

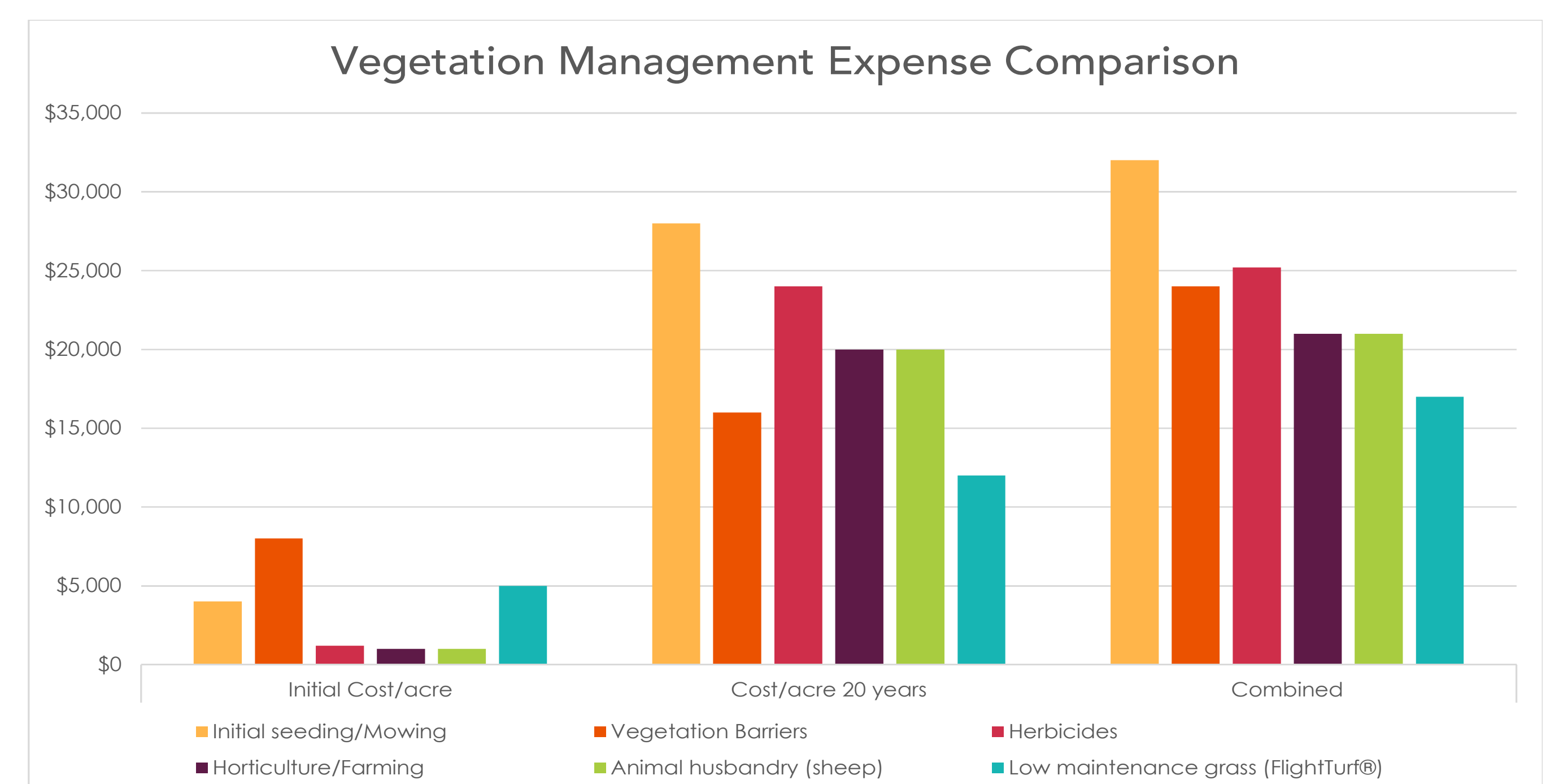
WHAT LIES BENEATH PV POWER PLANTS - INNOVATIONS IN VEGETATION MANAGEMENT

presented by **CHRISTINA KOBLAND - President, FlightTurf® LLC**

Low maintenance grass (FlightTurf®)



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| <p>Pros:
 Proven patented mix is wildlife, weed, insect, and drought resistant
 No mowing required
 Erosion control/soil stabilization
 Storm water infiltration
 Cools underside of panels optimizing efficiency
 Least expense over the life of the system</p> | <p>Cons:
 Seasonal water necessary to survive
 Requires occasional weed abatement
 Few grasses really are low maintenance</p> |
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References:
 EPRI 'Budgeting for Solar PV Plant O&M: Practices and Pricing' 2015
 Steve Hanley, 'Sheep Are Ideal for Controlling Weeds and Grass at Solar Farms' 2016
 Homeyse Cost of Landscape Fabric calculator
 Junko Movellan, 'Getting Out of the Weeds: How to Control Vegetative Growth Under Solar Arrays' 2014
 James Huff, Abakus Solar Inc, 'Solar Farm Grounds Management Vegetation Control'
 Kelly Pickerel, 'Using Animals to Keep Vegetation Control Costs Low May Not Be Such a Wild Idea After All' 2016
 Urban Engineers Inc, 'Cost/Benefit Analysis Prepared for PHL Airfield' 2010

Animal husbandry (sheep)



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| <p>Pros:
 Food production
 Farm economic diversity
 Multipurpose land use
 Lends well to any topography</p> | <p>Cons:
 Labor intensive
 Equipment damage potential
 Animal care
 Higher installation cost</p> |
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Mowing (typical other grasses)



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| <p>Pros:
 Herbicides and chemicals unnecessary
 Limited erosion control
 Energy production optimized
 Offers maintenance staff plenty to do</p> | <p>Cons:
 Damage to array systems
 Maintenance intensive for the life of the system
 Most expensive choice
 Wildlife attractant</p> |
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Horticulture, farming



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| <p>Pros:
 Food and or commercial plant production
 Ergonomically sensitive
 Multipurpose land use</p> | <p>Cons:
 Higher initial equipment cost
 Larger site necessary
 Labor intensive
 Water necessary</p> |
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Vegetation Barriers - Weed cloth, rocks, pavement



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| <p>Pros:
 Quick and easy
 Insensitive to weather
 Arid climate friendly</p> | <p>Cons:
 Requires weed control
 Habitat for insects, rodents, reptiles, etc. lends to array damage
 Provides no erosion control
 Storm water run off
 Expensive</p> |
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Green roof tops



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| <p>Pros:
 Combined application space
 Reduces building heat load
 Enhances environmental conditions for the solar array</p> | <p>Cons:
 Design choices key to success
 Maintenance can be labor intensive
 Water necessary</p> |
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Rights of Ways, Innovations, Future thoughts



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| <p>Pros:
 Multiple use of public space
 Charge electric vehicles while in use
 Integrated signage
 Sound barrier integration</p> | <p>Cons:
 Cost effectiveness
 Latitude sensitive
 Complex installation
 Prone to damage</p> |
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