

The Nexus of Energy, Water, and Climate: From Understanding to Action

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Thermoelectric power plants produce 80% of electricity in the U.S....

... and consume 39% of all freshwater withdrawals, just behind agriculture at 41%.

Meanwhile, 85% of electricity needs of farms are for pumping groundwater...

...while withdrawals from major aquifers far exceed recharge in many areas.

2000

100 FEET

2009







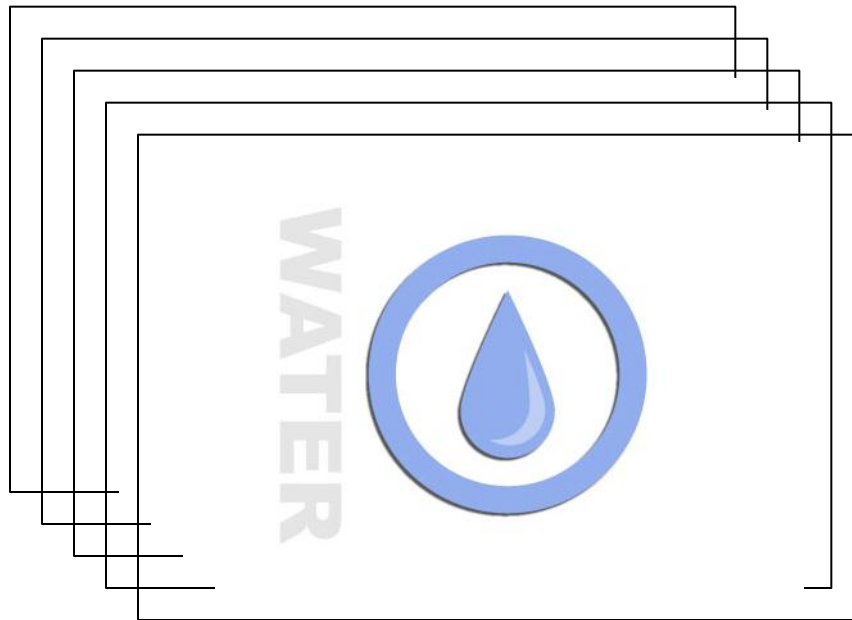
Growing demand for energy

Competition for water resources








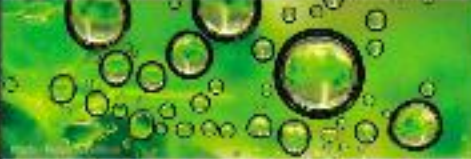












Climate change

The *Nexus* of
Water, Energy, and Climate





Water = Gold = \$




Energy Cards

 GENERAL ENERGY				 GENERAL ENERGY				 TRANSPORTATION ENERGY				 TRANSPORTATION ENERGY			
COAL				ONSHORE WIND TURBINE				OIL				ALGAE BIOFUEL			
															
<p>Did You Know? Pumping water from the Sierra Nevada to Los Angeles uses as much electricity as used by one-third of all homes in southern California.</p>				<p>Did You Know? Wind energy is neither strong nor persistent everywhere; rather, it is found in narrow regions of the world. Wind releases no greenhouse gasses.</p>				<p>Did You Know? Oil provides nearly 100% of our transportation needs, but it generates more than half of our CO₂ emissions. Producing oil consumes little water.</p>				<p>Did You Know? Microalgae, grown in salt or waste water, can potentially produce 100 times more oil per acre than any other biofuel crop.</p>			
	6	8	10		1	2	3		4	6	8		6	7	8
	70	100	130		10	20	45		50	70	90		50	65	80
	4	6	8		0	0	1		3	4	5		1	1	2

Regional Goal Cards



<p>CALIFORNIA COAST DRAW 50 <small>Per Turn</small></p> <p>⚡ 180 🚚 120 X 15</p>	<p>EASTERN MIDCONTINENT DRAW 40 <small>Per Turn</small></p> <p>⚡ 140 🚚 100 X 12</p>	<p>HIGH PLAINS DRAW 30 <small>Per Turn</small></p> <p>⚡ 110 🚚 70 X 9</p>	<p>WESTERN DESERT DRAW 20 <small>Per Turn</small></p> <p>⚡ 70 🚚 50 X 6</p>
			
<p>DID YOU KNOW?</p> <p>Tremendous energy is used in California to pump water over mountains. Cities compete for that water with farms that provide much of the country's food. Desalination plants could provide water, but are impractical due to high energy use.</p>	<p>DID YOU KNOW?</p> <p>Making ethanol from corn uses tremendous amounts of water and energy, plus pesticides and fertilizers made from petroleum. It also produces significant CO₂ and can drive up food prices globally.</p>	<p>DID YOU KNOW?</p> <p>Power plants fired by coal or natural gas generate 80% of all electricity in the U.S. They consume 39% of freshwater used yearly. Farmers use large amounts of electricity to pump groundwater for their crops, which is depleting major aquifers.</p>	<p>DID YOU KNOW?</p> <p>Lake Mead, created by Hoover Dam, has fallen 100 feet due to drought and climate change. Continued lowering would cut off water supplies from Lake Mead and the hydroelectric power generated at Hoover Dam that supplies six western states.</p>
<p>★ Earn an extra 10 ⚡ for each OFFSHORE WIND Source in this region.</p>	<p>★ Earn an extra 10 🚚 for each ALGAE BIOFUEL Source in this region.</p>	<p>★ Earn an extra 10 ⚡ for each WIND Source in this region.</p>	<p>★ Earn an extra 10 ⚡ for each SOLAR Source in this region.</p>


Action Cards

 **TECHNOLOGY**

METHANE CAPTURE


Technology to capture the greenhouse gas methane from the belches and gas of farm animals and their manure is widely adopted.


Invest 2  to decrease your  by 1

 **CLIMATE EVENT**

CRITICAL MATERIALS


Shortages appear in the world's supply of rare earth elements used in wind turbines. While avoiding climate impact, the cost of wind energy development increases.

Players with WIND sources discard 2  to pay higher costs.

 **POLICY**

TRANSIT INCENTIVES

Subsidies for mass transit, carpooling, and hybrid vehicles increase their use and decrease CO₂ emissions.

Player must discard 1  for each OIL source in play to subsidize clean energy transit.

Our Process....

From the playtesters

“...find more ways to build in interaction and competition!”

“I did not see the connection to
climate...”

“The transportation energy drove the pollution sky high. It was really annoying!”

