

## Intellectual Property Request Broadcast Description

### Basic Information

IP Title	Recycling methods for Solar power modules
IP Serial No.	IPR-007-2 108-090512
Date Issued	9/05/2012
Expected Delivery Date	11/15/2012

### Description of Requested Intellectual Property

#### Recycling Methods for Solar Power Modules

##### Background

Solar power modules contain a variety of potentially hazardous materials, and cannot be safely disposed of in landfills. Solar panels generally function for 20-25 years, so the majority of panels manufactured are still in use. However, in years to come, their disposal could become an issue. New companies are therefore looking for ways to recycle or reuse these solar modules when they have reached the end of their lifespan.

Solar modules employ a variety of technologies, and even models within the same technology can have different ingredients. These materials may or may not be classified as toxic depending on who is regulating them.

According to a study by the University of California, Berkeley, the key ingredients of modules currently on the market are crystalline photovoltaic which is the oldest and most widespread solar technology in the United States, holding 57 percent market share in 2009.

A thin film technology called cadmium telluride makes up about 21 percent of the U.S. market. First Solar panels use this technology.

Cadmium may be carcinogenic. Exposure affects the lungs and kidneys and can be fatal.

Cadmium is technically banned by the European Union's Restriction on Hazardous Substances directive, although the policy currently allows an exemption for its use in solar modules.

Another thin film material, Copper Indium Gallium Selenide (CIGS), also has a cadmium layer. Indium is a potentially hazardous substance, too, particularly in the form of indium tin oxide, and currently has a market share of just 6 percent. Amorphous silicon, which also has an indium tin oxide layer, holds 16 percent.

# TEXAS INSTITUTE OF SCIENCE

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## Request for Proposals (RFP)

Texas Institute of Science would like to research and identify new methods to enable safe land filling of shredded Solar Power Modules or proposals for more economic methods of recycling.

To date many companies have largely failed to achieve satisfactorily pure material fractions when recycling old solar modules which is also very costly and yields low sales return. The purpose of this request is to identify the most advanced technologies and designs that could provide our clients with a potential solution. If you or your group has a potential solution for the above mentioned topics, please contact TxIS with an initial description of your capabilities.

**The proposals should give a clear picture as to why the scientist thinks he/she can solve the problem, a brief definition of foreseeable way(s) the problem will be solved, and an explanation of the readiness of the development (in those cases where prior work has been conducted). It also should include the approximate time and estimated cost to reduce the solution to the proposed problem to practice.**

## NON-DISCLOSURE AGREEMENT

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**Texas Institute of Science  
Hossein Pasvar  
Senior Vice President**



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Signature

September 5, 2012

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Date