Highway 2.0
An American Interstate for the Solar Age
(Part I: Biomass)

Description
Vacant land along America's interstate highway system is renewed through the growing of quick-cycling biomass crops and the installation of wind turbines and solar photovoltaics. This represents an entirely new economy: Interstate Energy Farming. A redeveloped interstate corridor would be the backbone of an adaptive landscape reuse strategy on a national level.

Relevance
A solarized interstate highway system can reverse carbon emissions, bioremediate freshwater, and generate purer, more localized forms of energy. Biomass, solar, and wind power can be used closer to their point of generation, requiring lower transportation inputs, and be utilized with less processing energy inputs than required by fossil fuels.

Importance
The Interstate Highway System of the United States connects hundreds of millions of people, contains the most accessible real estate in the country and, along with the electric grid, represents one the nation's most valuable capital and cultural assets. However, this system is ill-adapted to a world of economic instability and rising energy prices. It is well known that the way we transport goods on our highways must become radically more energy efficient, but it's lesser recognized that the highway corridors themselves – the 500,000 or so forsaken acres - could also be used in vastly more valuable ways. The primary management practice on this half million acres of land if fossil-fuel powered lawn mowing. This represents low-hanging fruit on a continental scale. It is time to redevelop this national energy sink to once again become a massive resource and job producer while also serving as a web of continental climate change mitigation.

The cultural and ecological value of developing perennial crops in these degraded areas is impossible to calculate, but immense. We believe that the value of enhancing the health of water systems, air quality and bird habitat, while transforming these national corridors from polluted landscapes into a web of thriving and productive arteries goes beyond measurable economic outputs. Because fossil fuel-based fertilizers will become increasingly expensive and carry a high carbon cost, and because agricultural land will be needed to feed people, we need to develop bio-energy production strategies that minimize fertilizer inputs, maximize carbon sequestration and perform well on marginal land like that available in the interstate corridors.

Many techniques in biomass production are being developed but they are not being trialed along interstate corridors where they can potentially have the most immediate, high value impact and make available the more valuable agricultural land they would otherwise occupy. Quick-cycling biomass crops have been grown for centuries, however, further research is needed to refine optimal species selection, pest management and harvesting methods specific to growing energy crops via large-scale strip farming. There has been little to no focus on growing these crops on marginal land while minimizing energy and chemical inputs.

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The Interstate Highway System was the largest public works project in American history. Solarizing this infrastructure represents an equally profound opportunity for economic development and resource conservation that will drive the next economy. There is perhaps no greater symbol of Americana and of the era of cheap energy than the U.S. Interstate Highway System and perhaps no greater 'vehicle' for the sustainable redevelopment of America.

Proposal

Though it is a challenging prospect, we believe federal and state agencies will be willing to participate in this process because of the immense economic value that the U.S. Interstate corridor can provide from the growth of biomass tree crops:

a. 15 trillion BTU's of biomass fuel, equivalent to 115 million gallons of diesel fuel per year*
b. 1.3 million tons of carbon emissions offset (in soil and plants)
c. 1,000,000 new jobs initially and 50,000 perpetually*
d. $152 million yearly revenue stream from biomass production*

**Based upon estimates that the interstate corridor landscape contains, on average, 75 feet of available growing space with room for safety buffer strips on both sides of each travel lane; and that half of the roughly 500,000 acres are suitable for biomass tree crops*

We believe the most effective way to promote national-scale change is to make a working model at a smaller scale first, record its challenges and successes carefully and then communicate it in a compelling way to the larger world. To that end, we are currently trialing perrenial biomass systems using 5 species with 32 varieties on four different sites that have high potential for use in our region. We plan to expand those sites and to include an actual section of the local interstate for one of these trials. We have identified, but are not trialing yet, another 18 species with over 100 varieties that show high potential for production on marginal land with minimal pesticide and fertilizer inputs in warmer areas of the nation. The $10,000 award money from this competition would be applied to multiple stages of this process which consist of:

- Securing land for additional trials (more lineal feet of plantings need to be tested for data sampling validation)
  - Cost: $3,500 for paid staff time for meetings, communications and presentations of the project.
  - Timeframe: All sites are already secured except the interstate corridor site which we expect to be able to gain access to via additional meetings and presentations by Fall 2009.
- Purchasing materials and paying staff: Plants, planting labor, management labor and research time
  - Cost: $6,000 (4,000 bare-root plants wholesale)
    $8,000 (labor and manager cost to plant them)
    $2,000 (design and meeting time for all sites total)
    $9,500 (research, plant care and project management time for 4 years)
    $2,000 project communications during and after trials

- Timeframe: Designs for all sites could be finished for a fall 2009 planting; planting would start in fall 2009 with some spring 2009 planting if soil conditions necessitate; ongoing management and research would be concentrated during the growing season for the next 4 years during and after which project communication would occur.

We will continue to collaborate with two local universities that are supporting the effort with research capability. It is our hope that these small test plots will provide a visible and inspirational example of the many other possibilities for the 500,000 acres of underutilized real estate in the nation's interstate corridors.

Potential Collaborators

The State of Vermont
The University of Vermont
The Vermont Design Institute
LivingFuture
Vermont Family Forests
Yestermorrow Design-Build School

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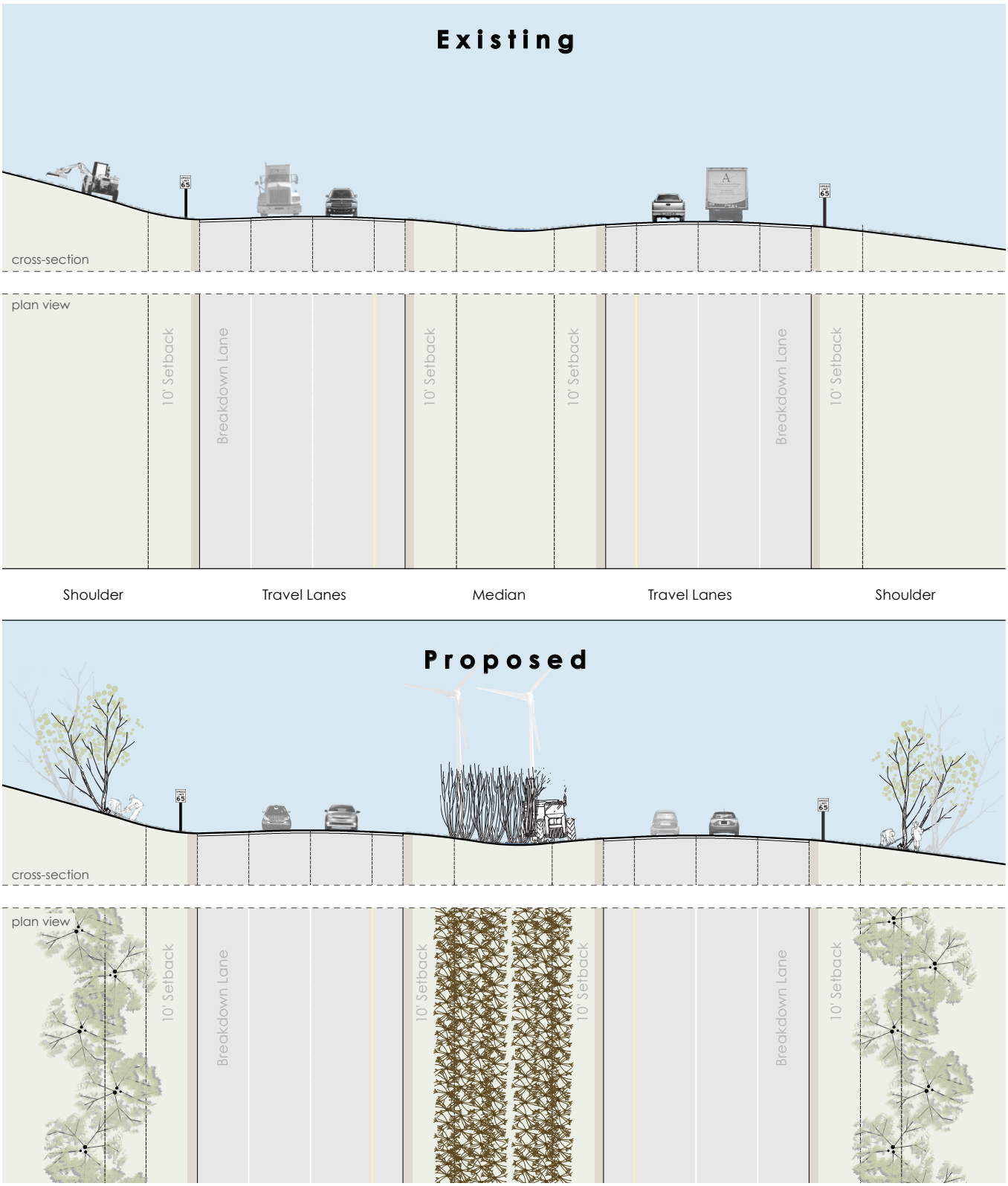

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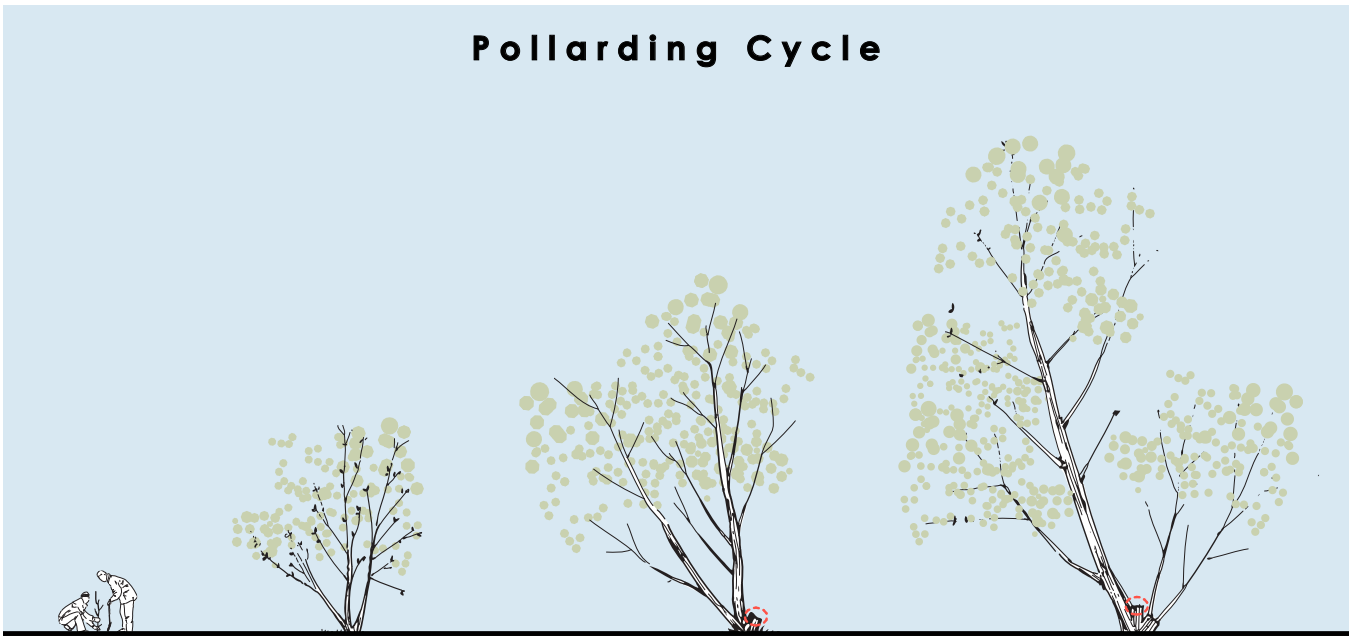
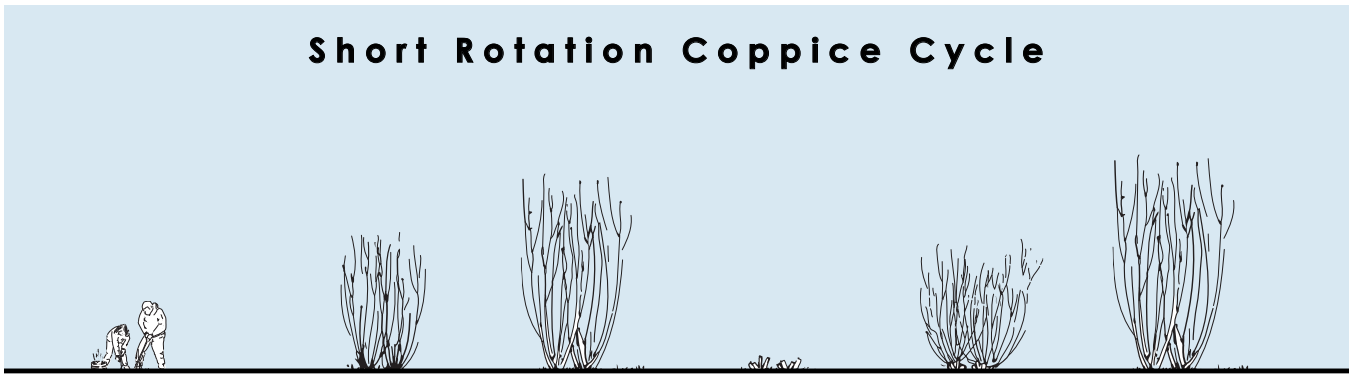
Pollarding Cycle



Year 1	Year 4	Year 6	Year 12
Planting	**Growth**	**Harvest**	**Harvest & Regrowth**

Short Rotation Coppice Cycle



Year 1	Year 2	Year 4	Year 4	Year 6	Year 8
Planting	**Growth**	**Ready**	**Harvest**	**Regrowth**	**Ready**

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Before

After

click on the image above to view the Highway 2.0 video

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