

# ***Green Way Pavements™***

**“Sustaining Our Green Planet, One Ecoraster at a Time.”**

## **Erosion Control & Environmental Technology**

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# ***Green Way Pavements Business Description***

- ✿ **Distribution – Wholesale**
- ✿ **Retail Sales – Contractor Sales**
- ✿ **Service: “Green” Pavement installation using ECORASTER -*recycled plastic pavers* – including Landscaping, Hardscaping, Maintenance and Construction**
- ✿ **Consumer Education on “Green” environment, Ecoraster and DIY installation**

# ***Green Way Pavements Goals***



- ✿ **Promote ecological, recycled plastic pavers – ECORASTER, that have a variety of designs**
- ✿ **to improve the environment**
- ✿ **serve the consumer with more efficient pavement alternatives that lower overall costs**
- ✿ **Using innovative “Green” approach that dramatically reduces cost**
- ✿ **long-term efficiency and a wear guarantee**

# ***Purus Plastics Manufacturer***



**ECORASTER**<sup>®</sup>  
WORLDWIDE No.1



# ***Product - ECORASTER***

- ✿ **Soil Stabilization System**
- ✿ **Made of 100% recycled plastic**
- ✿ **LEED point-eligible**
- ✿ *Fillers:* **grass, sod, gravel, rubber, wood chips, or colored stone**
- ✿ **Make our surroundings “Green”**

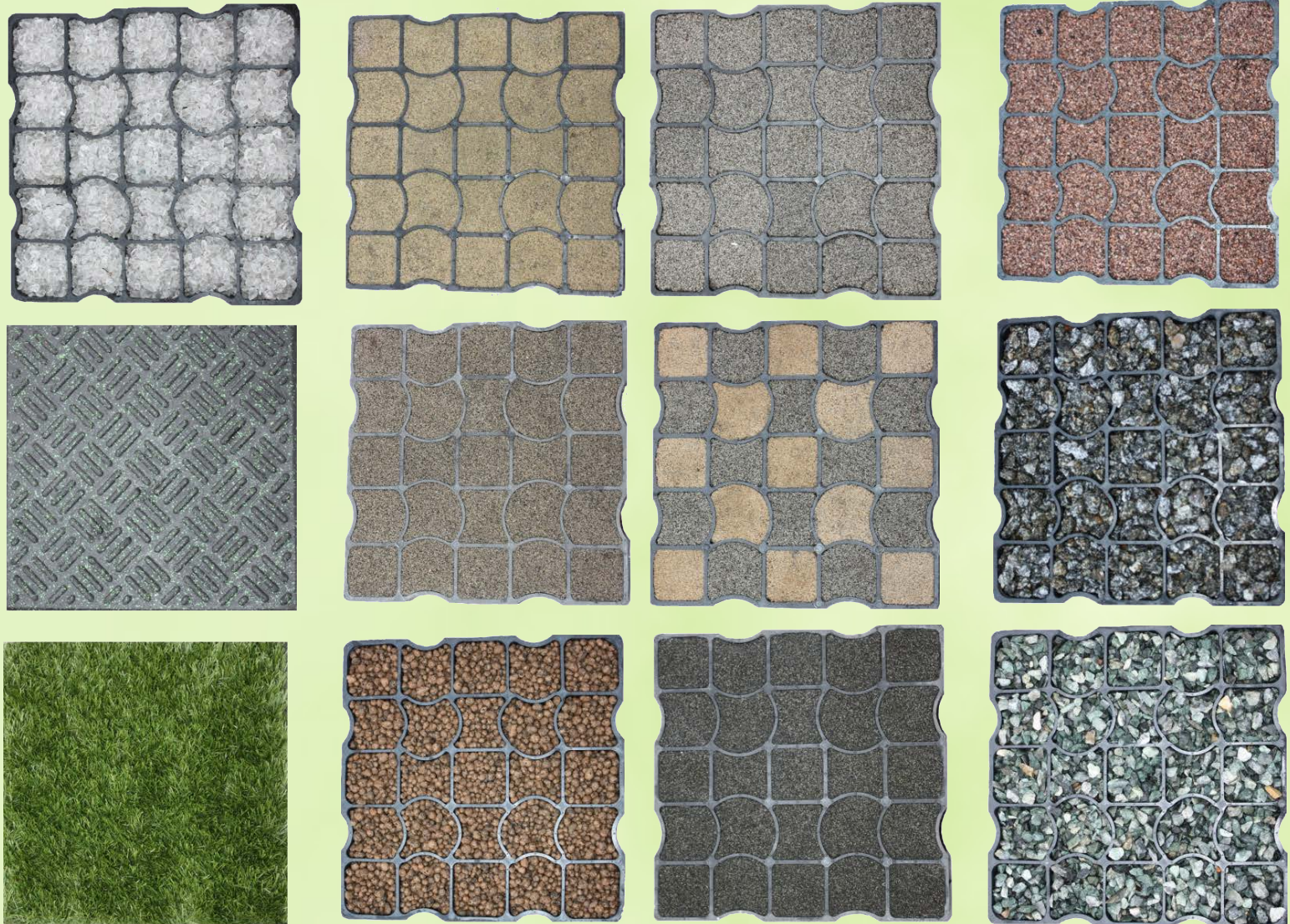


# *Features of ECORASTER*

- ✿ **Long-time product life**
- ✿ **Easily cut-to-fit**
- ✿ **Stability** is excellent
- ✿ Simple one-time, **quick and effortless installation**
- ✿ **Lightweight** to easily handle and install
- ✿ **High compressive strength**
- ✿ Quickly allow **drainage of liquid** through paver system
- ✿ Percolate over **10” of water per hour** with the appropriate aggregate fill
- ✿ **Run-off 1.2%**, as compared to asphalt and concrete that has a minimum run-off of 95%+



# Fillers for Ecoraster



# *Applications* - Civil Engineering

- ✿ car park reinforcement
- ✿ fire service access
- ✿ erosion protection
- ✿ curb reinforcement
- ✿ drives
- ✿ building site access
- ✿ loading bays
- ✿ helipads
- ✿ industrial and commercial applications
- ✿ military uses





# Gardening and Landscaping



- ✿ car parking
- ✿ parks
- ✿ embankment reinforcement
- ✿ slope reinforcement
- ✿ garage access

# Equestrian Sports



- ❖ Outdoor riding ring and indoor riding arena
- ❖ paddock and open stable
- ❖ horse walker and lunging ring
- ❖ tethering and loading area
- ❖ paddock access

# Golf Course



- ✿ Holes - greens - driving range
- ✿ putting green - pitching green - fairway

# Agriculture



- ✿ Storage area - chicken and cattle run
- ✿ paddock and grazing pasture access
- ✿ drive and path reinforcement

# Water Engineering



- ✿ Bank reinforcement - dike building
- ✿ moorings - stream bed stabilization

# Green Roofs



# Erosion Control

- ✿ Car park reinforcement
- ✿ erosion protection
- ✿ curb reinforcement
- ✿ building site access
- ✿ loading bays
- ✿ industrial and commercial applications
- ✿ military uses



Erosion Control



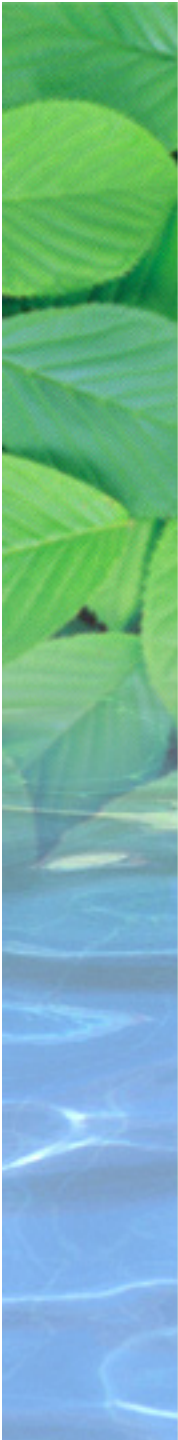
# Application

## ECORASTER E 50 / S 50 erosion control applications:

- slopes and embankments
- slag heaps from open-cast and underground mining
- dam slopes
- cutting slopes
- dyke and bank slopes around still and moving bodies of water







6/20/13

# INSTALLATION RECOMMENDATIONS



Grassed ECORASTER,  
filled with a blend of  
sand/topsoil/humus/  
chippings with grain 2/5

rubble/gravel base layer  
5/32 - 5/45

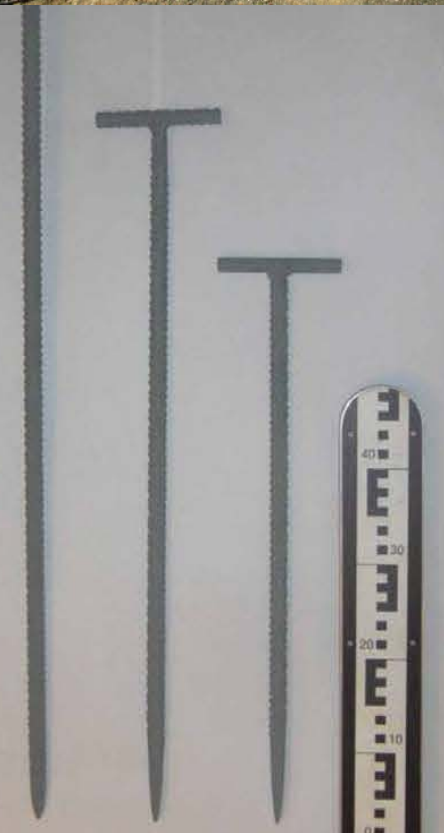
foundation plane

in-situ soil



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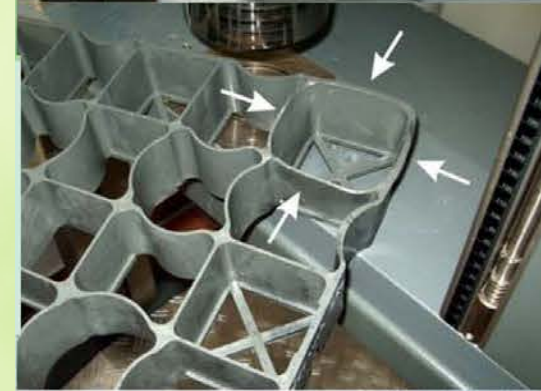
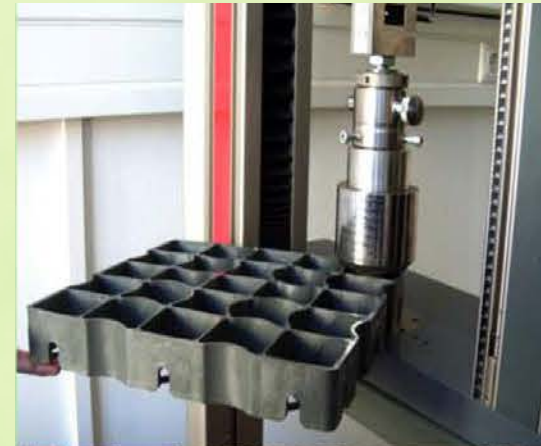
# SECURING THE SYSTEM TO THE SUBSTRUCTURE



# SUITABILITY TESTS

## Suitability test overview

Pressure test	Determining pressure resistance by applying a loaded plunger: E 50: 2,608 kN/m <sup>2</sup> (261 t) S 50: 1,193 kN/m <sup>2</sup> (119 t)
Shear test	Determining grid lug tensile strength (weakest point in the system): E 50: 14.3 kN/m (1.43 t/m) S 50: 21.4 kN/m (2.14 t/m)
Impact test	Corner slump test from height of < 3 m onto concrete: no defect determined
Test to gauge effect of heat	Heated to 110°C for 1 hour: no visible alteration
Weather test	Proof of UV-resistance using the Xenon test, cycle 102/18 over 200 hours. In practice the plastic is filled with filler and for the most part covered by vegetation and is therefore not subject to direct UV exposure.
Environmental test	Use of atomic emission spectroscopy to determine heavy metal content; leaching testing involving test fish: no impact on water quality



# PRODUCT CERTIFICATION



In confirmation of its adherence to quality standards and following completion of the above-mentioned suitability tests by TÜV Nord, ECORA has been issued with certificates on the load capacity and environmental compatibility of ECORASTER. Accordingly ECORASTER products may bear the TÜV stamp with the following inscription:

**“TÜV NORD CERT GmbH  
- Voluntary testing Production monitored -  
Max. axle load 20 t in acc. with DIN 1072  
Environmentally neutral in acc. with DIN 38412”**



The certificate also includes the following additional subheading:

“Tests based on DIN 38412 Section 31: 1989, based on DIN 1072: 1985, based on DIN EN 124: 1994”

<b>Load capacity</b>	
DIN EN 1072: 1985 “Road and footbridges; design loads”	Certificates issued for ECORASTER E 50 and S 50: Fulfil requirements for 20 t max. axle loads
DIN EN 124: 1994 “Gully tops and manhole tops for vehicular and pedestrian areas; design requirements, type testing, marking and quality control”	Certificate issued for ECORASTER E 50: Fulfil additional requirements for load class B 125 (test force 125 kN)
<b>Environmental compatibility</b>	
DIN 38412-31: 1989 “German standard methods for the examination of water, waste water and sludge; tests with water organisms”	Certificates issued for ECORASTER E 50 and S 50: Fulfil environmental compatibility requirements



# Environmental Technology



 English



Permeable solution

Rain retention

Protection against erosion

Protection against floods

Encourages re-growth

**Environmental technology**



Protect against erosion by reinforcing slopes and embankments with **ECORASTER®**





## Back to nature with ECORASTER®



**ECORASTER® – so that rain-  
fall never poses a problem!**



# Landscaping



English



- Parks and gardens
- Open space planning
- Car parks
- Road and footpath construction
- Renaturalisation

**Garden construction, landscaping and municipal development**





*ECORASTER® – for high-load capacity areas with natural drainage.  
Made of flexible polyethylene – absolutely environmentally neutral!*



## Benefits

**Surface reinforcement with natural drainage**

**Quick and easy to install:  
approx. 100 m<sup>2</sup>/ person and hour**

**Lightweight: 5-11 kg/m<sup>2</sup> depending on type**

**Low transport and handling costs**

**Maximum load up to 350 t/m<sup>2</sup> depending  
on type**

**Maximum axle load 20 t in compliance with  
DIN EN 1072**

**Certification under German TÜV quality system**

**Weather, frost and UV-resistant**

**Flexible, high tensile strength**

**No soil compaction**

**High rainwater infiltration**

**Excellent area load distribution**



# ECORASTER

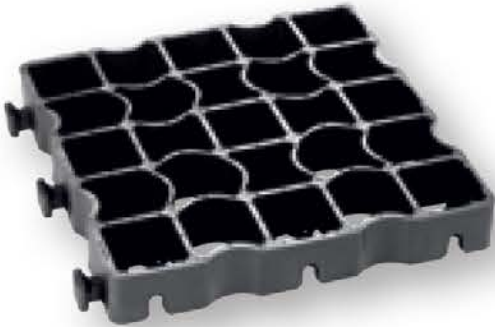
Environmentally – compatible and efficient



**As varied as nature itself**

## E 50

**High-strength**  
33,3 x 33,3 x 5 cm (w x l x h)



Areas exposed to extremely high loads, e.g.

building site access routes,  
emergency access routes

Transport routes

Raised verge reinforcement

Caravan pitches, boat trailer  
mooring areas

Helicopter landing zones

## S 50

**Super-elastic**  
33,3 x 33,3 x 5 cm (w x l x h)



Car parks, grassed  
parking zones

Access routes, paths  
and connecting routes

Carports

Slope and embankment  
reinforcement

Parks

# ECORASTER types for Environmental Technology

## E 40

**Versatile**  
33,3 x 33,3 x 4 cm (w x l x h)



Temporary car parks

Access roads and  
footpaths

Large area reinforcement  
for events, e.g., open-air  
or outdoor fairs, beer  
gardens, etc.

Cemeteries

## E 30

**Economical**  
33,3 x 33,3 x 3 cm (w x l x h)



Homes and gardens

Garden paths, parking/  
mooring areas

Storage and wood pile  
areas

Slope and pond rein-  
forcement


Garage access ways

# ECORASTER® E50 - the perfect solution for heavy duty applications



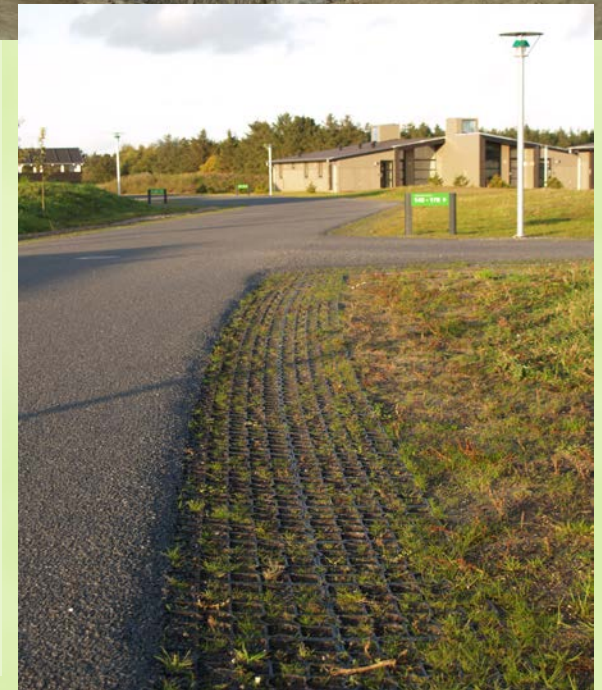
Technical data for the ECORASTER E50

- \* **Dimensions: 13 in x 13 in x 2 in**
- \* Wall thickness/wall height: **0.2 in / 2 in**
- \* **Weight per unit: 2.34 lbs**
- \* Weight per m<sup>2</sup>/10.8 sq ft: 21.05 lbs
- \* Material: **100 % recycling material PE** (polyethylene)
- \* Compression strength: up to 20 tons axle load
- \* **Carrying load** per m<sup>2</sup>/10.8 sq ft: up to **350 tons**
- \* Dimensional stability: **temperature range -58° to 194° F**
- \* Environmental compatibility: **Environmentally neutral UV and frost resistant**
- \* Solubility: **resistant to acids, alkalis, alcohol, oil and petrol** (de-icing salt, ammonia, acid rain etc.)
- \* **Laying performance: more than 1000 sq ft per person and hour**



# **E50 Suitable applications:**

- Car park reinforcement**
- Fire service access**
- Curb reinforcement**
- Connecting paths, drives**
- Building site routes, loading areas**
- Gardening and landscaping**
- Slope and dike reinforcements**
- Industrial and commercial applications**
- Military applications**





# ECORASTER® S50 - the universal ground reinforcement system

Technical data for the ECORASTER S50:

Dimensions: **13 in x 13 in x 2 in**

✱ Wall thickness/wall height: **0.1 in / 2 in**

✱ **Weight per unit: 1.61 lbs**

✱ Weight per m<sup>2</sup>/10.8 sq ft: **14.48 lbs**

✱ Material: **100 % recycling material PE** (polyethylene)

✱ **Compression strength: up to 20 tons axle load**

✱ **Carrying load** per m<sup>2</sup>/10.8 sq ft: **up to 120 tons**


✱ Dimensional stability: temperature range **-58° to 194° F**

✱ Environmental compatibility: **Environmentally neutral**, UV and frost resistant

✱ Solubility: **resistant to acids, alkalis, alcohol, oil and petrol (de-icing salt, ammonia, acid rain etc.)**

✱ **Laying performance: more than 1000 sq ft per person and hour**





# **S50 Suitable applications:**



- Garage drives and carports**
- Fire service access**
- Gardening and landscaping**
- Bank and river bed reinforcements**
- Slope and dike reinforcements**
- Lawn greening**

# ECORASTER® E40

- ✦ Technical data for the ECORASTER E40:  
Dimensions: **13 in 13 in x 1.6 in**
- ✦ Wall thickness/wall height: **0.14 in / 1.6 in**
- ✦ **Weight per unit: 1.39 lbs**
- ✦ Weight per m<sup>2</sup>/10.8 sq ft: 12.5 lbs
- ✦ Material: 100 % recycling material PE (polyethylene)
- ✦ Compression strength: up to 20 tons axle load
- ✦ **Carrying load** per m<sup>2</sup>/10.8 sq ft: up to **120 tons**
- ✦ Dimensional stability: temperature range **-58° to 194° F**
- ✦ Dimensional change: 0.5 % (for a normal temperature +68° to 176° F)
- ✦ Absorption of humidity: 0,01 %
- ✦ Environmental compatibility: **Environmentally neutral UV and frost resistant**
- ✦ Solubility: resistant to acids, alkalis, alcohol, oil and petrol (de-icing salt, ammonia, acid rain etc.)
- ✦ Laying performance: **more than 1000 sq ft** per person and hour



# **E40 Suitable applications:**

- Car park reinforcement**
- Fire service access**
- Raised verge reinforcement**
- Connecting paths, drives**
- Building site routes, loading bays**
- Gardening and landscaping**
- Slope and dike reinforcements**
- Industrial and commercial applications**
- Military applications**



# ECORASTER® E30 - a system for reliable ground reinforcement

- ✦ Technical data for the ECORASTER E30:  
Dimensions: **13 in 13 in x 1.2 in**
- ✦ Wall thickness/wall height: 0.16 in / 1.2 in
- ✦ **Weight per unit: 1.32 lbs**
- ✦ Weight per m<sup>2</sup>/10.8 sq ft: 11.9 lbs
- ✦ Material: 100 % recycling material PE (polyethylene)
- ✦ Compression strength: up to 20 tons axle load
- ✦ **Carrying load** per m<sup>2</sup>/10.8 sq ft: **up to 120 tons**
- ✦ Dimensional stability: temperature range **-58° to 194° F**
- ✦ Dimensional change: 0.5 % (for a normal temperature +68° to 176°F)
- ✦ Absorption of humidity: 0,01 %
- ✦ Environmental compatibility: Environmentally neutral UV and frost resistant
- ✦ Solubility: resistant to acids, alkalis, alcohol, oil and petrol (de-icing salt, ammonia, acid rain etc.)
- ✦ Laying performance: **more than 1000 sq ft** per person and hour



# **E30 Suitable applications:**

**Paths and drives**  
**Carports**  
**Parks**  
**Campsites**  
**Garage drives**  
**Wood and storage areas**  
**Container depots**  
**Flat silos**  
**Market gardening**



# Frankfurt, Germany



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# Frankfurt, Germany



6/20/13

40



# Embankment with ivy



6/20/13

41

# Embankment Austria



# Carrefour Prague-Green Roof



**ASFINAG Straßenabschnitt A1 Salzburg**



**ÖSAG-Strabag Leitschientausch Block II Autobahn Mitte  
Parkplatz Stegenwald Rfb Salzburg 1100 m<sup>2</sup> S50**

**Firma Hinteregger Salzburg; Hangrutschung Hangau 300 m<sup>2</sup>**

**Alpine Mayreder Salzburg, Böschungssicherung 200 m<sup>2</sup>**

# Highway, Austria

# Las Matas, Madrid, Spain



# Pumping Station



# Retention Basins

## Aalst Gracht Colruyt, Belgium



# Retention Basins Paris, France





# Retention Basins Arzberg, Germany



# Erosion Control on Rügen Island, Germany



# Embankment Control



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# Embankment Control



# Erosion Control



# De Gavers, Harelbeke, Belgium



01/20/15

# Access Road



6/7/2009

# Access road in Switzerland



6/20/13

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# Logging Road



# Municipal Green Donau Park, Germany



6/20/13

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# Farmers Market Austria



# ***Basic Installation (DIY)***

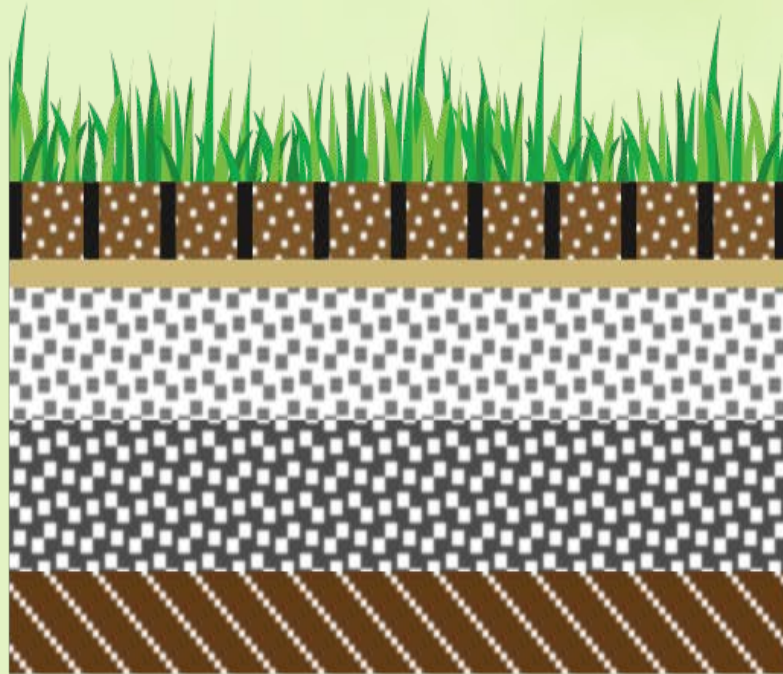
- ✿ **Choose a design** for your new pavement system
- ✿ Map out and **mark area** where pavers will be installed
- ✿ **Excavate** designated area to specifications
- ✿ Prep excavated area with **base material**
- ✿ **Install pavers and fill**

# ***Materials and Guidelines for Basic Installation***

## Materials:

- ✱ **Porous road base:** Sandy gravel mixture (washed masonry sand). Aggregate should not exceed 3/4" in diameter
- ✱ **Bedding layer:** (OPTIONAL with aggregate fill application)
  - ✱ —washed masonry sand, depth 1-1.5"
- ✱ **Grassy paver (See assembly layout!)**
- ✱ **Fill Material**
  - ✱ GRASS: sandy topsoil (60/40 mix)
  - ✱ AGGREGATE: 3/16" crushed stone to 3/8"
  - ✱ Or, washed pea gravel
  - ✱ Grass seed, Sod or Aggregate

# Installation chart



## **ECOGRID®**

Filled with a mixture of sand, topsoil, humus, long-time fertilizer

### **Levelling course**

Mixture from 50 % of humus and 50 % of quartz sand

### **Intermediate layer**

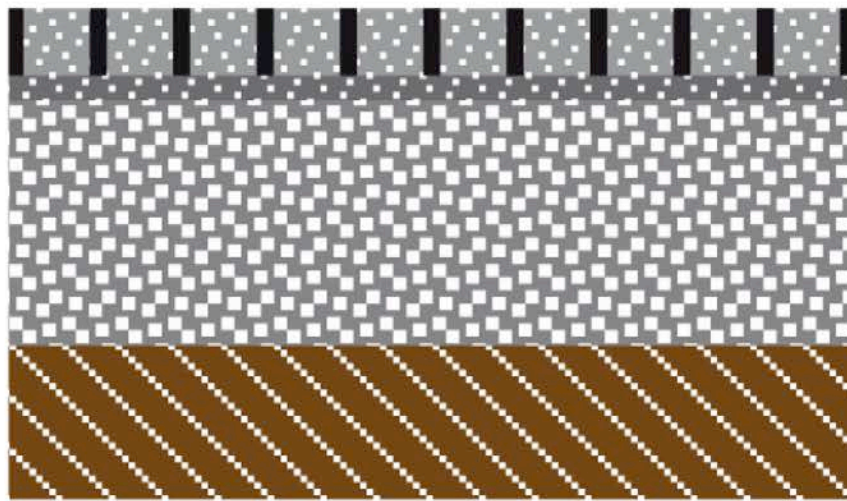
Mixture from 30 % of humus and 70 % of gravel

### **Drainage layer**

gravel

### **Natural soil**

Ground with gradient of 1-1,5%



**ECORASTER®**

filled with chippings

**Levelling course**

chippings

**Drainage layer**

gravel

**Natural soil**

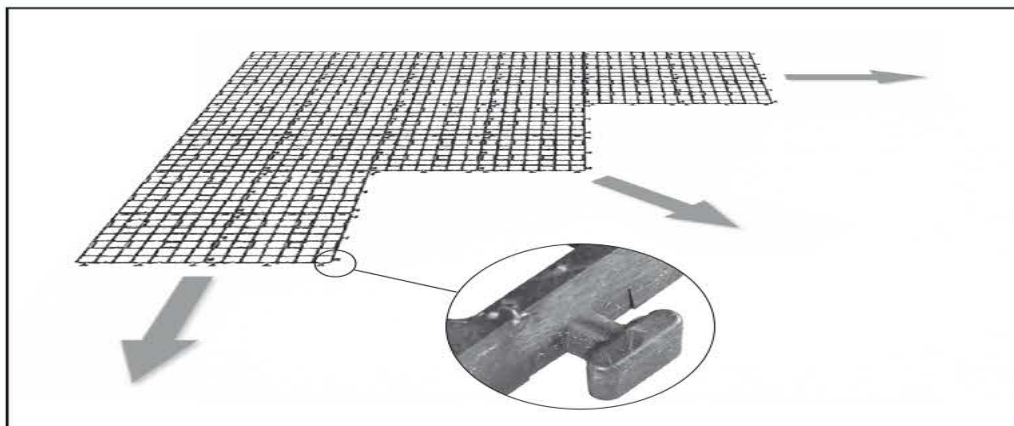
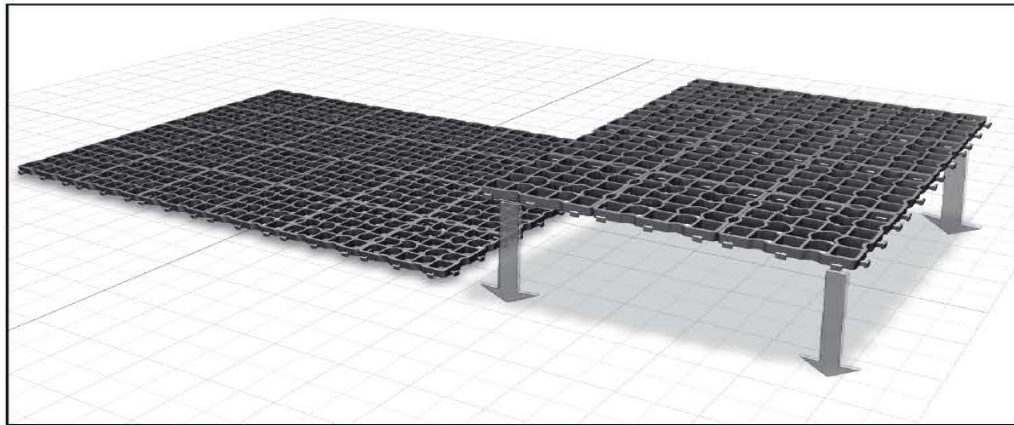
Ground with gradient of 1-1,5%

*Example: car park with chippings*



# Working with the preconnected grids

**ECOGRID®** is quick and easy to lay without machinery. The system is delivered in preconnected units of 12 sections and can be taken straight off the pallet and laid in one go.





Before...



...and After Photos



# *Gravel fill in Ecoraster*

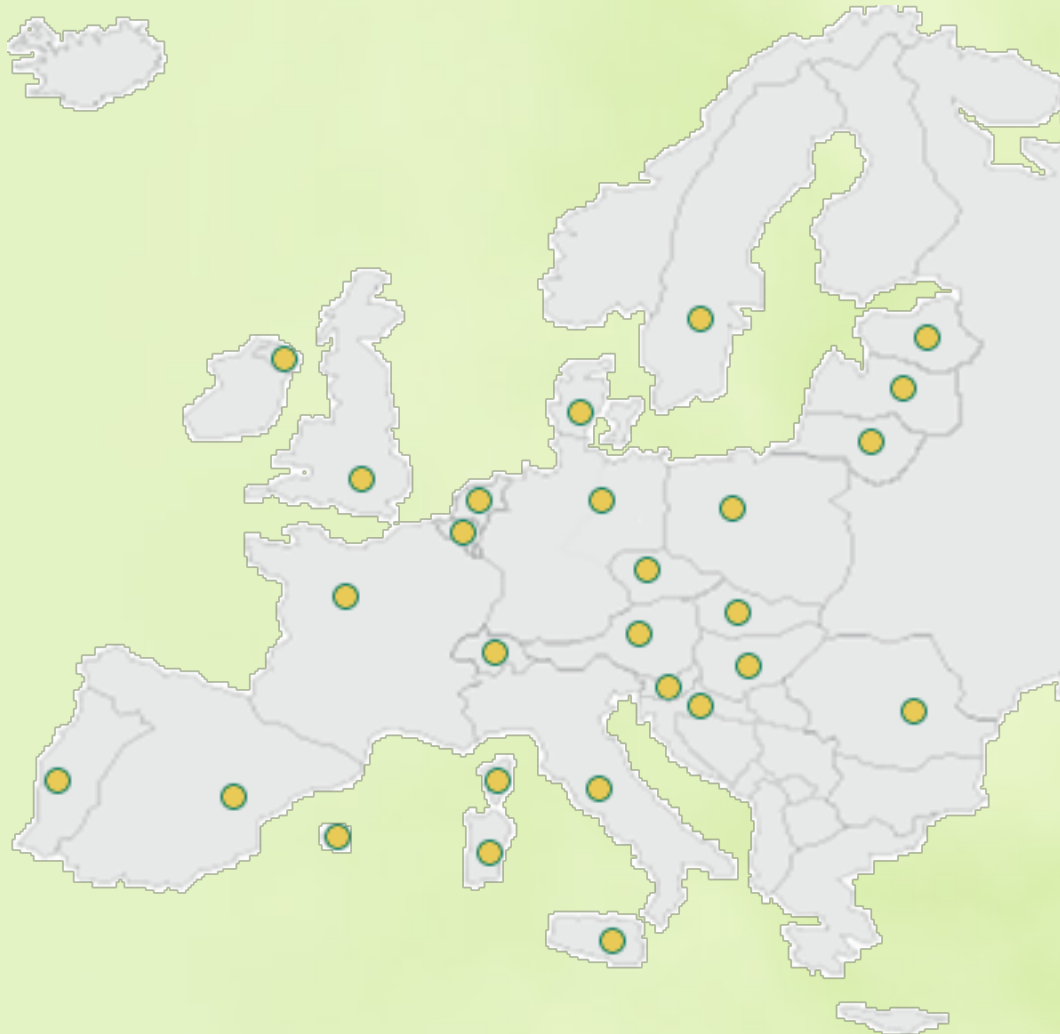


# ***Grass fill in Ecoraster***



# ECORASTER

**in Europe...**



**Denmark, Sweden  
Belgium, Luxembourg  
Germany  
France  
Great Britain, Ireland  
Italy  
Netherlands  
Austria, Slovakia, Croatia  
Poland, Latvia, Litauen,  
Estland  
Switzerland  
Spain, Portugal  
Czech Republic, Slovakia  
Hungary, Romania**

**...Worldwide**

**Ukraine  
Australia  
Canada  
Russia  
United States  
Korea**

# Market Analysis

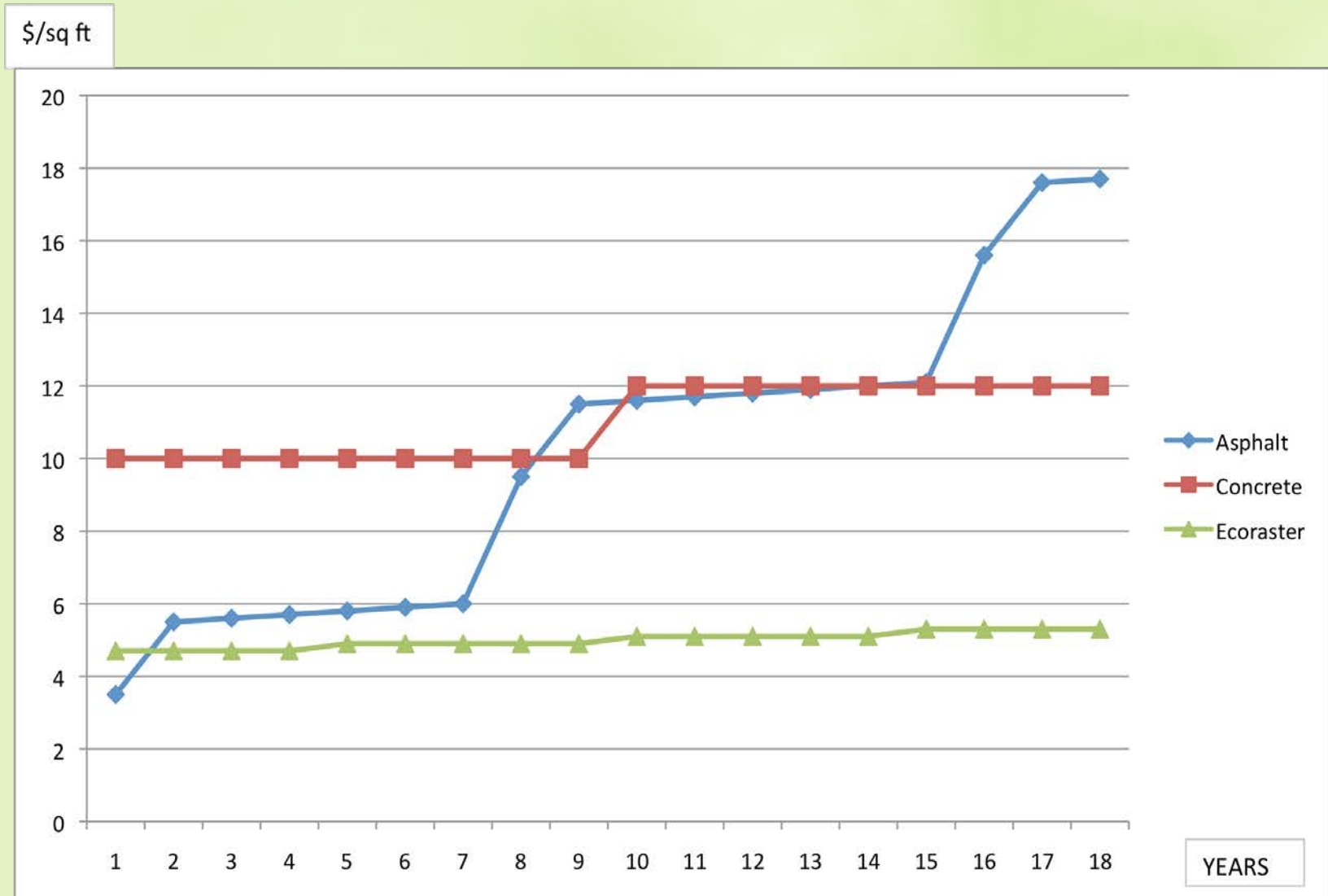
## Pavement Comparison Chart

Considerations to be evaluated	Asphalt	Concrete	Concrete Pavers	Recycled Eco-Pavers
Appearance	Offers a basic black lifeless setting, better with borders or curbs to improve appeal	Offers a variety of appealing options and custom colors and designs	Very appealing and offers a variety of paver designs and colors	<b>Natural looking</b> non-intrusive décor and environmentally appealing
Materials	Mixture of tar and small aggregates 	Mixture of cement, stone, reinforcement bars 	Pre-casted concrete which vary in size and shapes 	<b>Recycled consumer waste</b> treated plastic 
Durability	4-8 yrs	15+yrs	10-15 yrs	<b>25+yrs</b>
Maintenance	High, needs top resealing about every 3 yrs, and becomes unlevelled	Low, but can crack and become unlevelled	Low, but can require some resetting	<b>Very low</b> , may require some quick resetting, grass or gravel maintaining

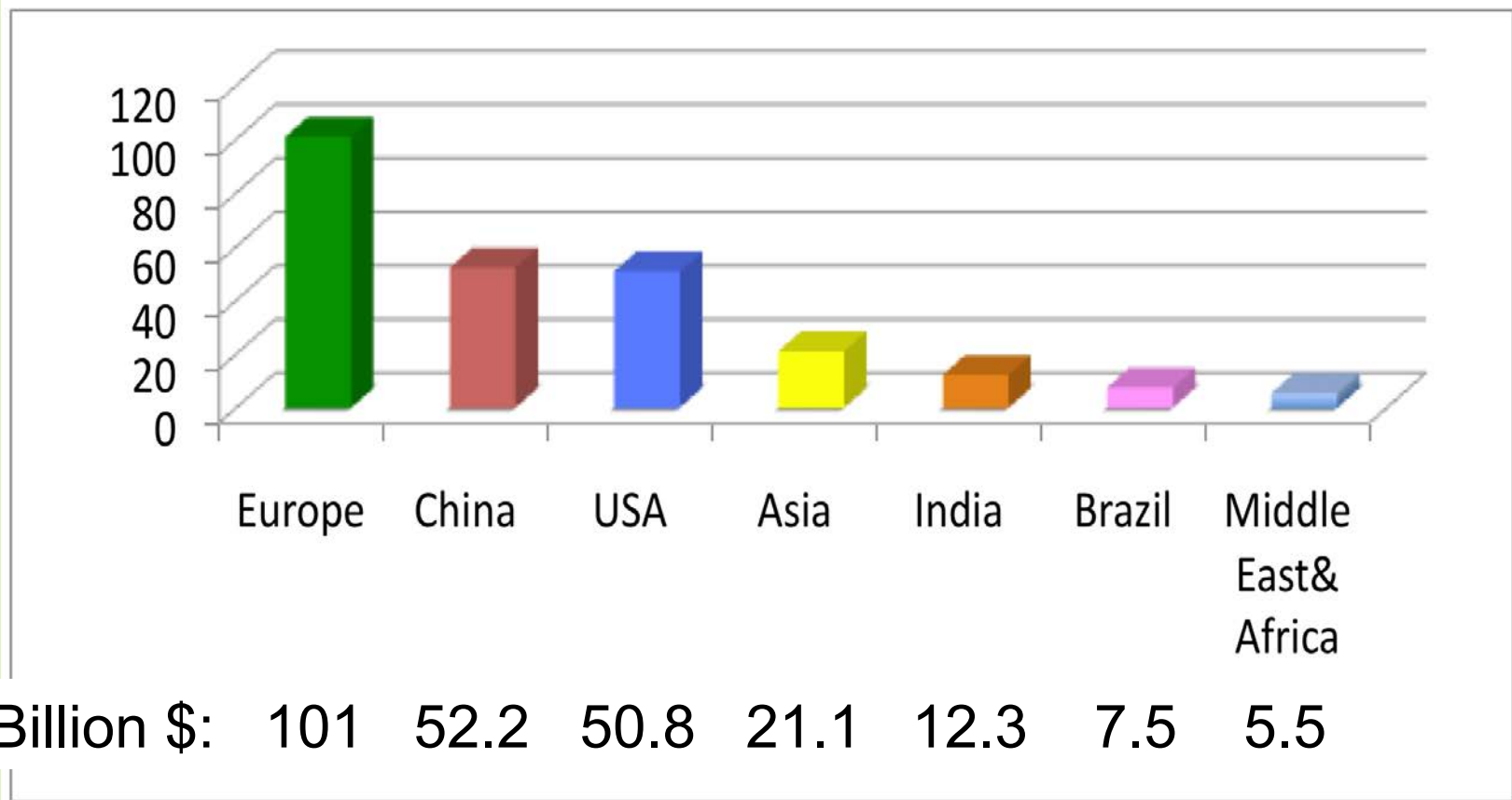
Considerations to be evaluated	Asphalt	Concrete	Concrete Pavers	Recycled Eco-Pavers
Drainage	Poor: 95% runoff	Poor: 95% runoff	Good: 15-30% depending on style, 70-85% runoff	<b>Excellent: 97% drainage, &lt;3% runoff</b>
Depth or thickness	First layer about 2-3", second or top layer about 1--1-1/2"	Minimal 3" for walkways; 6-8" for driveways; 8-11" for heavy loads	Thickness varies based on driveway loads: minimum of 4-6"	Varies based on load: 1-2"
Estimated Costs (includes installation)	\$3.50-\$6.00 /sq ft	\$6-\$15 /sq ft	\$4.50-\$12 /sq ft	<b>\$4.50-\$6.25 /sq ft</b>
"Green" ecological materials	Not friendly to environment and becomes messy if not maintained	Basically neutral though lime can generate acid	Basically neutral without any noticeable harm	Aids the environment by <b>recycling consumer plastic waste</b>
Environmental factors	Uses oil based derivatives, if replaced, require waste dump and impacts nature	Suffocates ground if replaced, require waste dump and impacts nature	Suffocates ground if replaced, require waste dump and impacts nature	<b>Environmental, friendly to ground and allows 97% water permeation, can be restored, replaced grids can be reused elsewhere</b>

# Asphalt, Concrete and ECORASTER® Pavers

## Graphic of Cost \$/sq ft through 18 years



# *Who's funding the “green” energy revolution?*



Source: June 12, 2012 / Eoghan Macguire for CNN / [http://edition.cnn.com/2012/06/12/world/renewables-finance-unep/index.html?hpt=hp\\_c4](http://edition.cnn.com/2012/06/12/world/renewables-finance-unep/index.html?hpt=hp_c4) CHART SHOWS YEAR 2011





# ***Advantages***

- ✿ Both, economically and ecologically friendly by **replacing asphalt and concrete** with a Green alternative
- ✿ **Weather resistant**
- ✿ Gives **the strength of conventional pavement**, while architecturally **beautifying your landscape**
- ✿ Successful in **storm water management** by allowing water to drain back into the soil
- ✿ **Reduces surface heat**, unlike standard asphalt applications
- ✿ Significant **reduction in maintenance costs** over the lifetime of the product

# ***Maintenance***



- ✿ Relatively maintenance free
- ✿ For grass filled pavers - requiring only basic **lawn maintenance** (watering, fertilizer and mowing)
- ✿ **Snowplow at least 1 inch above the paver.**
- ✿ **Two-Stage Snow Blower** is recommended for snow removal on uneven or gravel surfaces because it has two augers involved in the snow removal process.

# Snowplowing...



# ***Green Way Pavements™***

**Thank You for Your Support!**

**ZELJKA ONE Management LLC**

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