Scrap Tire Disposal in the US-Mexico Border and Sustainable Recycling Solutions in the context of the BECC Development Process

Scrap Tire Issues in the California-Baja California Border Region

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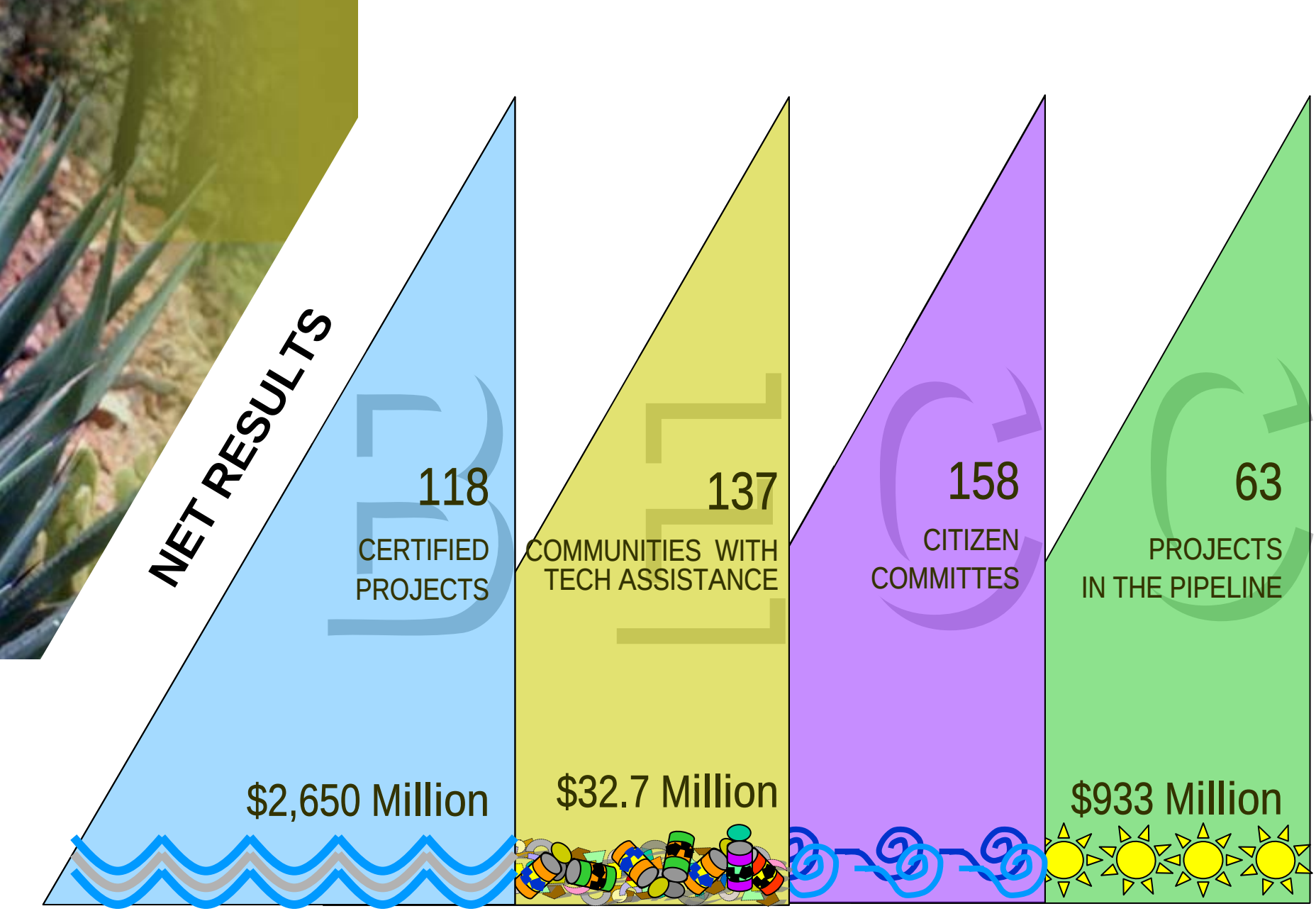

NET RESULTS
118
CERTIFIED PROJECTS
$2,650 Million
137
COMMUNITIES WITH TECH ASSISTANCE
$32.7 Million
158
CITIZEN COMMITTES
63
PROJECTS IN THE PIPELINE
$933 Million

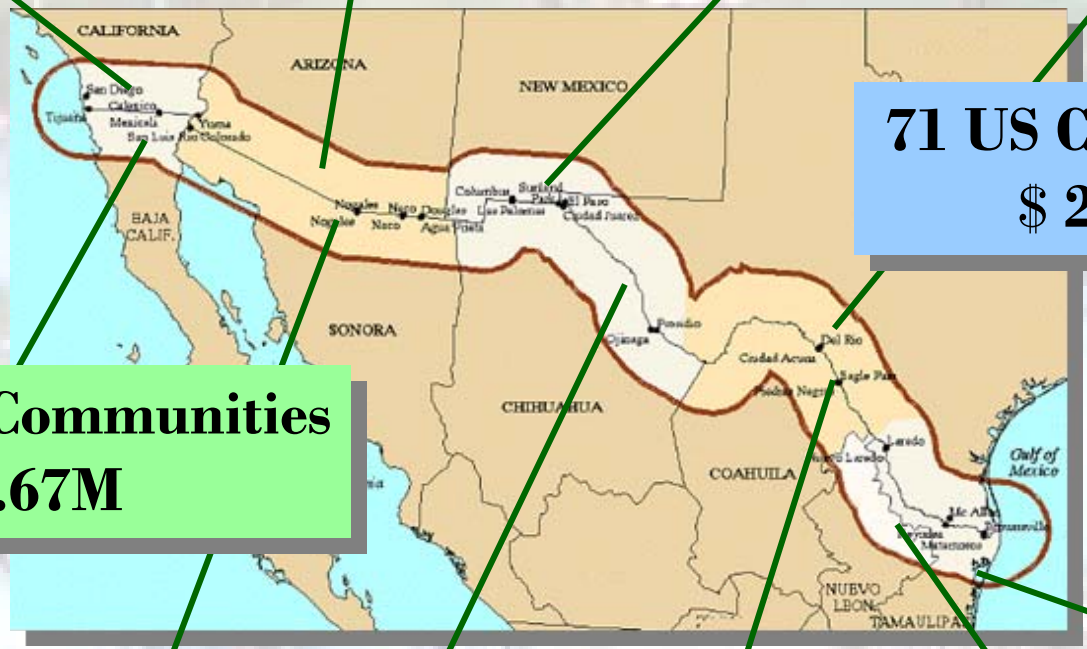
Supporting Border Communities - PDAP

California
$ 1.9M

Arizona
$ 3.39M

New Mexico
$ 3.28M

Texas
$ 11.48M



71 US Communities
$ 20.05M

59 Mexico Communities
$ 8.67M

Baja California
$ 1.56M

Sonora
$ 2.38M

Chihuahua
$ 1.95M

Coahuila
$ 0.79M

Nuevo Leon
$ 0.09M

Tamaulipas
$ 1.90M

Total PDAP Technical Assistance: **$28.72M**

Total PDAP + other BECC Technical Assistance: **$33.62M**

Certified Projects

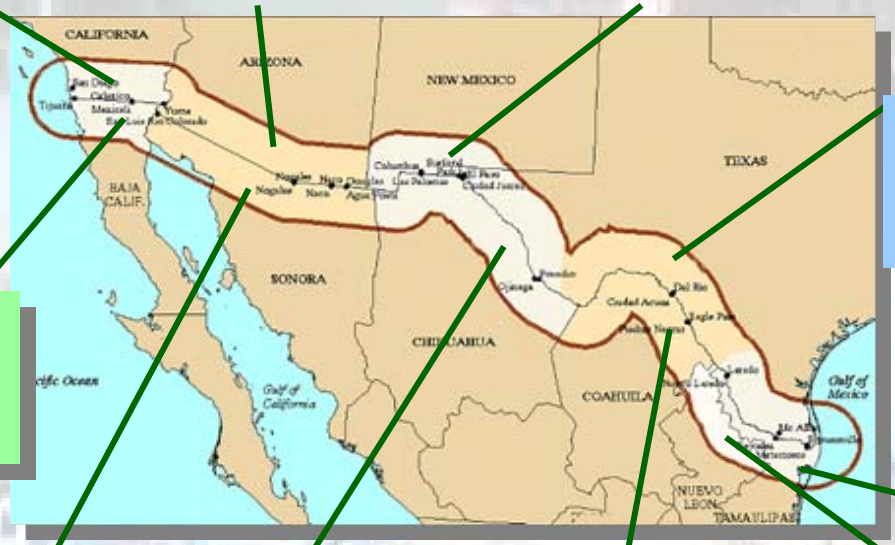
115 Projects to date. 56 BEIF Projects

California
11 projs.
$ 182 mil.

Arizona
12 projs.
$ 145 mil.

New Mexico
7 projs.
$ 57 mil.

Texas
39 projs.
$ 666 mil.



69 in the US
$ 1.05 bil.

46 in Mexico
$ 1.615 bil.

Baja California
11projs.
$ 734 mil.

Sonora
14 projs.
$ 111 mil.

Chihuahua
7 projs.
$ 210 mil.

Coahuila
3 projs.
$ 157 mil.

Nuevo Leon
2 proj.
$ 67 mil.

Tamaulipas
5 projs.
$ 336 mil.

Total estimated investment -- $2.665 bil.

Total est. investment BEIF Projects - $1.966 bil

Benefiting over 13 million border residents

Scrap tire generation

- In the United States, more than 280 million scrap tires are generated per year (one per person)
- In Mexico, about 25 million scrap tires are generated per year
- Used tires are imported into Mexico, both legally and illegally, contributing extensively to the scrap tire problem

Stockpiled Tires in Mexico's Border Cities

México	Estimated tires in piles
Mexicali(Llanset)	400,000
San Luis Rio Colorado	140,000
Nogales	200,000
Agua Prieta	80,000
Ciudad Juárez	4,500,000
Ciudad Acuña	25,000
Piedras Negras	250,000
Reynosa(all 6 dumpsites)	300,000
Matamoros	600,000
TOTAL	**8,335,000**

Source: EPA's Inventory 2007

What Happens to Tires in México?

Final Destination	% of tires consumed
Burned for fuel	5% - 15%
Ground rubber	2% - 5%
Disposed in piles	balance

Naturally-occurring Options for Scrap Tires in the Mexican Border

- Landfilling
- Ground Rubber (facility in Juarez)
- Pyrolisis (pilot project in Matamoros)
- Street Paving (*llancreto* from Cemex in pilot projects in San Pedro Garza, NL and Tijuana (Col. El Florido) and crumb rubber paving in Ciudad Juárez.
- Tire Derived Fuel (*TDF*) in cement kilns in Baja California, Sonora, Chihuahua and Monterrey

Landfilling

- Undesirable disposal method
- Whole tires trap gases and tend to rise to the top of landfills
- Misfortunate way to waste energy, steel and recyclable rubber

Ground Rubber for Molding (Crumb Rubber)

- Undeveloped market in Mexico for ground rubber
- High capital investment (mechanical or cryogenic)
- High maintenance costs
- Several facilities have been unsuccessful in the border

Rubber-Modified Asphalt

- Ability to withstand both hot and cold temperature extremes that prevail in many regions of the border and reducing both cracking (due to cold temperatures) and rutting (due to hot temperatures)
- Increased skid resistance and better deicing properties
- Capacity to support more weight (highly recommended in roads with heavy truck loading transportation)
- Higher initial construction costs per unit than conventional pavement but in the long term is a good alternative due to lower maintenance costs
- It requires high investments in equipment to produce and apply
- Juarez' pilot project proved the need to subsidized this option

Llancreto-Cemex Technology

- Technology developed by Cemex
- Mixes shredded tire with concrete
- Provides same properties than traditional concrete pavement (long durability and resistance to flexion)
- Slightly costlier than traditional concrete pavement

Pyrolisis

- Tire chips are heated to high temperatures in a low oxygen environment.
- Produces: 40% black carbon, 25% pyrolisis oil, 20% hydrocarbon gases and 15% other gases.
- Expensive and technically challenging process.
- Pyrolisis products competes with others typically obtained by cheaper processes.

Tire Derived Fuel (TDF)

- Most developed market for scrap tires worldwide
- Depending on the incinerator and primary fuel, tires can be burned whole or shredded
- Used in combination with other fuels such as coal, gas or fuel oil
- Used predominantly by the cement industry, also by power plants, pulp & paper mills, and steel mills
- Emissions profile is similar to coal's, but with more zinc and less SO_2

41% of scrap tires generated in the U.S. in 2001 were used as fuel

Tire Derived Fuel (TDF) in cement kilns

- Cement kilns are the most effective disposal route for scrap tires when properly equipped with emissions controls
- Tires provide iron and sulfur, two minor but key ingredients in producing cement
- Cement kilns must be modified to use scrap tires as a supplemental fuel
- Cost of these modifications vary from $ 0.1 million to 5.0 million USD
- Financial feasible operation thru energy savings and tipping fee combined
- These are the reasons why the US cement industry is the largest end user of scrap tires

BECC – NADB Criteria for Project Certification and Financing

EVALUATION MATRIX

	Human health and environment	Technical feasibility	Financial feasibility	Public acceptance	Sustain-ability	TOTAL
Do Nothing	0	5	5	0	0	10
Tire derived fuel	5	3	4	4	5	21
Crumb rubber for asphalt paving	4	3	2	5	5	19
Shredded tire for concrete paving	5	3	3	5	4	19
Crumb rubber for molded products	5	3	2	5	2	17
Energy recovery by pyrolisis	5	1	1	3	4	14
Landfilling (whole or shredded)	3	5	5	3	1	17

Human Health & Environment Certification Criteria

- Projects shall solve the environmental and human health problems associated with tire mishandling such as diseases; fires and soil and water pollution
- Projects shall not poses unacceptable new risks while processing spent tires

Technical Feasibility Certification Criteria

- Proposed processes shall not: require rigorous supervision and control, be maintenance intensive and/or prone to break down
- Previously proved technology is highly advisable
- Training of locally available labor should be included in project plans
- Pyrolisis and other high energy processes shall be checked up for associated fire and explosion risks
- Stockpiled tires conditions shall be suited for intended products (some stockpiled tires may not be suitable for ground rubber projects)

Financial Feasibility Certification Criteria

- High throughput projects requires, in most cases, government regulation and disposal tariffs to be financially feasible
- Projects intended to manufacture commercial products shall ensure bottom line results without government subsidies unless a special policy is aimed to do so.
- Whole business cycle shall be financially sustainable

Other Financial Considerations

Viability of any tire disposal or recycling project is highly dependent on several project-specific factors

- Supply — # of locally available scrap tires
- Location — Distance of tire stockpiles from the recycling center, and distance from markets for the end product
- Size of system — economies of scale
- Labor — costs of transporting, handling, and processing the tires
- Condition — tires that have been in stockpiles may be too dirty or degraded for some options
- Fuel costs — for TDF, cost of competing fuels such as coal and natural gas
- Market for the recycled product
- Financial feasibility is highly dependent on tire supply, system location, energy prices, and labor and operating costs

Community Participation Certification Criteria

- Most options requires intense public education efforts
- Tire-to-energy projects may be met with considerable public skepticism
- Civil engineering applications such as rubber modified pavement and ground rubber projects would generate less public concern
- Transparency of the project plan and sponsor communications is critical
- At public forums, alternative solutions as well as the “no action” alternative should be discussed
- Instituting a public comment period for proposed scrap tire projects would facilitate participation

Sustainability Certification Criteria

- Most sustainability desirable characteristic is to apply a process to transform a spent tire in a useful product while replacing a exploited natural resource
- Since the spent tires generation is so huge, most sustainable solutions are those capable of recycling massive tire quantities
- Hard to reach sustainable solutions should include the tires whole life cycle, including manufacturers, distributors, sellers and primary users as well as parties of secondary uses

Overarching themes

- Set up a border-wide tire management strategy to eliminate scrap tire piles
- Fire prevention planning and training is paramount for existing tire stockpiles
- All options discussed (tire-to-energy, civil engineering, ground rubber) have the potential to be certified under the BECC criteria
- A coordinated effort in legal, market and recycling projects is needed in the border region
- Address legal and environmental responsibility in the spent tire economic cycle such as tax evasion, the fraudulent misuse of the disposal fees paid in the US and tire smuggling across the border

Stockpiles Elimination Throughout the Border

Scrap tires removed with EPA's Funds through BECC

México	Estimated tires in piles
Mexicali(Centinela)	300,000
San Luis Rio Colorado	11,000
Ciudad Juárez	693,256
Piedras Negras	164,500
TOTAL	**1,168,756**

In addition, similar numbers has been removed with funding from SEMARNAT and State and Municipal Governments

Status as of August, 2007

City	No. of tires by EPA/BECC	Spent dollars	No. of Tires by other funds	Total Tires
Processed				
Cd. Juarez	693,256	$155,412	1,154,394	1,847,650
Mexicali	300,000	$ 74,954	900,000	1,200,000
Piedras Negras	164,500	$ 50,000		164,500
San Luis Río Colorado	11,000	$ 6,667	20,000	31,000
To Be Processed with BECC/EPA Funds				
Cd. Juarez	*32,350*	*$6,470*	-	*32,350*
P. Negras	*50,000*	*$24,317*	-	*50,000*
San Luis RC	*54,000*	*$41,686*	-	*54,000*
TOTAL	**1, 305,106**	**$359,506**	**2,074,394**	**3,379,500**

Thank you