Maps to Megawatts

Evaluating Land Use Suitability for Solar Energy Facilities in Arizona

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Image courtesy inhabit.com

(Reuters) - German solar power plants produced a world record 22 gigawatts of electricity per hour - equal to 20 nuclear power stations at full capacity……..

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Micro Solar

Solar-powered pizza oven

Residential Solar– Safford, AZ

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Solar Farm – McNeal, AZ

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Concentrating Solar

Source: solarinsure.com

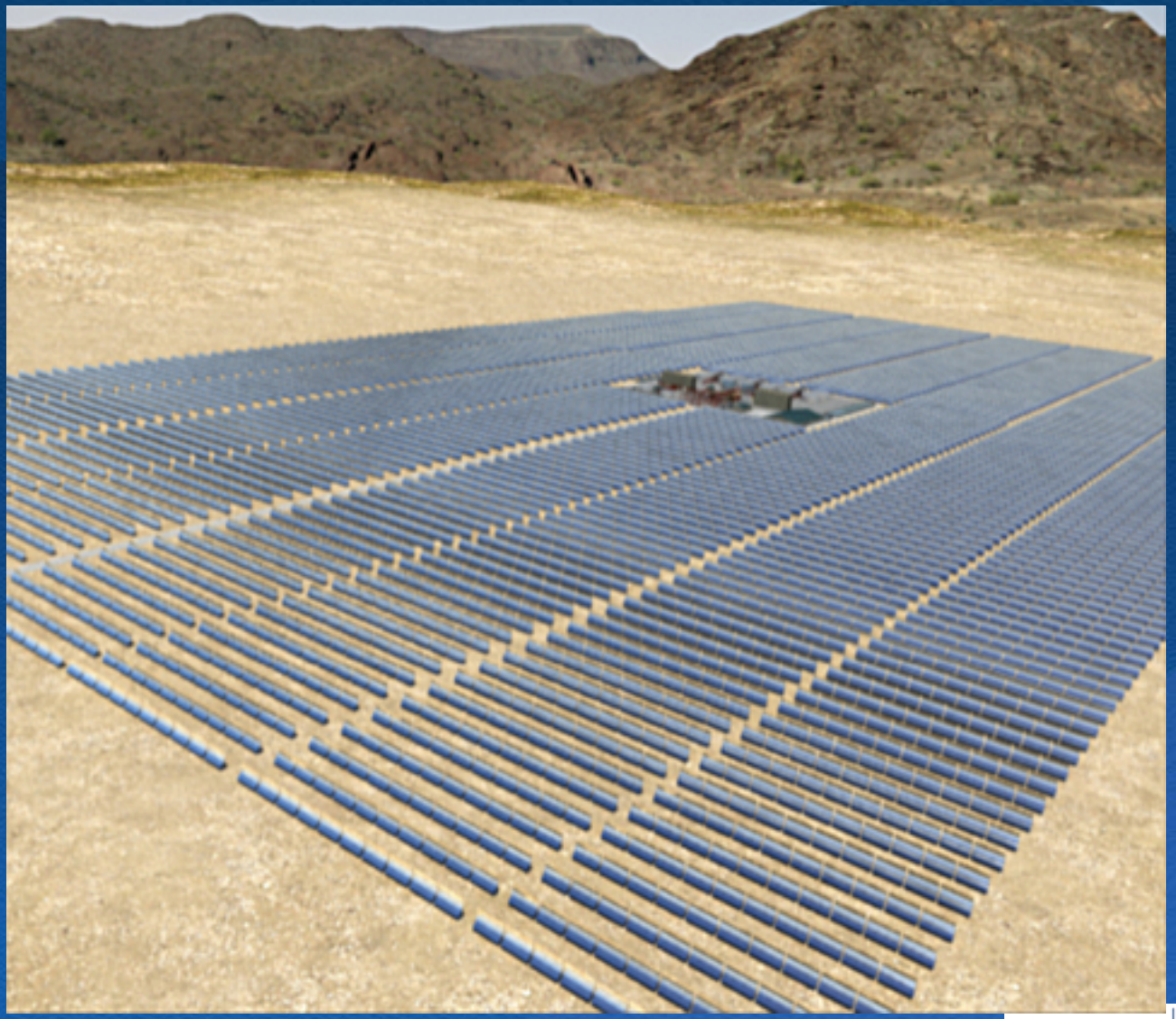

Photo source: Abengoa Solar

Solana CSP Generating Station
Gila, Bend Arizona

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5 MW project – Hatch, NM

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Utility-Scale Solar Projects

A typical 5 megawatt solar array project……..

- Needs 5-10 acres per megawatt
- Requires approximately 79,000 panels mounted on 8,000 posts
- Construction takes 2-3 months

Utility-Scale Solar Projects

A 5 megawatt solar array project……..

- Can generate 60-75 construction jobs
- Will power 3,000-4,000 homes

(Source: Gary Barnard, Public Service Co. of New Mexico)

Spatial Analysis & Renewable Energy

PROBLEM

– Find the most capable and sustainable locations for solar energy facilities in Arizona based on fundamental spatial parameters

OBJECTIVE

– Create suitability maps for different project sizes that identify locations of low, moderate, and high opportunity.

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Renewable Energy Opportunity Analysis (REOA)

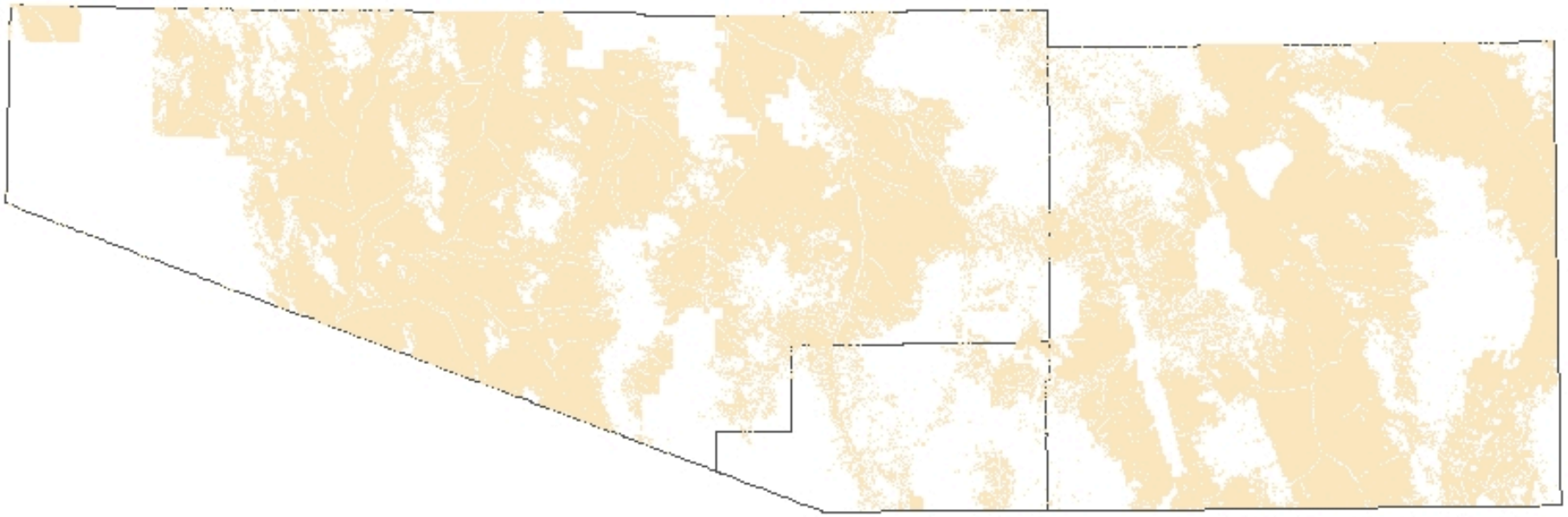
- Capability
  - Absolute constraints
- Suitability
  - Relative constraints/ weights

Capable Areas vs. Absolute Constraints

AREAS REMOVED FROM CONSIDERATION

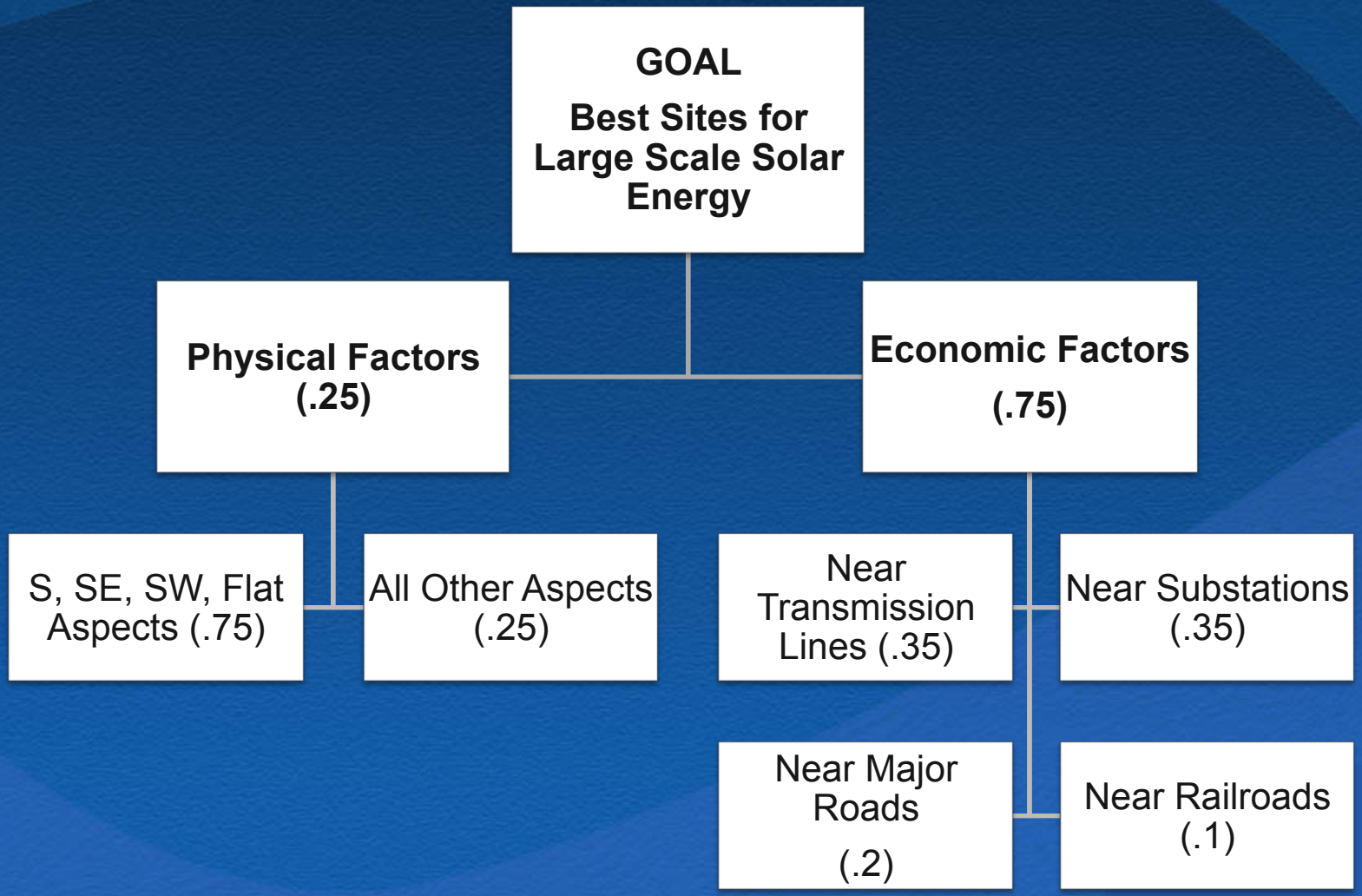
- Land ownership & use
  - NPS, USFS, State Parks, Conservation Areas
- Major streams
  - 600 foot buffer
- Slope
  - Greater than 4%

Southern Arizona

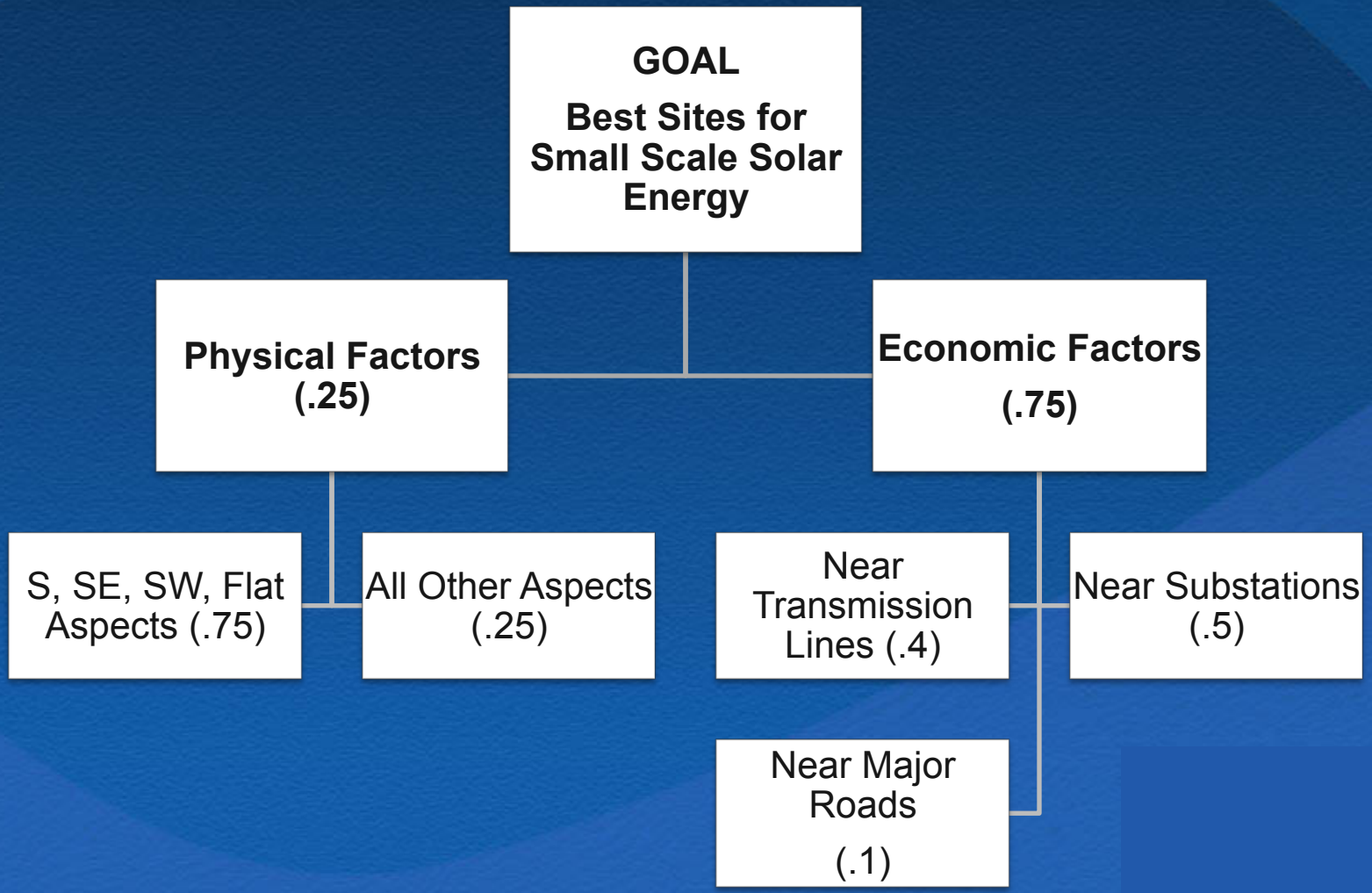


Capable Areas

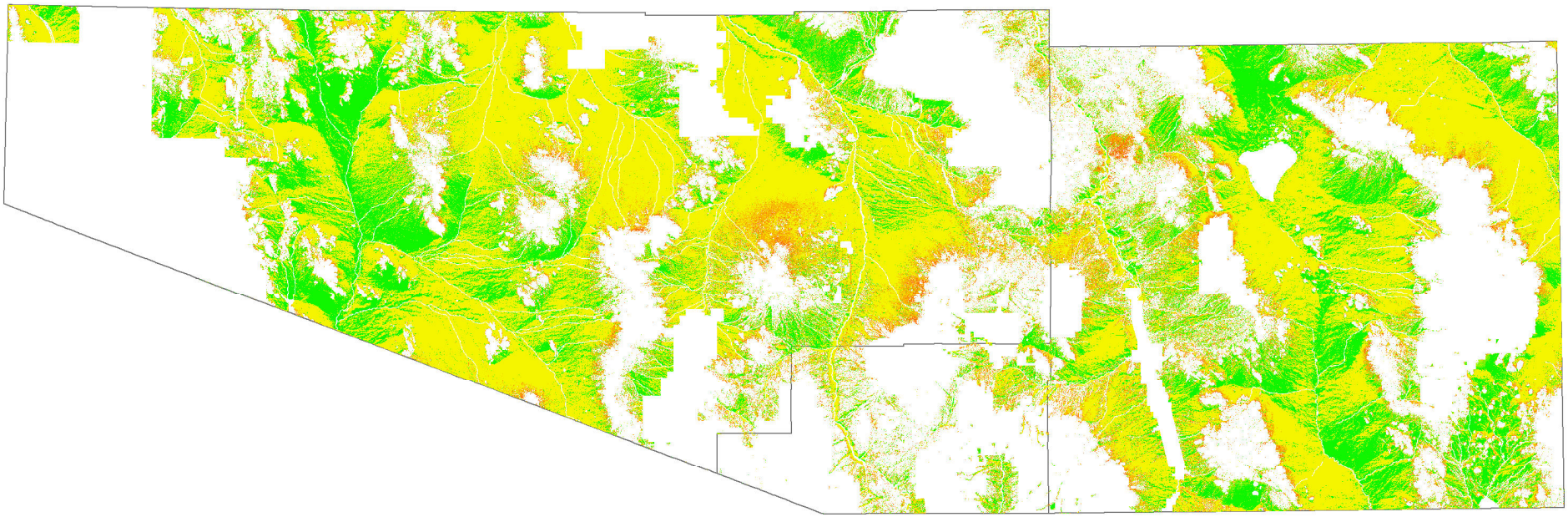
Large Scale Solar Suitability



Small Scale Solar Suitability



Physical Suitability



Slopes
0-2% **High**
2-3% **Mod**
3-4% **Low**

Aspect
SW, S, SE or Flat: **High**
All others: **Low**

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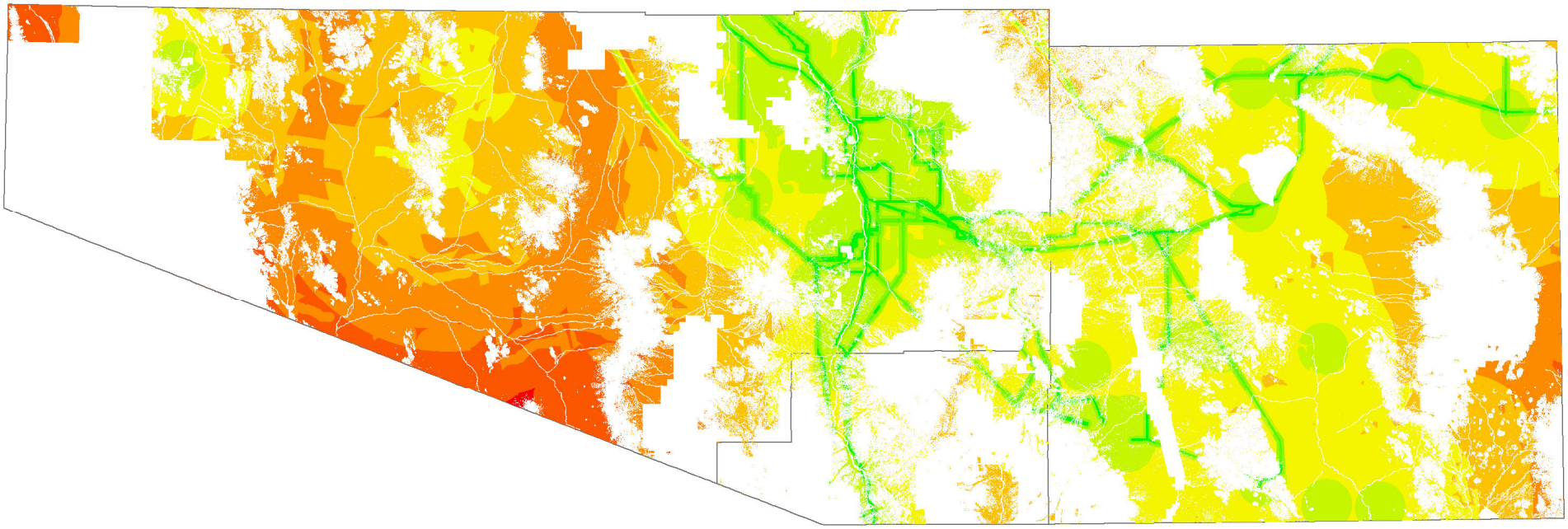
Economic Suitability

Large Scale Projects



Low Suitability

High Suitability

1
2
3
4
5
6
7
8
9

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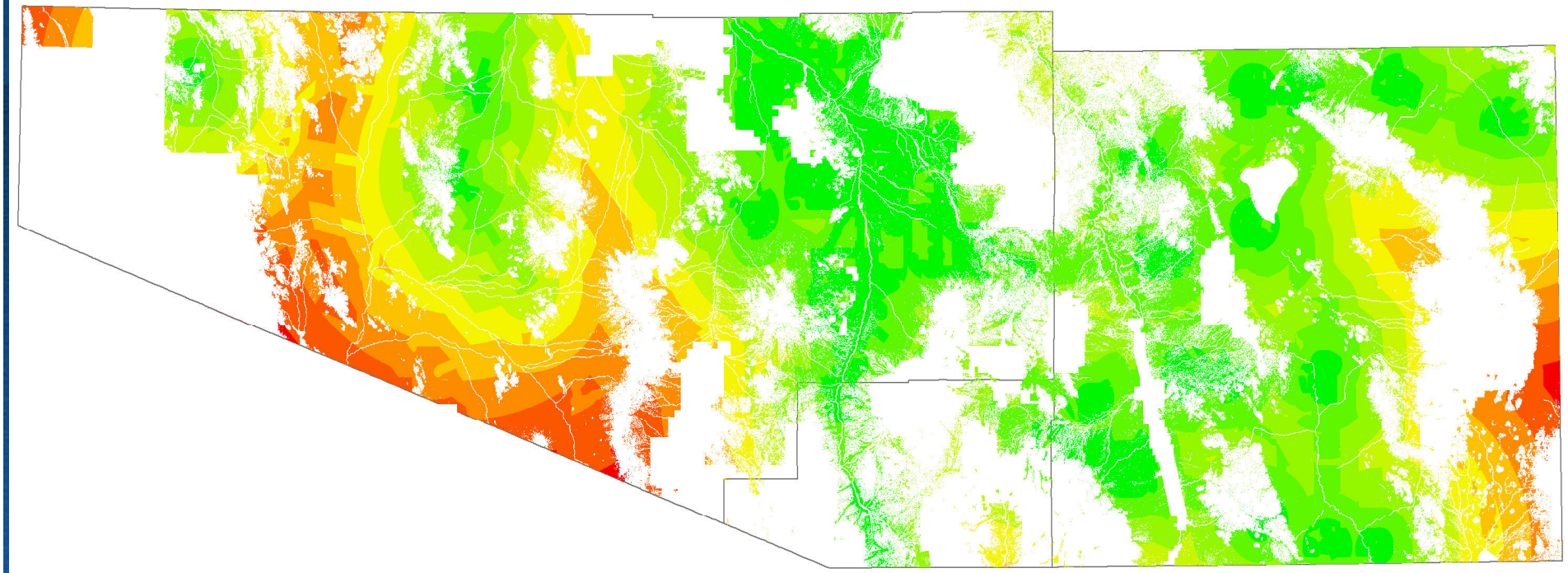
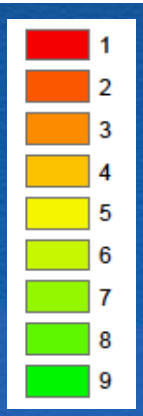
Economic Suitability

Small Scale Projects



Low Suitability

High Suitability



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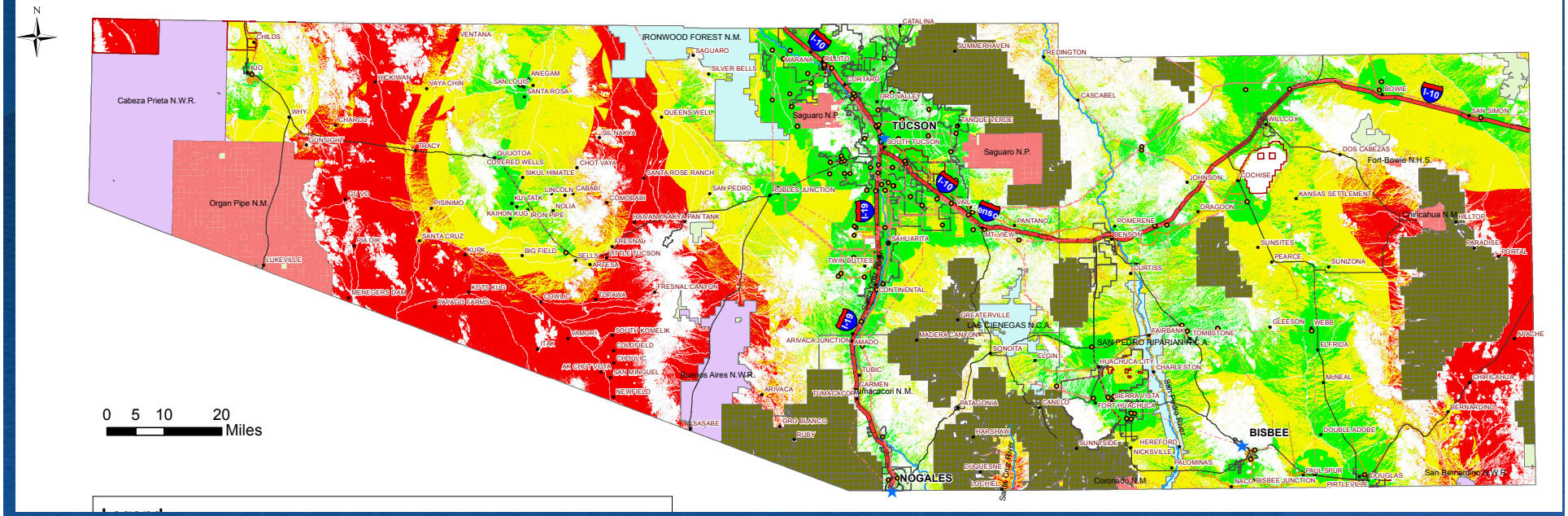
Suitability for Projects
5 Megawatts or Less



Potential

High	Moderate	Low
1.5 million	2.5 million	1.5 million

Acreage

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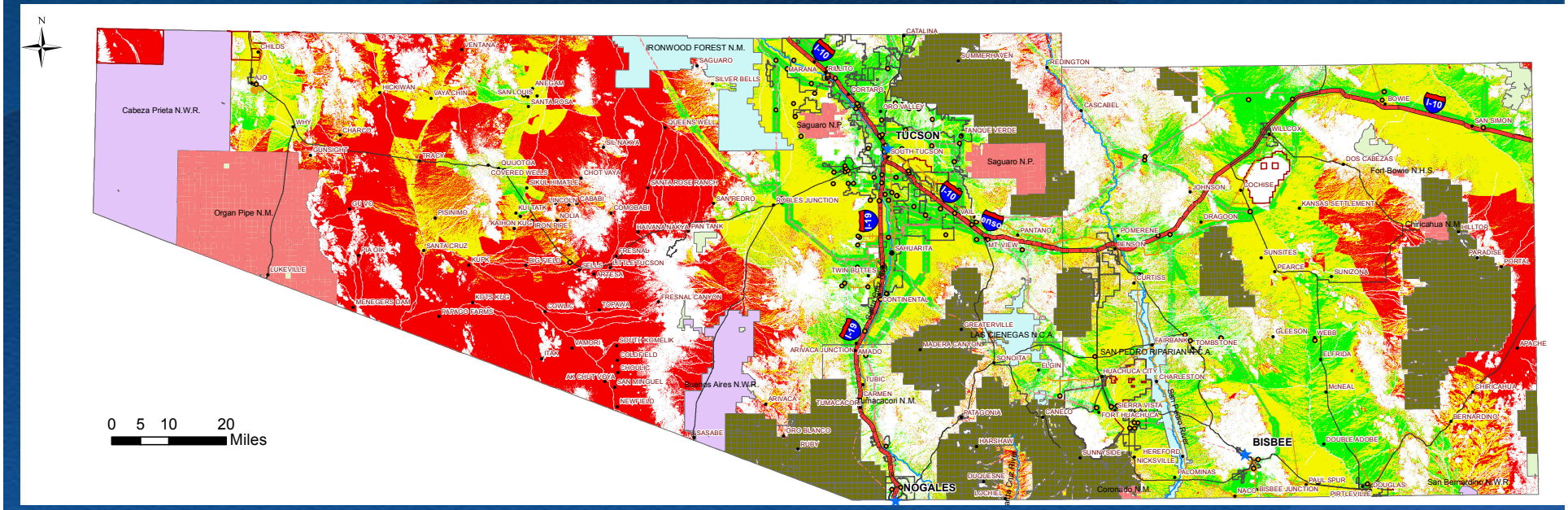
Suitability for Projects Greater than 5 Megawatts



Potential

High	Moderate	Low
1.1 million	2.5 million	2.1 million

Acreage

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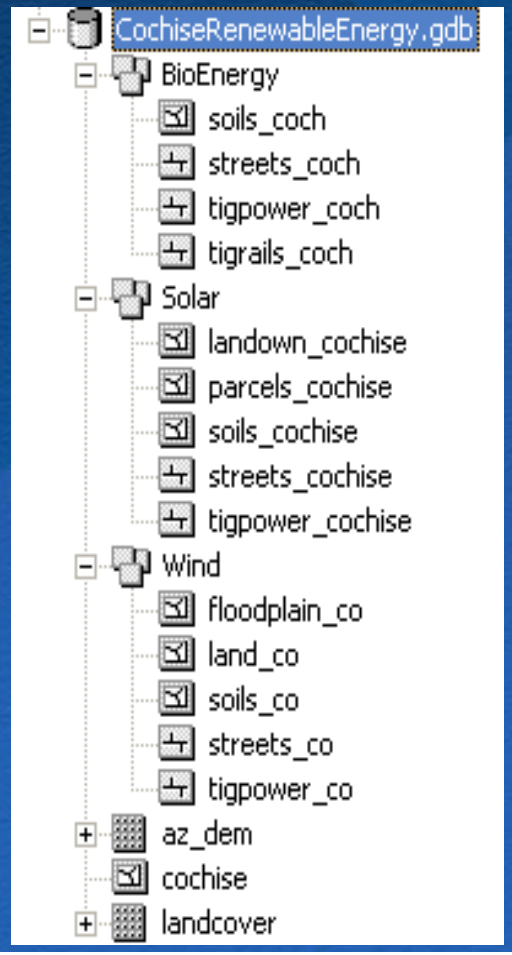
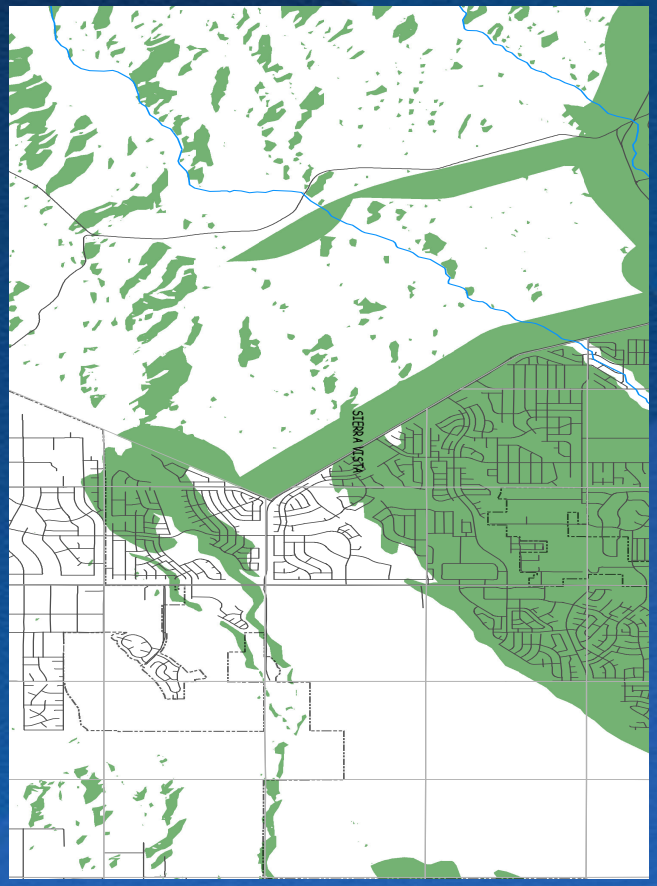
Data Inventory & Management

- Data Sources:
  - Counties' GIS data, AZ State Cartographer, NREL, Southern AZ Data Services Program, Arizona Land Resource Information System
- Storage: ArcCatalog Geodatabase
- Cell Size: 10 x 10 meters (~0.02 acres)
- Model Extent: Regional then Statewide



How Can This Model Be Used?

- Recommendations for using outputs
  - Overlay with available lands (MLS listings)
  - Overlay with other layers like residential and commercial development, wildlife and scenic corridors, water resources, high value ag lands, etc.



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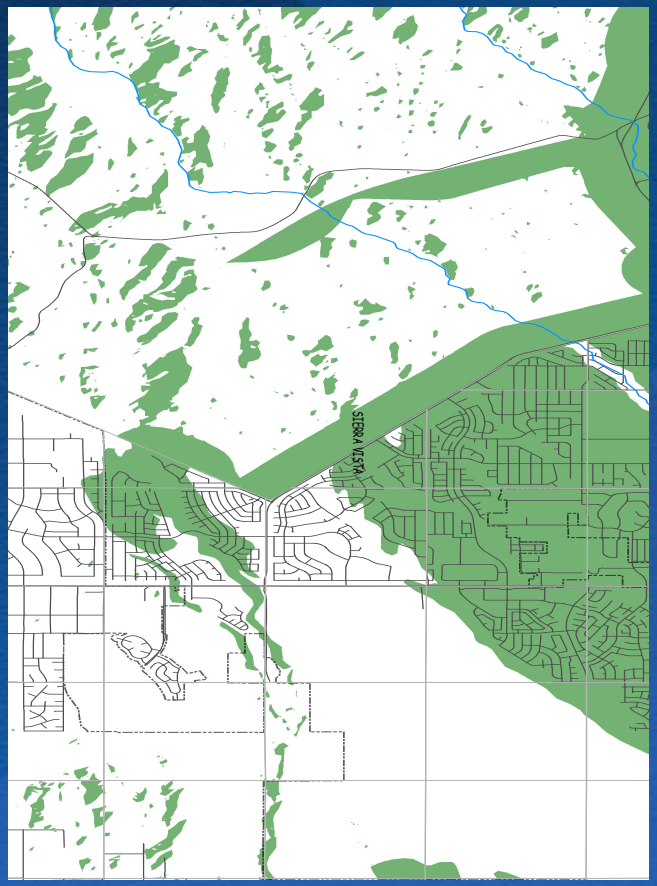
Who can use this information?

- Economic development specialists
- Renewable energy developers
- Chambers of Commerce
- Planners
- Real estate interests
- Community decision makers
- Agricultural interests



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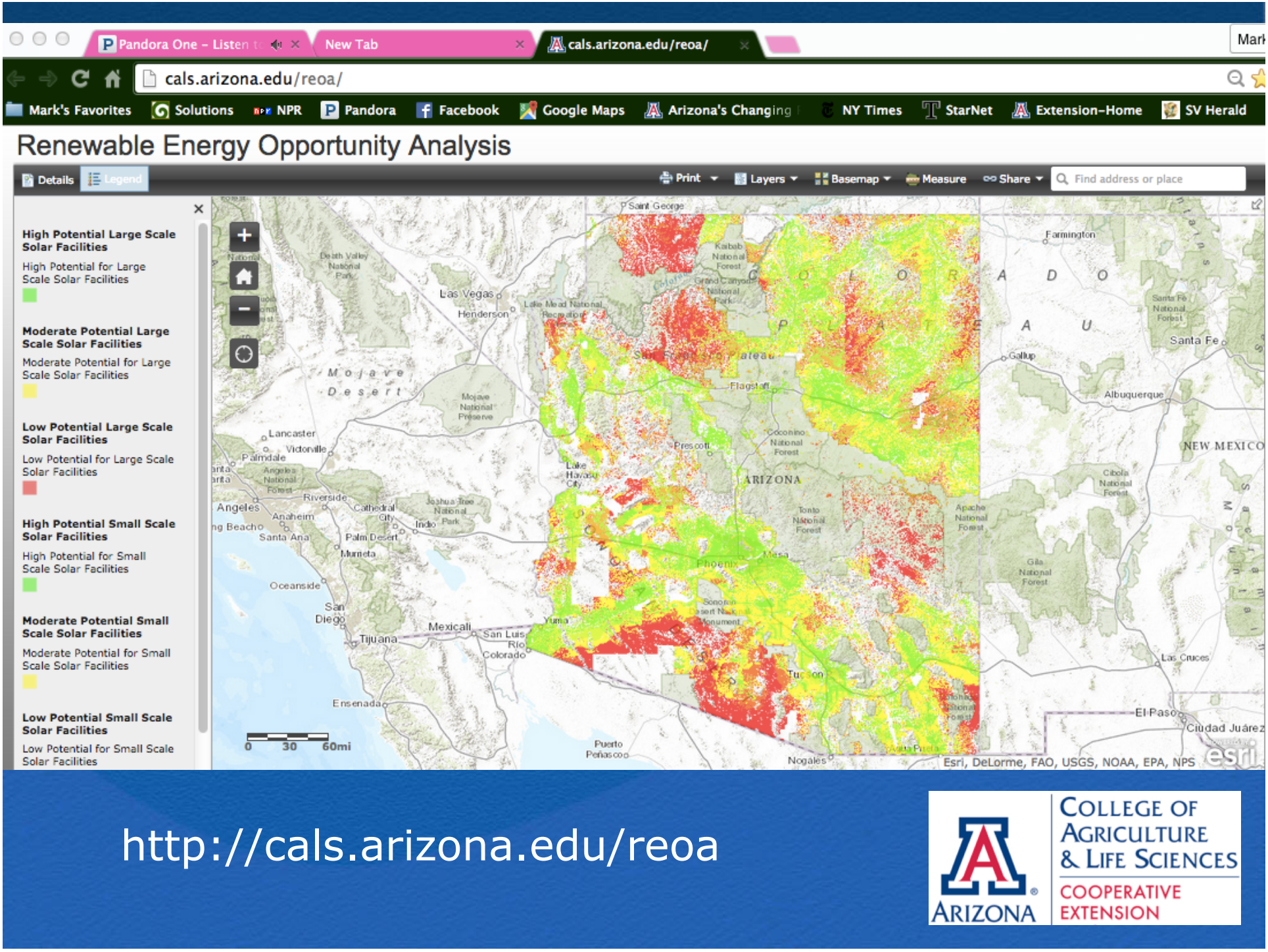

http://cals.arizona.edu/reoa

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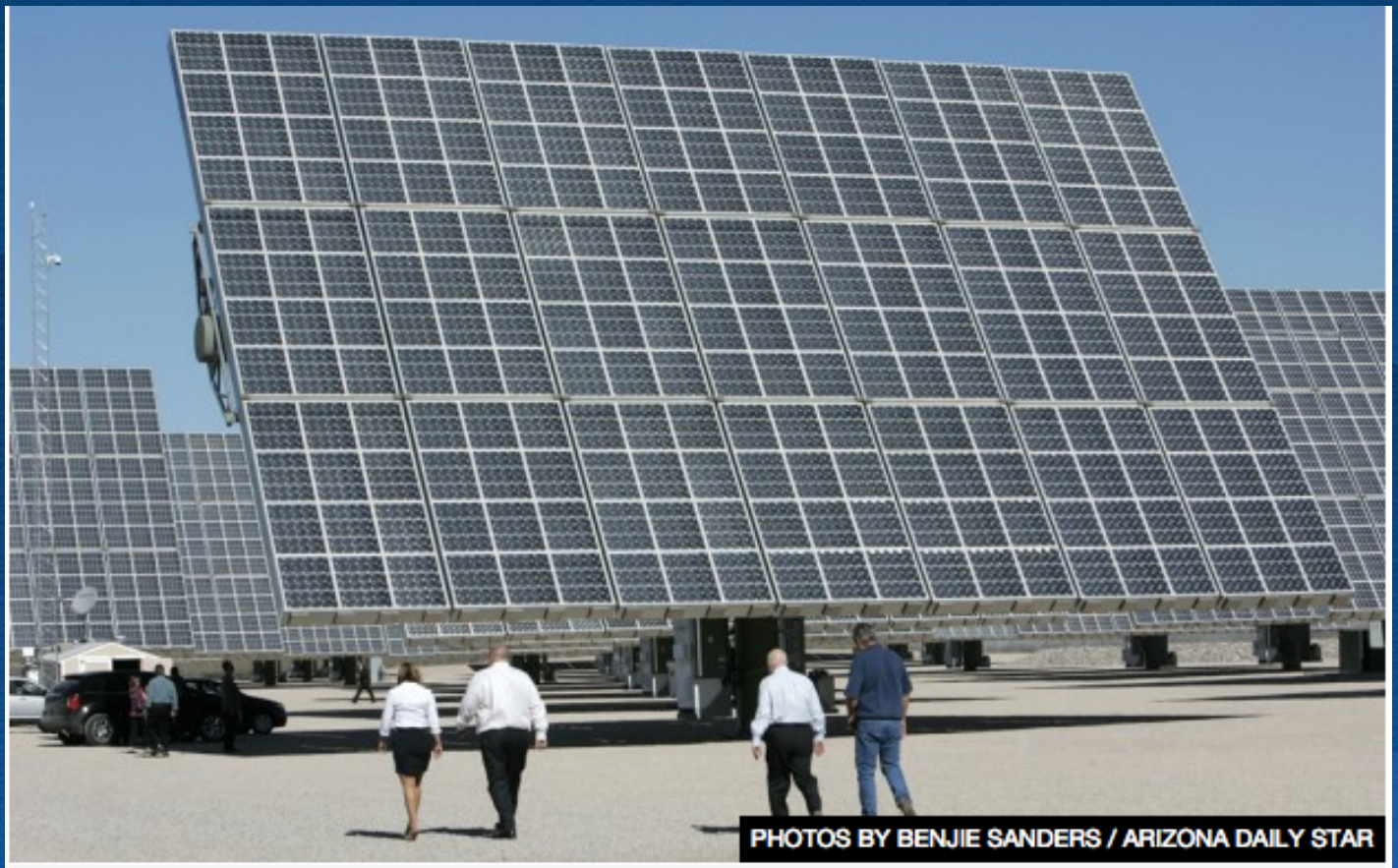

A new 12-acre solar-energy system at UA's tech park features 36 huge solar panels, each about the size of an IMAX movie screen.

QUESTIONS?

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