

KAYFORD SOLAR FARM



80 MW UTILITY-SCALE SOLAR ARRAY DEVELOPED BY
“KEEPER OF THE MOUNTAINS FOUNDATION” ON THE SITE OF THE
5,600 ACRE FORMER MOUNTAINTOP REMOVAL COAL MINE ATOP
KAYFORD MOUNTAIN, WEST VIRGINIA

Acknowledgments

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KEEPER OF THE MOUNTAINS FOUNDATION is a non-profit corporation, organized in the state of West Virginia in 2004. Donations are deductible under § 501 (c)(3) of the Internal Revenue Code. EIN: 14-191205.

PLEASE CONTRIBUTE HERE: www.mountainkeeper.org



Larry Gibson (1946-2012) Founder
KEEPER OF THE MOUNTAINS FOUNDATION

“Be A Mountain Keeper, Love ‘em or Leave ‘em, Just Don’t Destroy ‘em.”

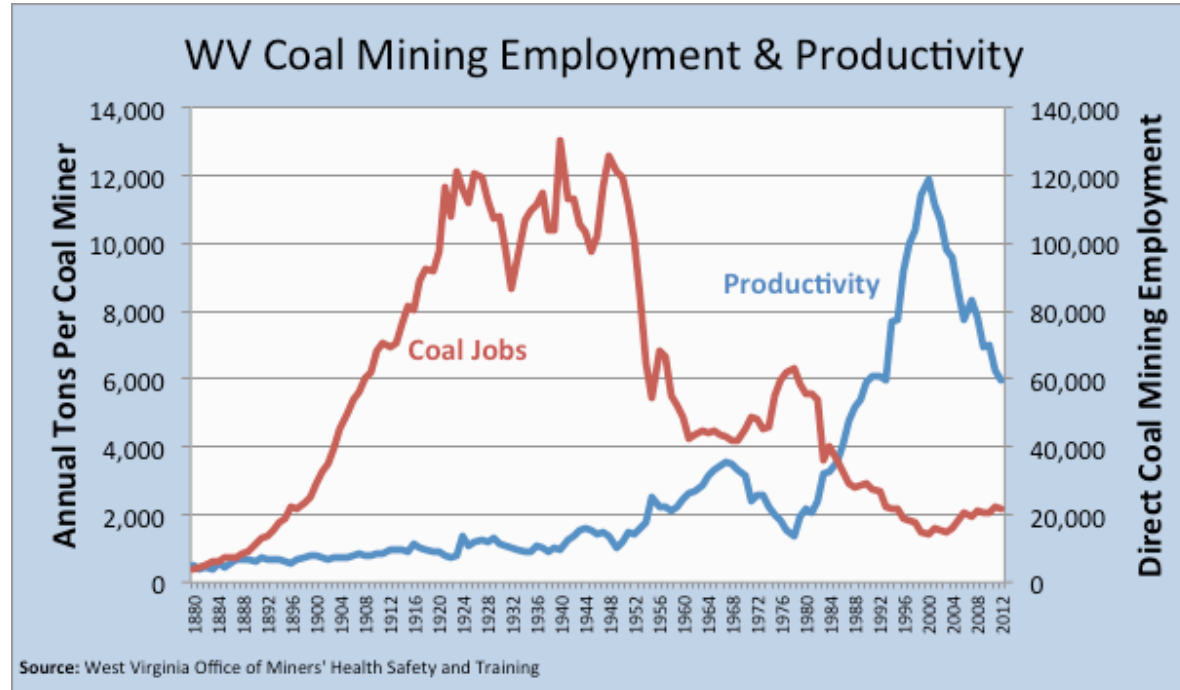
The Historic Opportunity

Kayford Mountain's 5,500 acre mountaintop removal coal mining site was – for many decades -- operated by Patriot Coal and Alpha Natural Resources, both of whom are now in bankruptcy.

These bankruptcies, and the general collapse of the coal industry, has created an historic opportunity on Kayford Mountain to build a utility-scale solar array, consisting of up to 250,000 photo voltaic panels, to power tens of thousands of homes and businesses. In the process, hundreds, if not thousands, of currently displaced laborers, can obtain retraining in skills that will empower them for the 21st century.

The example of reclaiming Kayford Mountain -- with renewable energy - can serve as an economic model for the resurrection of southern West Virginia, replacing an historically extractive economy, modeled on colonial economics, into a self-sustaining economy and healthy community.

WV is “Ground Zero” for coal industry collapse

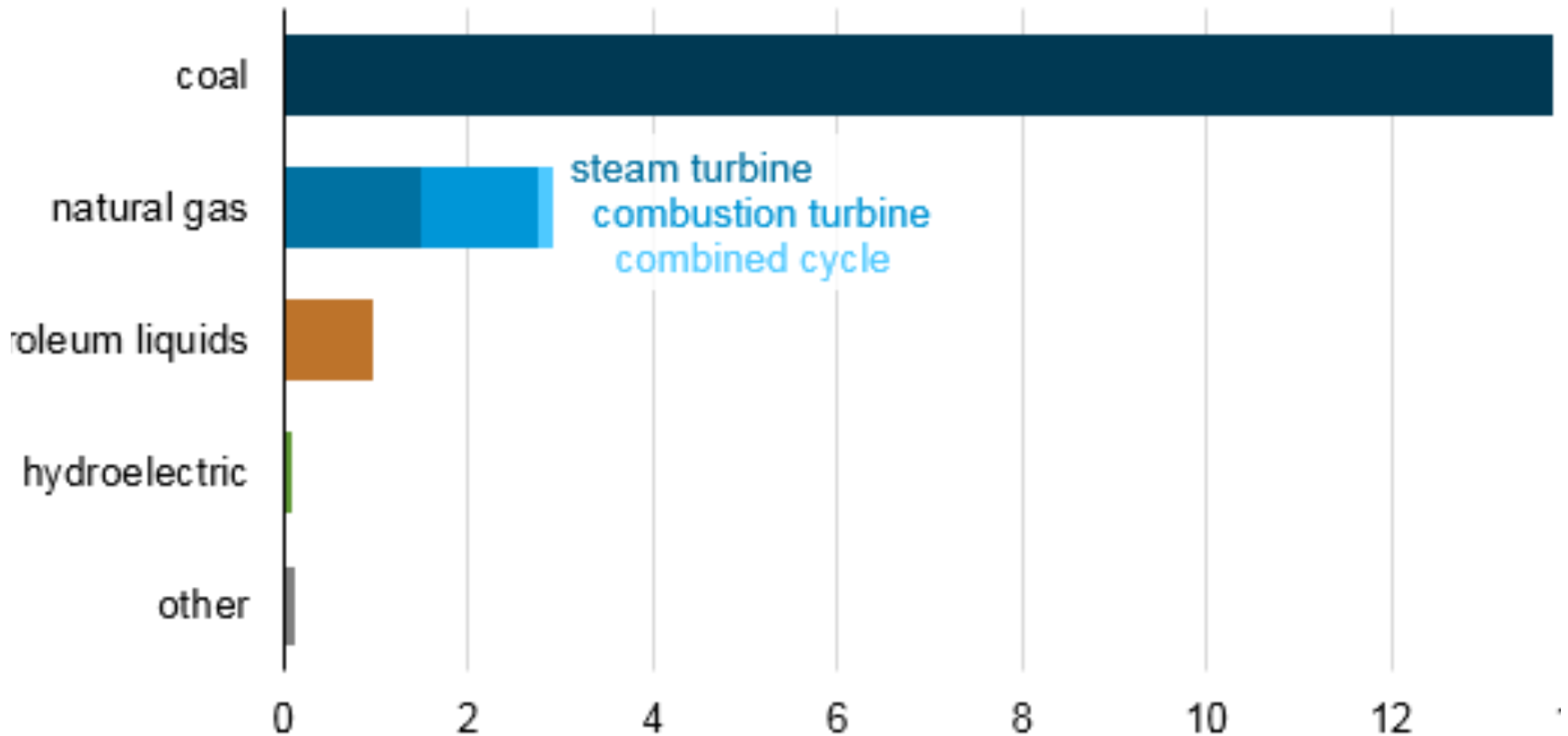


- Steam Coal: 80M decline to 40M tons in 2016
- Metallurgical Coal: Declining Chinese steel industry
- Coal bankruptcies = thousands of job losses

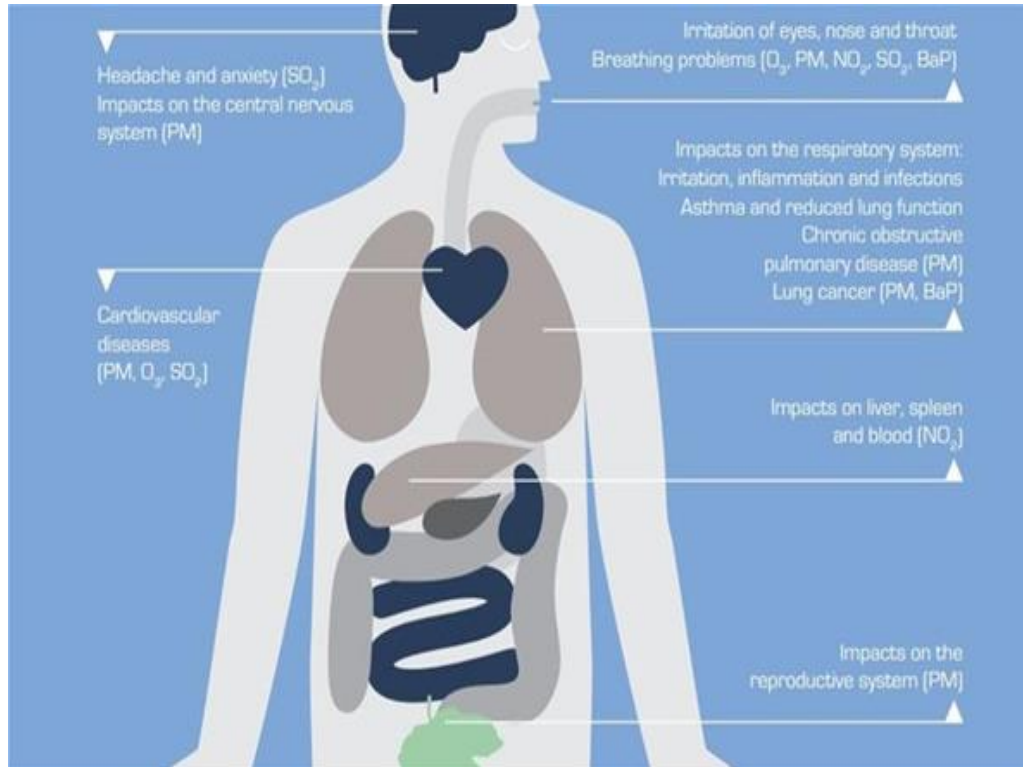
COAL = 80% OF RETIRED CAPACITY

Electricity generating capacity retired in 2015 by fuel and technology

GW



But Decreased Coal Use Will Reduce Adverse Health Effects

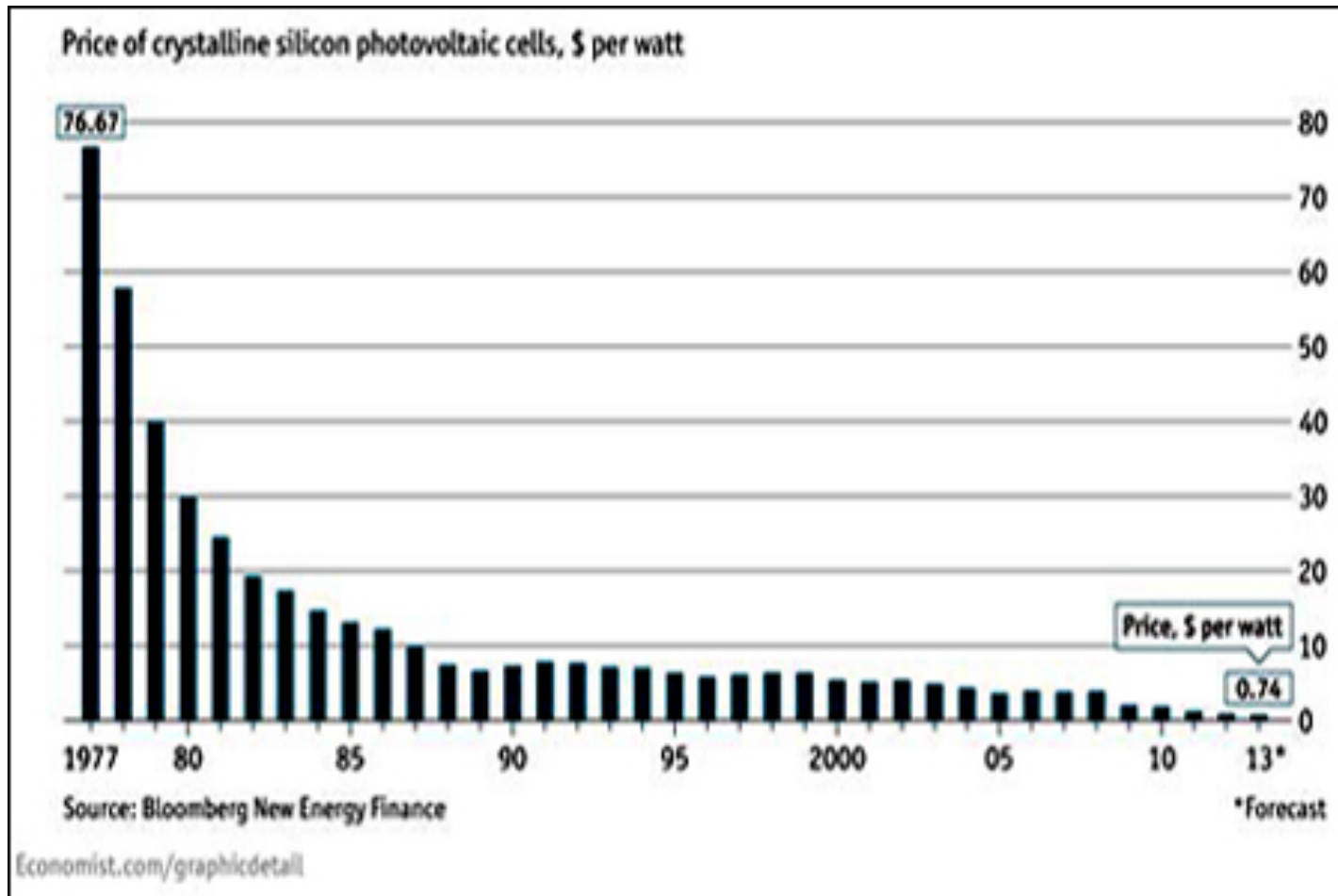


- Dozens of peer-reviewed health studies document adverse health impact on MTR communities of dependence on coal-fired electricity:
 - Increased birth defects
 - Decreased birth weight
 - Diminished educational attainment
 - Increased cancer, pulmonary and cardiac disease
 - Greatly diminished life expectancy

WV: Ground Zero for Renewables Economy

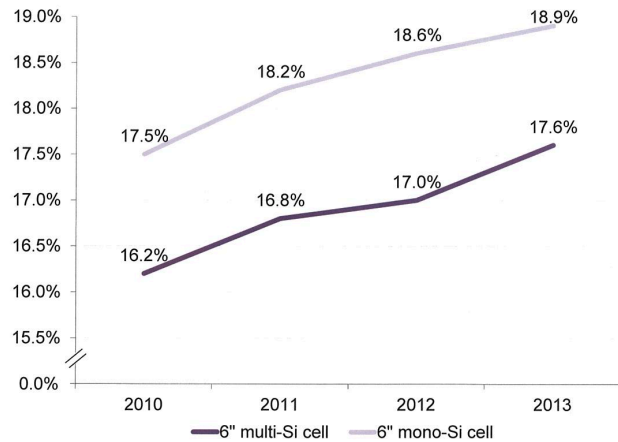
- Historic opportunity to make long-term decisions on re-use of former MTR sites.
 - Individual land owners
 - Utilities
 - Public authorities
 - NGO's
- Based on renewable energy technologies
 - Solar
 - Wind

Decreasing Cost of PV Technology



Increasing Efficiency of PV Technology

AVERAGE EFFICIENCY OF 6" CRYSTALLINE SILICON SOLAR CELLS, 2010-13 (%)

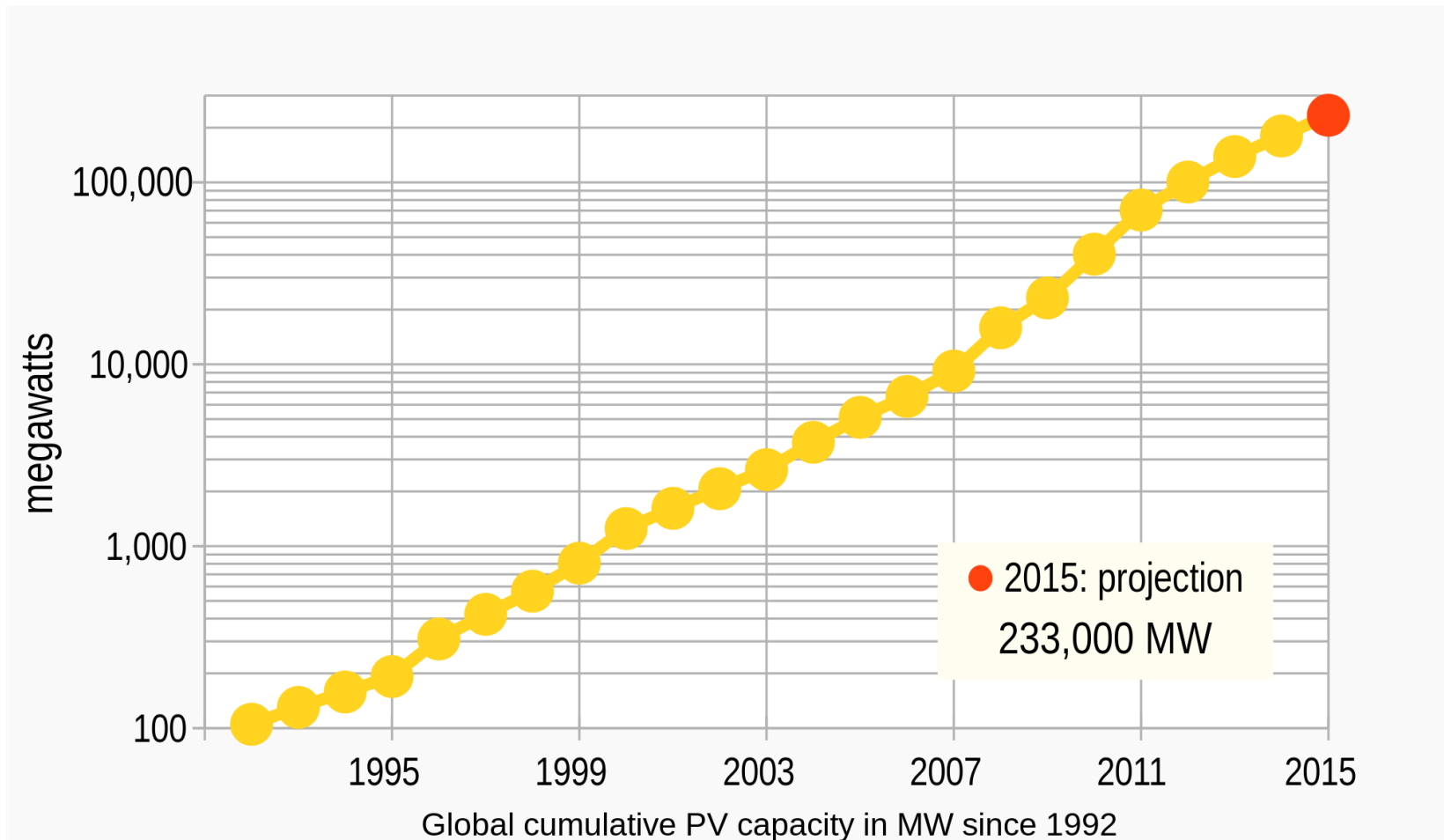


Source: Bloomberg New Energy Finance

Bloomberg **NEF** LCOE OF PV, FEBRUARY 2014
NEW ENERGY FINANCE

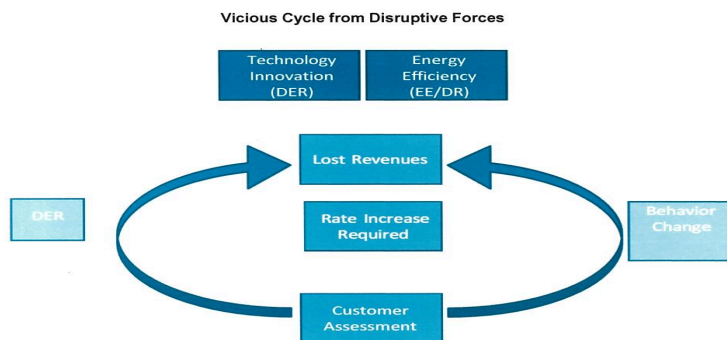
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Increasing PV Market Share



The Fossil Fuel “Death Spiral”

- “Disruptive Challenges” -- the pivotal 2013 study by the Edison Electric Institute of the impact of renewables on traditional utility economics -- described a fossil fuel industry “death spiral”:



- As the cost of renewables declines, and customers use more renewable based electricity, the cost of fossil-fueled electricity increases, motivating more movement to renewables, and further increasing fossil-fuel generated electricity. This cycle is self-feeding and decimates fossil-fueled electric generation over time.

Utility Scale Renewables Reach Critical Mass

“Virtuous” Cycle



For the first time, widespread adoption of renewables is effectively lowering the “capacity factor” for fossil fuels, increasing their costs.

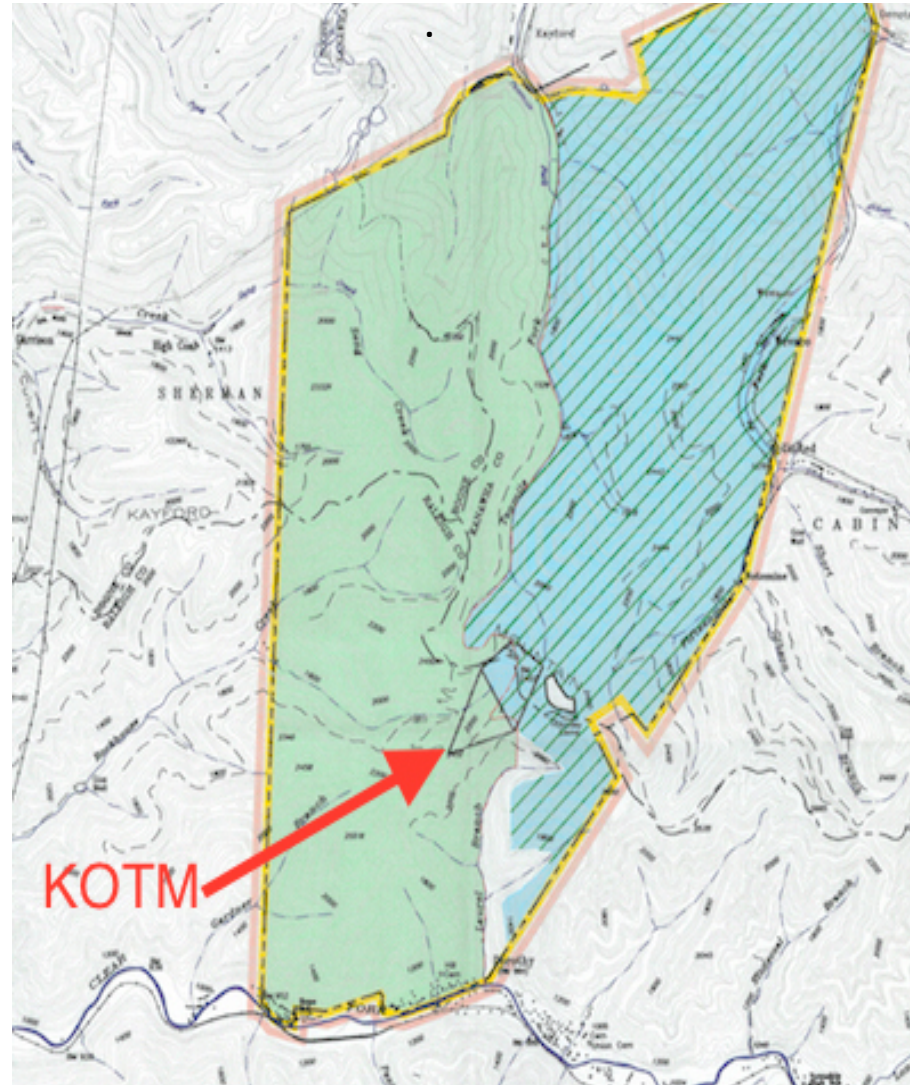
Once a solar or wind project is built, the marginal cost of the electricity it produces is near zero—free electricity—while coal and gas plants require more fuel for every watt produced. A power company will choose free fuel every time.

As coal and gas are used less, the cost of using them to generate electricity goes up. As the cost of coal and gas power rises, more renewables will be installed.

The virtuous cycle has begun.

5,500 AC MTR SITE SURROUNDING KOTM

Patriot Coal (left), Alpha Nat Res (rt); in bankruptcy.



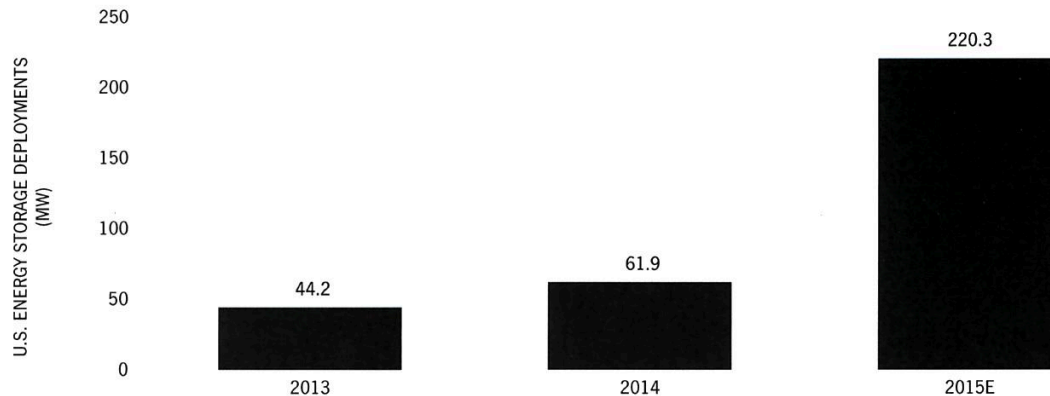
Electricity Generation Project: Specs



- 80 MW – Amazon Solar Farm model
 - 250,000 solar panels (power 15,000 homes/yr)
 - Tilted axis sun tracking
 - 1,000 acres
 - \$150-\$200 million project
 - 200+ construction jobs

Solar's inherent limits – Intermittency

U.S. Energy Storage Deployments Are Growing Fast



- The U.S. installed 61.9 MW of energy storage in 2014, up 40% from 2013, and completed 180 individual installations
- With a weighted average system price of \$2,064/kW (see pricing section), the total energy storage market size in 2014 was \$128 million
- We expect 2015 to be the biggest year in the market's history with 220 MW of deployments, two times the capacity installed in 2013 and 2014 combined.
- On a quarterly basis, Q3 2014 saw the largest volume of utility-scale storage deployments, while Q4 2014 was the best quarter ever for both residential and non-residential energy storage

EPA “Clean Power Plan” Reqts

- West Virginia **MUST** reduce use of coal
 - 96% dependence on coal-fired electricity
 - Highest percentage coal dependence in USA
- Recent additions to coal-fired fleet
 - FE 2013 Harrison acquisition of add'l 1,476 MW coal-fired generation
 - AP 2014 Mitchell acquisition of add'l 1,647 MW coal-fired generation
- EPA “CPP” Proposal – State designated decreases in Co₂
- WV DEP – Feasibility Study “State Implementation Plan”
- FirstEnergy IRP - no plan to diversify
- AP IRP - has light penetrated the forest....

Appalachian Power IRP

- Integrated Resource Plan – PSC Docket No. 15-2003-E-P
- November 2105 RFP for 150 MW Wind
 - RFP required by terms of settlement in Mitchell case
- Acquisition of 100 MW Va Solar
 - Amendment in Va statutes
- Additional 260 MW Solar Planned
 - Kayford Solar Farm = 80 MW

PURPA – 1978 Act

- Compelled purchase of solar by local utility
 - Impractical currently because of low price App. Power will pay.
- Power Purchase Agreements (PPA) – PSC
 - Long term purchase contract by state regulated utility subject to Public Service Commission approval.
- Exempt Wholesale Generator – FERC
 - Interstate sale to wholesale user beyond control of PSC
 - Subject to FERC approval

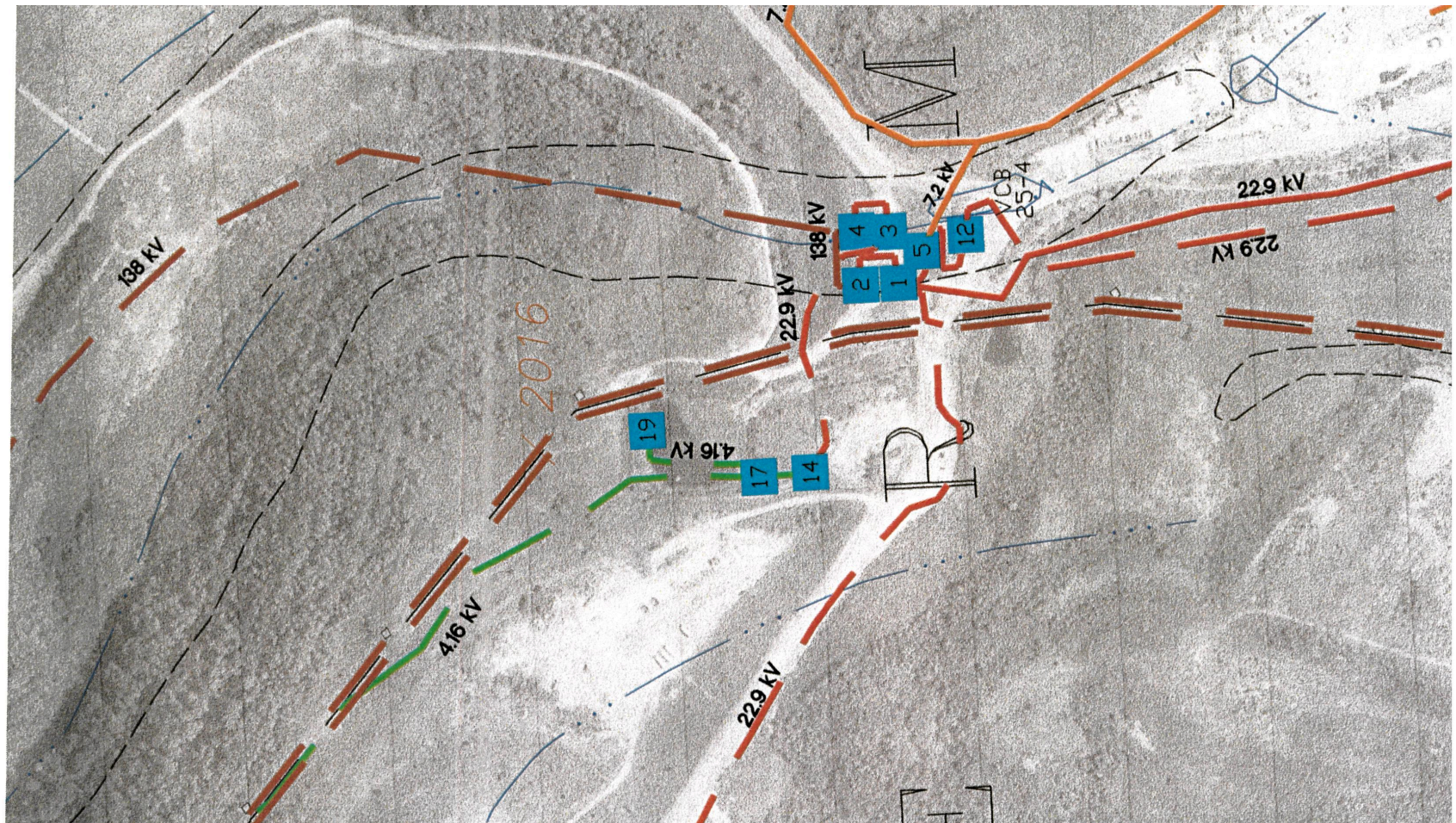
VIRTUAL POWER PLANTS

- Term describing long term purchases of *specific MW output from individual source* by end users.
- At consumer level by use of TESLA style storage in residential setting.
- At wholesale level by Fortune 100 companies who have made commitments to shareholders to become carbon-free by 2020, by use of long term purchases of mini-grid's entire capacity.
 - Accomplished by geographically remote, offsetting purchase and sales.

Grid Interconnection Agreement

- PJM: Regional Transmission Organization
 - 13 Mid-Atlantic, Midwestern States
 - Manage day-to-day spot market for electricity
 - Express control of planning for transmission capacity
 - de facto control of planning for generation
- APCO - Cabin Creek Substation
 - Proximity to Kayford mountain
 - Closure of near-by Kanawha River coal-fired elec plant
 - \$83 MM App. Power substation/transmission upgrade
- ON-SITE SUBSTATION AVAILABLE ALSO
 - FED BY TWO 138 Mw Lines from App. Power Substation

ON-SITE SUBSTATION



Government Financial Incentives

- Critical 30% Federal Investment Tax Credit
 - Extended five years incident to repeal of crude export ban
 - \$45 million worth of tax credits in \$150 million project
- App Regional Comm/Econ Devel Admin
 - 2016 “Power Plus” \$65 million in grants
- WV Public Energy Authority
 - Authority to issue tax-free bonds

KOTM People

Paul Corbit Brown – Chairman, KOTM paulcorbitbrown@gmail.com

- For the last 10 years Paul has lived in a self-designed and built, 100% solar-powered house with 1,000 watts of PV panels, and dual construction, air-separated, external walls, battery bank and rain catchment system.
- Paul has developed energy efficiency tools, including a low voltage transfer and cut off switch and an energy auditing device, “the spider,” which monitors, records and interprets energy consumption at residential electric service panels.
- Paul has been a career photojournalist, covering human rights world wide. His work has appeared in national and international publications, including the Washington Post, the Los Angeles Times, Smithsonian Magazine, US News & World Report, Business Week, among others.

William V. DePaulo – KOTM Co-Founder and Counsel william.depaulo@gmail.com

- Bill has been in the private practice of law since graduating from the Georgetown University Law Center in 1973 and clerking with the US Court of Appeals for the Fourth Circuit in 1974
- Since 1996, Bill has represented the Sierra Club, the Audubon Society, the West Virginia Highlands Conservancy, Energy Efficient West Virginia, WV Citizen Action Group, and every day NIMBY’s, in a range of environmental concerns before the PSC, the DEP and before WV courts.
- In 2015 Bill intervened in EPA’s Clean Power Plan litigation before the U. S. Court of Appeals for the District of Columbia Circuit on behalf of six W Va. NGO’s.