment and Environmental Effects

Solar cell manufacturing projects can be the subject of intentional destructive acts ranging from random vandalism and theft to sabotage and acts of terrorism intended to disable the facility. Acts of vandalism and theft are far more likely to occur than sabotage or terrorism. Theft usually involves equipment at the facility. Vandalism usually occurs in remote areas and is more likely to involve spontaneous acts such as shooting at equipment.

The risk of damage to the proposed project from intentional destructive acts would be considered very low. The 43 acres that the Suniva ARTisun facility would be built on will be 100% fenced in, with two gates allowing access to the facility. Both gates would be manned by guards 24 hours a day, seven days a week. The ARTisun facility buildings would have biometric access control. Access to all hazardous materials storage areas would be further restricted to only employees trained in handling hazardous materials. As required by Thomas Township, the ARTisun facility would have security lighting at the facility and around the fenceline. The ARTisun facility will be in operation 24 hours a day, seven days a week, and therefore would never be vacant.

Theft or opportunistic vandalism is more likely than sabotage or terrorist acts. The results of any such acts could be expensive to repair or replace, but no substantial impacts to continued manufacturing operations would be anticipated. No significant environmental impacts would be expected from physical damage to the proposed project or from temporary loss of manufacturing capacity.

Threatened and Endangered Species

No federally recognized threatened, endangered, or candidate species were identified on the property that the ARTisun facility would be built on. Therefore, notification to the U.S. Fish and Wildlife Service is not required under Section 7 of the Endangered Species Act and no impacts are anticipated to threatened, endangered, or candidate species.

Cultural Resources

Upon request of the State of Michigan's Historic Preservation Officer (SHPO), a cultural resources survey was completed on November 30, 2009 for the property on which the ARTisun facility would be built. In a letter dated December 9, 2009, the SHPO stated that no historic properties would be affected within the area of potential effects for the undertaking, and that HUD had fulfilled their compliance and consultation with the SHPO obligations under Section 106 of the National Historic Preservation Act.

Information from the cultural resources survey was also provided to the Saginaw Michigan Chippewa Indian Tribe for their review and consultation. The Tribe responded on May 24, 2010 that the area of potential effect is close to an area in which they have information indicating the presence of an Indian traditional cultural property. The Tribe offered their assistance if, during the course of the project, there is a discovery of Native American human remains or burial objects, but did not indicate that they had any further requests.

Public Involvement in the EA Process

The County of Saginaw sent a copy of the completed HUD EA and all supporting documentation to the State of Michigan for their review and comment on February 8, 2010. The State of Michigan reviewed the documentation, found it acceptable, and had no further comments on the EA. The County of Saginaw posted a combined Notice to Public of No Significant Impact on the Environment and Notice to Public of Request for Release of Funds in the local newspaper, The Township Times, on February 10, 2010, announcing the County's intention to issue the FONSI and RROF, and requesting comments from the public. The County received no comments on the FONSI, or objections to the planned RROF. The County signed the RROF on February 26, 2010 and sent the RROF to the State of Michigan. On August 17, 2010, the State of Michigan sent an e-mail to DOE and indicated that they found the EA acceptable and would not need to see the EA again for comment.

DETERMINATION: On the basis of the Final EA and the additional analysis in this FONSI, DOE has determined that providing a Federal loan guarantee to Suniva, Inc. for construction and startup of the ARTisun Project located in Thomas Township, Saginaw, Michigan, will not have a significant impact on the human environment. The preparation of an environmental impact statement is therefore not required, and DOE is issuing this FONSI.


Copies of the Final EA are available at the DOE Loan Guarantee Program Office website at <http://www.lgprogram.energy.gov/NEPA-1.html> or from

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Additional information on the DOE NEPA process is available from

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