

# INVESTOR PRESENTATION

April 2015

This presentation may contain forward-looking information about NanoFlex Power Corporation, a Florida corporation and its wholly-owned subsidiary, Global Photonic Energy Corporation, a Pennsylvania corporation (collectively, the “Company”). All statements other than statements of historical facts included herein regarding the Company’s financial position, business strategy, growth strategy and other plans and objectives for future operations, are forward-looking statements. The words “anticipate,” “believe,” “estimate,” “expect,” “intend,” “plan” and similar expressions that may tend to suggest a future event or outcome are not guarantees of performance and are inherently subject to numerous risks and uncertainties, many of which cannot be predicted or anticipated. Future events and actual results, financial or otherwise, could differ materially from those contained herein. Potential investors are cautioned that any such forward-looking statements are not guarantees of future performance and involve significant risks and uncertainties, and that actual results may differ materially from those projected in the forward-looking statements as a result of various factors, including without limitation, the risks set forth "Risk Factors" contained in the Company's Annual Reports on Form10-K and Quarterly Reports on Form10-Q. Potential investors are urged to carefully consider all risk-factors highlighted in the private placement memorandum. All forward-looking statements are expressly qualified in their entirety by the foregoing cautionary statement. This is not a solicitation to sell nor offer to buy.

**NanoFlex Power Corporation develops advanced configuration solar technologies which enable unique thin-film solar cell implementations with industry-leading efficiencies, light weight, flexibility, and low total system cost.**

**We are executing a strategy to commercialize our initial commercial opportunity, our patented Gallium Arsenide (GaAs) technology, during 2015.**

**This presentation only describes our GaAs solar business. We have a vast portfolio of advanced solar intellectual property, including organic photovoltaics, representing significant incremental business value which is not discussed herein.**

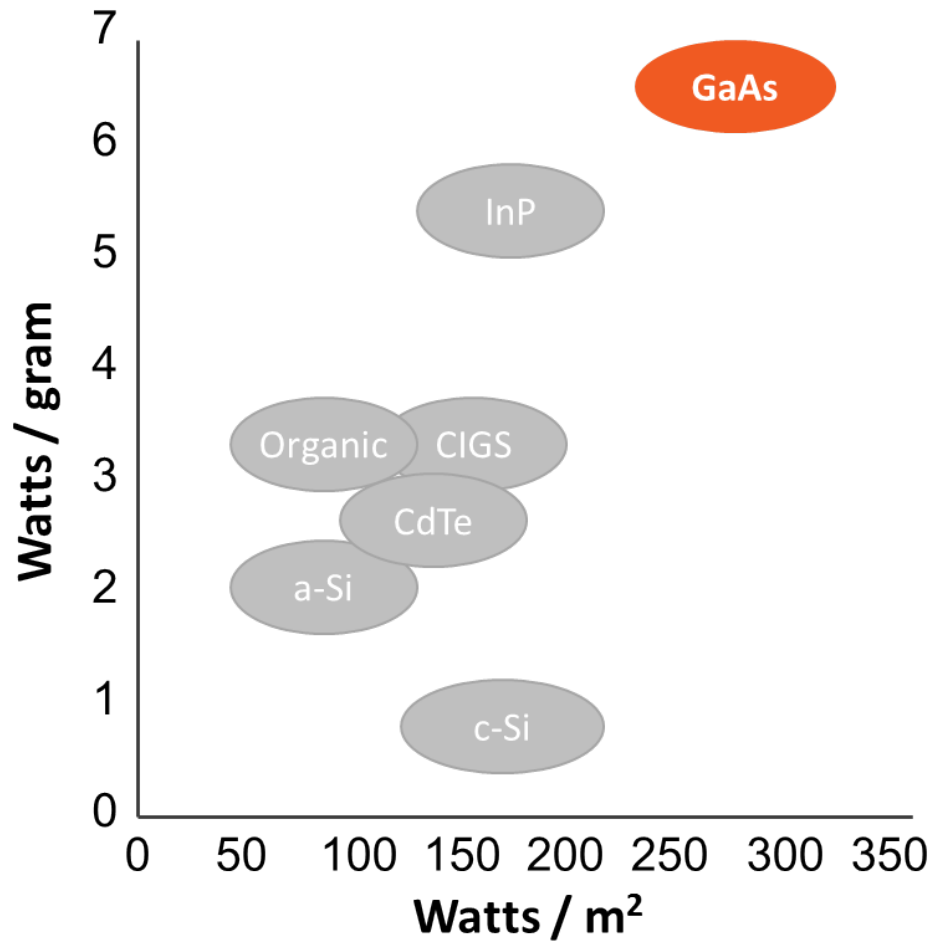
- Management and technical team with extensive experience developing advanced technologies; previously developed & commercialized technology for organic light emitting diodes (OLEDs) with Universal Display Corporation
- Extensive foundational intellectual property with more than 780 issued/pending patents covering thin film solar photovoltaics
- Two distinct thin-film solar technology platforms that can transform the solar industry:
  - NanoFlex's gallium arsenide (GaAs) photovoltaic technologies & processes enable high performance solar cells in thin films and at competitive costs
  - NanoFlex's organic photovoltaic (OPV) materials, architectures, and processes will enable ultra-low cost and highly versatile solar PV form factors
- NanoFlex is currently transitioning its GaAs thin film technologies & processes to the commercialization phase

- NanoFlex's proprietary ND-ELO photovoltaic technologies & processes enable high performance GaAs solar cells in thin films at competitive costs
  - Use the most powerful photovoltaic material available – GaAs
  - Create thin film solar cells that are flexible, lightweight, and durable
  - Dramatically reduce cost by re-using the GaAs parent wafer (via ND-ELO) and using less semiconductor material in the cell (via mini-concentrators)
- NanoFlex's GaAs solar cells can be made cost competitive for important applications in sizable market segments
- NanoFlex GaAs cells in mobile/field applications have over 300% power improvement at nearly half the price vs. competitive thin film systems
- Joint development discussions underway with three GaAs development/license/supplier partners
- Achievement of key product development milestones will position NanoFlex and its partners to enter these initial markets in 2015

- Highest power output per weight
- Highest power output per area

However, there are limiting factors...

- GaAs cells are **extremely expensive** due to high wafer & processing costs
- And **inflexible**, because cells are typically glued onto rigid or semi-rigid substrates
- And production is **not scalable** to high volume due to complex processing steps



\*Graphic shows approximate values, for illustration purposes only

# HIGH CONVERSION EFFICIENCY GaAs HAS BEEN LIMITED TO SPACE APPLICATIONS BY ITS HIGH COST

Price

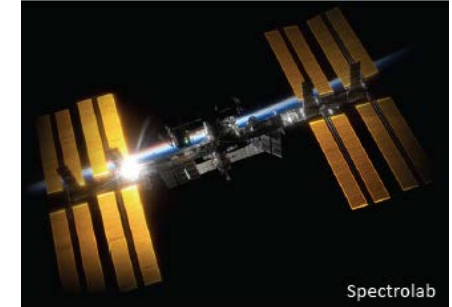
## Gallium Arsenide Solar PV

Power: ~300 watts per m<sup>2</sup>

Price: Up to \$400 per Watt

Markets: Space & Specialty

Current Market: <\$0.4 billion



## Crystalline Silicon Solar PV

Power: ~150 watts per m<sup>2</sup>

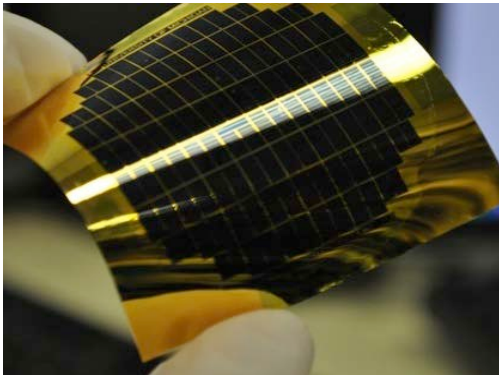
Price: ~\$0.70 per Watt (module)

Markets: Rooftop & Utility-Scale

Current Market: >\$36 billion

Power Conversion Efficiency (PCE)

- Harvest ***substantially more energy within the same surface area***
- Harvest the same energy with ***a fraction of the surface area, dramatically reducing total system costs***
- Produce flexible, rugged, thin films that ***do not require bulky encapsulation***
- Yield ***unique solar implementations for mobile field generation and Building Integrated/Applied Photovoltaic (BIPV/BAPV) applications***
- ***Reduce balance of system costs thru reduced footprint and elimination of system structural requirements***



Source: University of Michigan



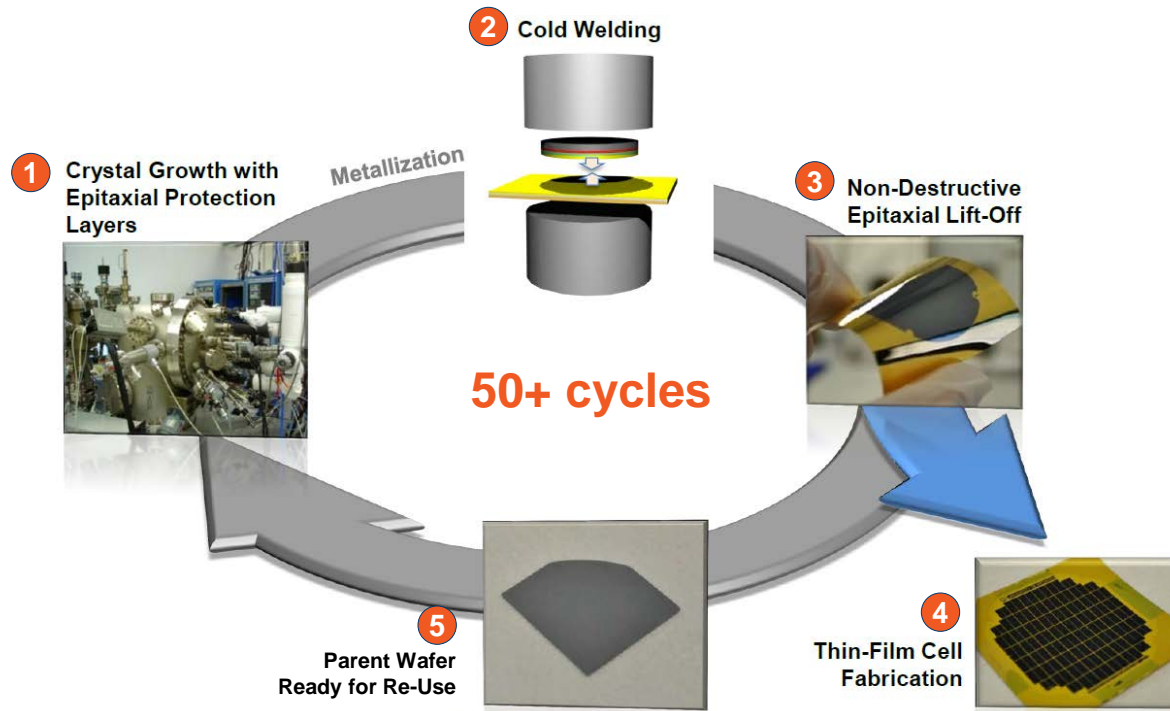
Source: GreenPath Technologies



Source: CoolFlatRoof.com

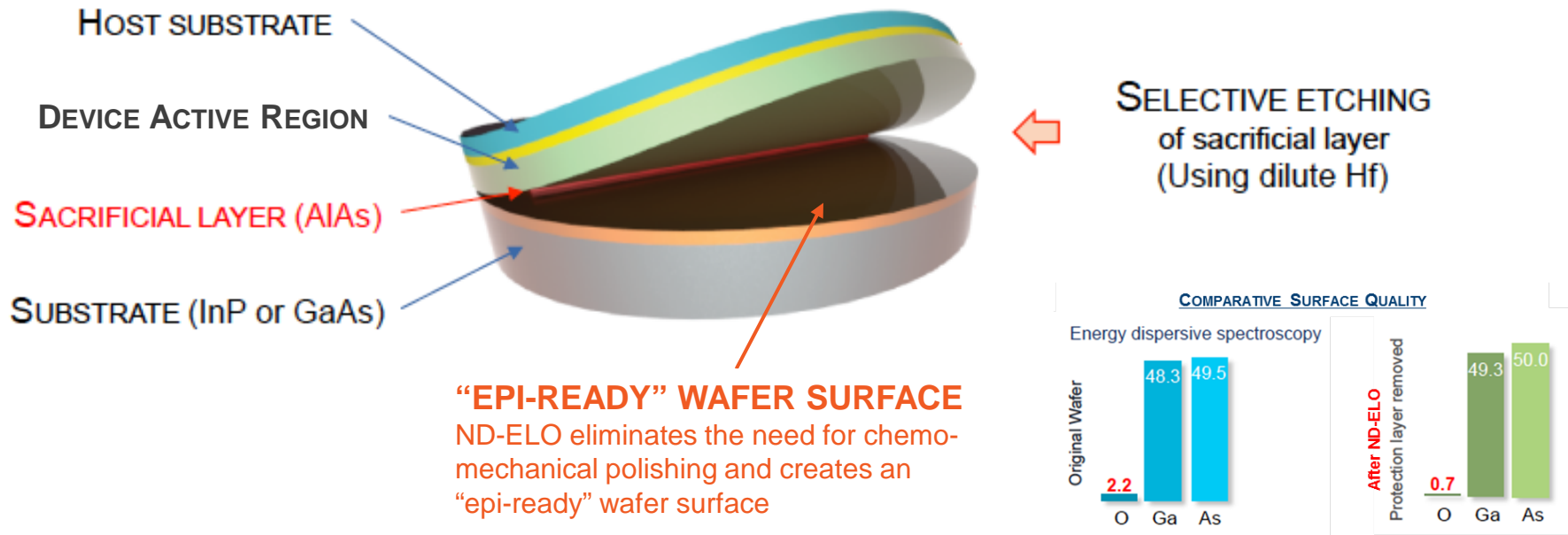


- **NanoFlex's GaAs technology: Non-Destructive Epitaxial Lift-Off process**
  - ✓ Ultra-high power conversion efficiency (like other GaAs PV cells)
  - ✓ Low-cost (via GaAs wafer re-use)
  - ✓ Higher speed processing (elimination of chemo-mechanical polishing step) and
  - ✓ Flexible & lightweight thin films (cold weld bonding eliminates need for adhesives)
  - ✓ Compatible with existing GaAs fab processes



## NON-DESTRUCTIVE EPITAXIAL LIFT-OFF (ND-ELO)

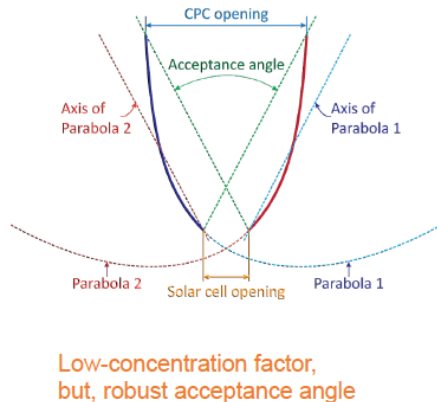
Separate a single crystalline thin-film from substrate using selective etching.



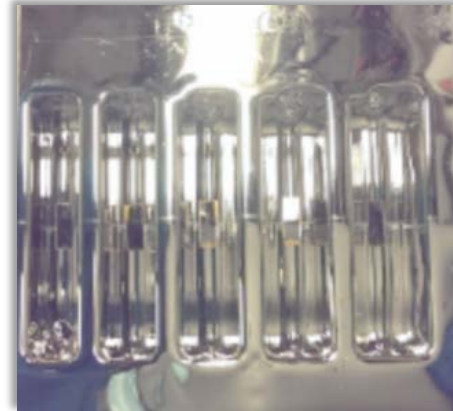
**ND-ELO creates a wafer surface ready for regrowth on the original substrate without any detectable degradation in surface quality or solar cell performance**

- **NanoFlex's GaAs technology: Mini Integrated Concentrator Array (MICA)**
  - ✓ Compound parabolic mini concentrators integrated with GaAs thin film cells
  - ✓ Reduce required semiconductor material by 90%
  - ✓ Capture equivalent energy production density (kW-hrs/m<sup>2</sup>) with 85% less cost
  - ✓ Enable energy harvesting in diffuse light

**Compound Parabolic Concentrator (CPC)**

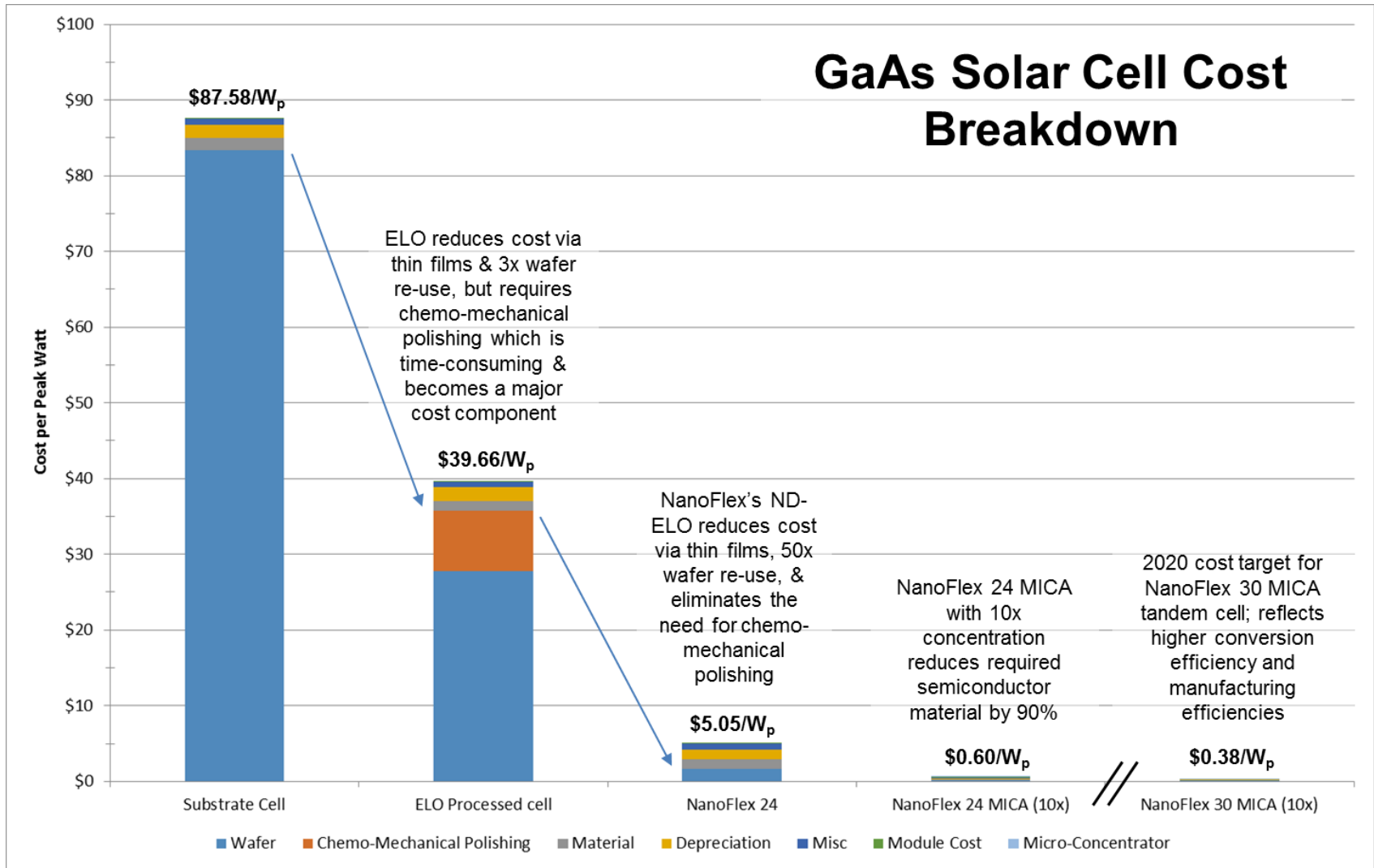


**Integrated solar cells with CPCs**

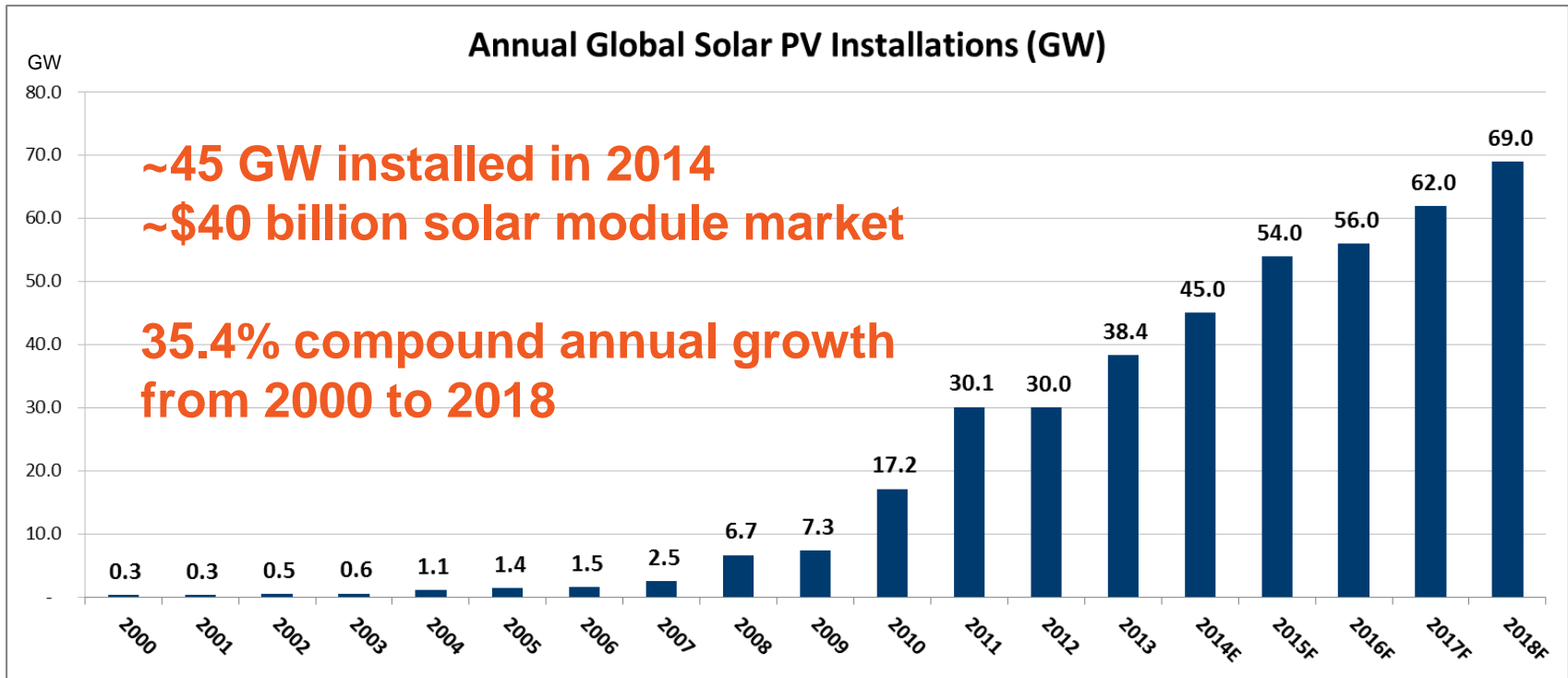


**A 10x MICA requires only 1/10<sup>th</sup> of the semiconductor material to generate an equivalent energy production density (kW-hrs/m<sup>2</sup>), enabling an 85% cost reduction**

# WAFER REUSE, PROCESS EFFICIENCY & MICA BREAK THE COST CURVE ON GaAs SOLAR CELLS



Source: National Renewable Energy Laboratory, NanoFlex Power, University of Michigan



Source: 2000-2013 actuals from European Photovoltaic Industry Association (EPIA); 2014 & 2015 estimates from Deutsche Bank; 2016-2018 forecasts from EPIA high scenario

- Crystalline silicon (C-Si) modules make up >90% of solar PV production<sup>1</sup>, but limited to rigid panels with fixed placement & significant attachment hardware and not well-suited for applications beyond the rooftop
- Current thin films (CdTe, CIGS) limited by low power conversion efficiencies

Note: <sup>1</sup>Fraunhofer ISE

## Initial focus on high value, low volume applications...

Specialty niche applications for GaAs ND-ELO allow product and partnership development

### Aerospace

**<1 MW, \$300-400M**  
Ultra-high performance solar arrays for space vehicles and UAVs

### Field & Mobile

**50-160 MW, \$500-800M\***  
High efficiency, flexible & transportable solar mats and portable packs for military, emergency response, outdoor enthusiast markets

### BIPV / BAPV

**750 MW, \$1.4 billion**  
High efficiency thin films for integration into roof membranes, spandrels, curtain walls

### Rooftop

**~30 GW, \$21 billion**  
Low-cost, flexible membranes for commercial and residential rooftops, space-constrained applications

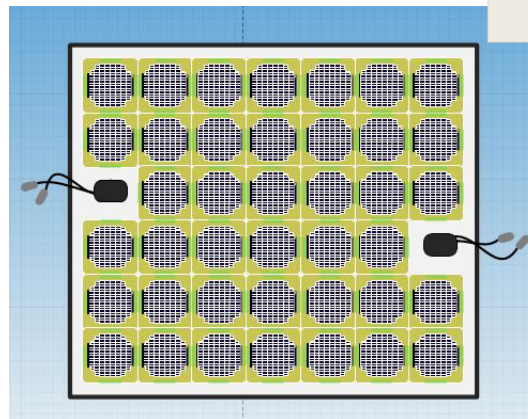
...transition to larger markets as production scales

Source: Aerospace market data from Emcore SEC filings & Spectrolab media sources; \*Field & Mobile reflect NanoFlex estimates of future market potential; BIPV estimates from BCC Research and Navigant Consulting; Rooftop volume estimates from EPIA, pricing assumptions from DOE Sunshot

**Mobile Field Generation for military, emergency preparedness and response, non-government organizations, outdoor enthusiasts**

**NanoFlex GaAs has significant power, weight & cost advantages for mobile field applications**

- ✓ **Higher power**
- ✓ **Less expensive**
- ✓ **Thinner**
- ✓ **Lighter**
- ✓ **More flexible**
- ✓ **More rugged**



One out of eight U.S. casualties during Operation Iraqi Freedom was sustained by a soldier protecting a fuel supply convoy. Cumulatively, over the past decade, more than 3,300 U.S. troops have died during attacks on fuel convoys.<sup>1</sup>

U.S. military operations in Afghanistan have paid the equivalent of \$400 per gallon of fossil fuel when security, transportation, and mortality costs are tallied up. The largest consumer of fuels on the battlefield is electricity generation.<sup>2</sup>



Images (L to R): GreenPath Technologies' concept for NanoFlex solar mat; Goal Zero Nomad 20; Solar tent, Ascent Solar, FTL Solar  
Notes: <sup>1</sup> Solar Energies Industries Association & PV Magazine (May 2013) ; <sup>2</sup> Navigant Consulting/Pike Research (4Q 2012)

**NanoFlex GaAs solar cells can provide more than 300% higher areal power density (W/m<sup>2</sup>) than other flexible thin films, at 90% lower price, and at 35% lighter weight.**

Benchmark	W/m <sup>2</sup>	W/kg	Form Factor	kg/m <sup>2</sup>	Module Price/m <sup>2</sup>	Module Price/Watt
Monocrystalline	78 <sup>1</sup>	18 <sup>1</sup>	Foldable	4.33	\$782 <sup>1</sup>	\$10.00 <sup>1</sup>
CIGS Thin Film	51 <sup>2</sup>	16 <sup>2</sup>	Flexible	2.57	\$802 <sup>2</sup>	\$15.79 <sup>2</sup>
NanoFlex 24 MICA	226 <sup>3</sup>	170 <sup>3</sup>	Flexible	1.66 <sup>3</sup>	\$301 <sup>4,5</sup>	\$1.33 <sup>4,5</sup>

Notes:

1. From Goal Zero Nomad 20 (20W) specifications
2. From Ascent Solar Enerplex Commandr XII (19W) specifications
3. Estimates by GreenPath Technologies for complete mat assembly including NanoFlex solar cells
4. NanoFlex's MICA with 10x concentration reduces required semiconductor material by 90%; NanoFlex pricing assumes 40% gross margin
5. Reflects MICA's reduced price per energy production density (kW-hrs/m<sup>2</sup>)



**Building Integrated and Applied Photovoltaics (BIPV/BAPV) markets have not reached high growth because current technology is cumbersome and mounting is hardware intensive**

**NanoFlex GaAs advantages for limited areas on roofs and sides of buildings**

- ✓ **Higher power**
- ✓ **Thinner**
- ✓ **Lighter**
- ✓ **Flexible**
- ✓ **Rugged**
- ✓ **Non-intrusive to roof structure**



**NanoFlex 24 MICA GaAs solar cells can provide more than 10% higher areal power density ( $W/m^2$ ) than industry leader SunPower at a competitive price and at less than 20% of the weight/ $m^2$ !**

**2020 price projection for NanoFlex 30 MICA module of  $\$0.52/Wp$ <sup>3,4,5</sup> meet 2020 SunShot price goals for commercial & residential modules!**

Benchmarks	$W/m^2$	$W/kg$	Form Factor	$kg/m^2$	Module Price/ $m^2$	Module Price/ $W$
SunPower <sup>1</sup>	204 <sup>1</sup>	17.88	Rigid/ Heavy	11.40 <sup>1</sup>	\$252	\$1.20
NanoFlex 24 MICA	226 <sup>2</sup>	170 <sup>2</sup>	Flexible/ Light	1.66 <sup>2</sup>	\$301 <sup>3,4</sup>	\$1.33 <sup>3,4</sup>

Notes:

1. From SunPower E-Series Specification SPR-E20-327
2. Estimates by GreenPath Technologies for complete mat assembly including NanoFlex solar cells
3. NanoFlex's MICA with 10x concentration reduces required semiconductor material by 90%; NanoFlex pricing assumes 40% gross margin
4. Reflects MICA's reduced price per energy production density ( $kW-hrs/m^2$ )
5. Reflects 2020 price targets for NanoFlex dual-junction GaAs cell with 10x MICA

# OUR PATH TO COMMERCIALIZATION

## Invention:

Generate new directions and intellectual property for applications

## Development:

Bring inventions to manufacturing readiness, develop complete specifications

## Prototypes:

Commercialization via multiple independent partnerships, JDAs, demonstrations, testing, certification

## License:

Commercialize successful technologies & sign licenses with manufacturing partners

## Production:

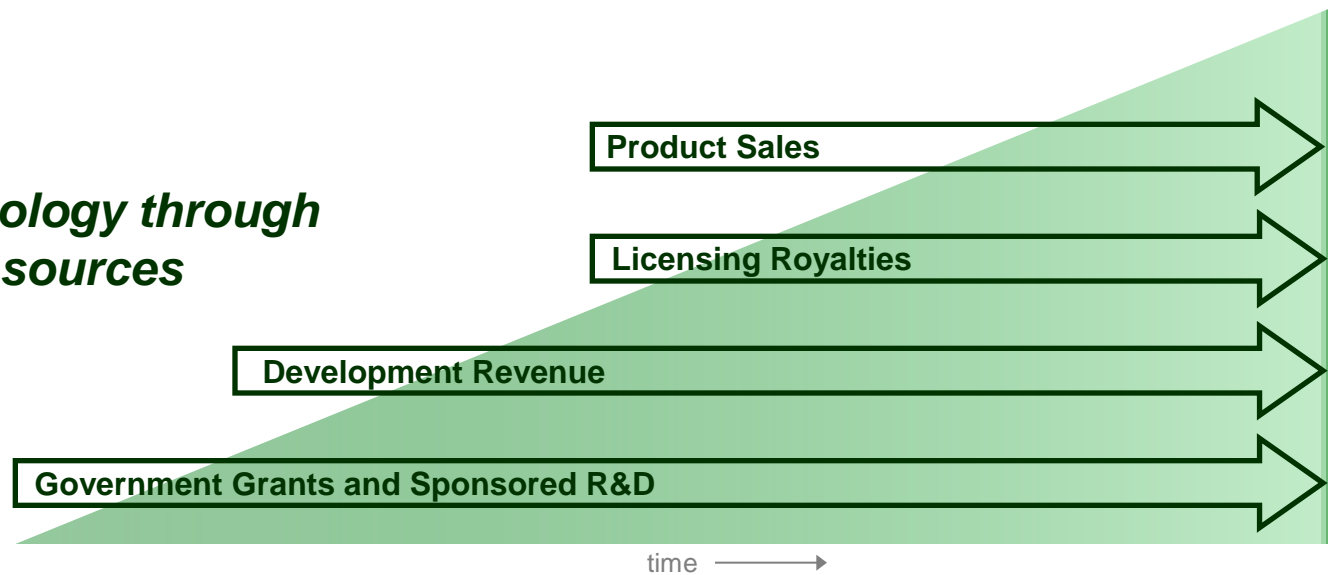
Manufacture commercial products by licensee partners or by NanoFlex with subcontractors

*University Labs*

*NanoFlex Engineering*

*Manufacturing Fabs*

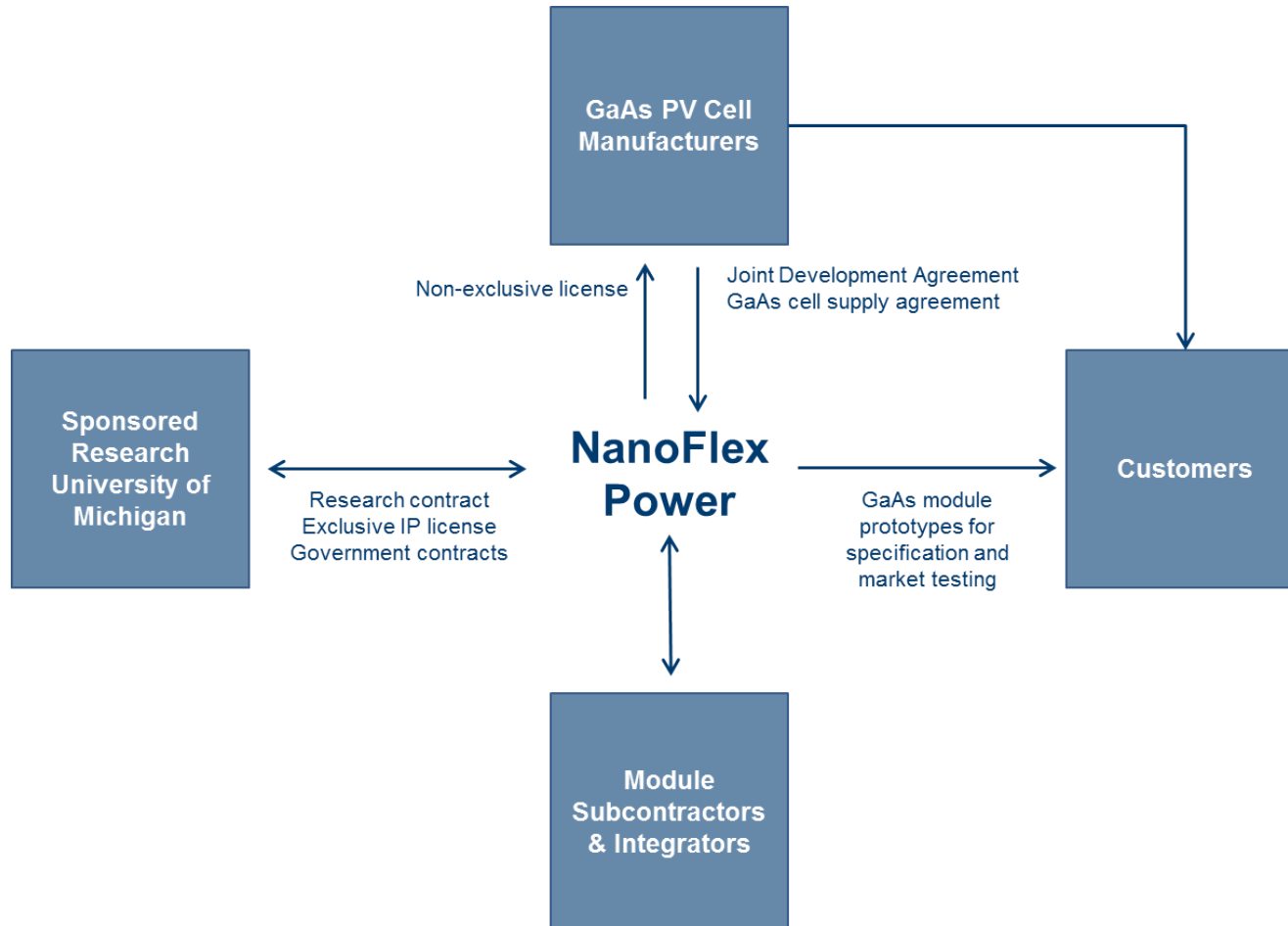
***Monetize our technology through four revenue sources***



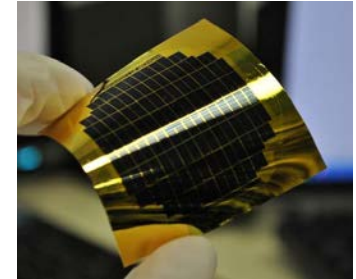
## NanoFlex Power's 15 issued or pending U.S. GaAs Patents cover all aspects of its proprietary technology

- Protective and sacrificial layering of growth wafers to allow multiple reuses without polishing
- Cold weld bonding, which allows adhesive-free GaAs solar cells affixed to thin film plastic, paper, etc.
- Methods to increase cell efficiency past its thermodynamic efficiency limits
- Low-cost thermo-formed plastic mini-compound parabolic arrays
- Roll-to-roll mini-concentrator array processing
- Micro-Inverters monolithically integrated into GaAs solar cells during production to reduce the production cost of a photovoltaic system

## Licensing + Fabless Semiconductor Business Model



- **Transition to application development phase**
  - ✓ Build NanoFlex's technology development team
  
- **Key development activities and milestones**
  - ✓ Demonstrate 10x ND-ELO cycles at low cost
  - ✓ Scale up to modules on plastic/metal foils
  - ✓ Validate cost models
  - ✓ Partner with GaAs PV manufacturers for joint development & supply of ND-ELO cells
  
- **Application development & early demonstration projects**
  - ✓ Seek government funding to augment R&D investment
  - ✓ Initial focus on military field and field hospital applications
  - ✓ Design and develop mobile field prototype products with future applications to BIPV
  
- **Expand to new applications & opportunities**
  - ✓ Solar power for BIPV/BAPV, flat commercial rooftop
  - ✓ Low-cost, thin film fabrication process potentially applicable to non-solar GaAs



Name	Position	Related Experience
Dean L. Ledger	Co-Founder, CEO, Director	35 years experience financing & developing technology opportunities; prev Director & EVP at Universal Display Corporation (Nasdaq: OLED)
Robert J. Fasnacht	Executive Vice President, Director	Private law practice; General Counsel & Director for privately held restaurant franchisor; B.S. Chemistry; J.D.
J. Norman Allen	Chief Technology Officer*	35 years in battery, semiconductor, green energy ventures; prev President of New Products & Tech at Duracell; Founder/CEO of PowerSmart Electronics; Founder/COO of Ultracell; Founder/CEO of Solidia Technologies; Greentech Advisor at Kleiner Perkins; Operating Partner at Potomac Energy Fund
Mark Tobin	Chief Financial Officer*	18 years experience with advanced technology development within industry and the capital markets; prev Director of Research at Roth Capital Partners; Science Applications International Corporation; U.S. Air Force officer
Joey Stone	Senior Vice President of Corporate Development	22 year financial services veteran; Senior VP at Morgan Stanley; financial consultant at J.C. Bradford & Co.
Dr. Stephen R. Forrest	Founding Scientist, University of Michigan	Professor of Electrical Engineering, Materials Science & Engineering, & Physics; track record of delivering commercially successful companies; Director at Applied Materials (Nasdaq: AMAT)
Dr. Mark E. Thompson	Founding Scientist, University of Southern California	Professor of Chemistry, Chemical Engineering, & Materials Science; instrumental in discovery & commercialization of OLED technology

\* External consultants

- NanoFlex's Non-Destructive Epitaxial Lift-off (ND-ELO) for GaAs is a game changer, not just for GaAs solar, but for the entire solar industry
- NanoFlex has the key gate keeping patents enabling low cost thin film GaAs solar cells via ND-ELO and MICA concentration
- NanoFlex is implementing a commercialization strategy encompassing joint development, licensing, & supply agreements with major GaAs partners
- NanoFlex will develop prototypes for mobile field generation and BIPV as the first two applications, working with integration partners
- This business will open a path for both NanoFlex and its license partners to very large segments within the solar market





Dean L. Ledger  
Chief Executive Officer  
(480) 585-4200  
dledger@nanoflexpower.com

Joey Stone  
SVP of Corporate Development  
(225) 400-9720  
jstone@nanoflexpower.com