# Annex 1: Expression of Interest (EOI)

**Development Innovation Ventures Expression of Interest Form**

**All applicants MUST use this form to apply**

**By submitting this EOI, your organization is certifying that the answers to the questions are accurate to the full extent of your organization’s knowledge.**

**Instructions:**

1. Your application will be considered for under all of the mechanisms at DIV’s disposal. For additional information about our [partnership](http://www.grants.gov/web/grants/view-opportunity.html?oppId=255248) opportunities, visit our website.
2. In the space provided at the end of the application form, include citations for any assertions or references.
3. Use 11 point Calibri font.
4. DIV may not review any material beyond eight pages; the eight page limit includes the instruction text as well as the information provided by the applicant.
5. Submit the completed LOI to **DIVApplications@usaid.gov** Applications submitted to another mailbox will not be reviewed. You will receive a response an email confirming DIV’s receipt of your LOI.
6. If your LOI advances to the interview or full application stage, we cannot move forward with our review until you are registered in the [System for Award Management (SAM)](http://www.sam.gov/) site. Follow the online instructions to complete SAM registration. You will need a DUNS number, and an Employment Identification Number (EIN) or Taxpayer Identification Number (TIN).

For additional information about DIV, examples of great projects that we support, and our application process and timeline, please visit DIV’s website at <http://www.usaid.gov/div/>.

1. **Organization Information**
2. Organization legal name: Công ty TNHH Công nghệ Tam Hùng (Tri-Heroes Technology Co., Ltd)
3. Organization type (please select from dropdown menu):

If ‘Other’, please specify:

1. Organization address:

|  |  |
| --- | --- |
| Street Address | 2 Kieu Mai Str - Phúc Diễn Com - Bắc Từ Liêm Dist |
| City: | Hà Nội |
| State/Region: |       |
| Zip/Postal Code: | 100000 |
| Country: | Viet Nam |

1. Contact information:

|  |  |
| --- | --- |
| Primary point of contact | Secondary point of contact |
| Name: Phuc-Anh TRAN | Name: Diem-Hong HOANG |
| Title: President (Author) | Title: Assistant (CEO) |
| Telephone: +8496-750-0371 | Telephone: +8416-5646-5845 |
| E-mail: tranphucanh1991@gmail.com | E-mail: hoangdiemhong@gmail.com |

1. **Overview Information**
2. Project title: Electronic Direct Current Supply Ballast (DC Supply Ballast or DC Ballast) for Fluorescent, Compact and High-Pressure Lamps as Sodium and Metal for 'Super Power Saving' upto 50-70%.
3. DIV stage (please select from dropdown menu). Please refer to the [DIV website](http://www.usaid.gov/div/apply) for definitions of each stage. The stage should be selected based on project activities, not funding needs:
4. Total funding requested (USD): 1479000
5. Proposed cost share (USD) : 32500
6. Which of the following best describes the sector your solution addresses? (please select from dropdown menu):

If ‘Other’, please specify: Energy Saving and longlife for lamps

1. Secondary sector, if any (please select from dropdown menu):

If ‘Other’, please specify: Green Production

1. Partner organizations: N/A
2. Primary country where the project will take place: Viet Nam
3. Secondary country/countries (if any) where the project will take place: Worldwide
4. Expected duration of project activities (months): 24
5. Expected source of financial support at scale (long-term widespread implementation):
6. Has the applicant ever received USAID funding in the past?
7. Has the applicant received USG funding for this or a similar project?
8. Has the applicant received DIV funding for this or a similar project?

If ‘Yes’, please provide the grant number:

1. How did you initially hear about DIV?

If ‘Other’, please specify: someone introduced

1. Please specify the DIV staff member who referred you to submit this LOI, if applicable:
2. **Project Information**

**Please review the information available on** [**our website**](http://www.usaid.gov/div/apply) **and any stage-specific expectations before answering the following questions.**

1. What is the problem your innovation addresses?

Our new DC Supply Ballast aims to: 1) Electricity saving in lighting; 2) Extended life of luminesent lamps. 3) Production of lamps better than LED lamps being widely used today.

\* There are 2 popular types of ballasts:

- AC50Hz-60Hz Ballast within 85-95 lumen/Watt refering as link: http://www.lrc.rpi.edu/programs/nlpip/lightinganswers/t8/02-t8-light-output.asp

... shown consuming large power and need much energy for transmision on power lines within 70-75% power turned into heat inside the lamp and 10-35% in the Ballast;

- Electronic Ballast of High Frequency up to 20-120KHz: although it can save 25-40% power in the Lamp and Ballast, in addition it reduces consumption current by 1/3 of AC50Hz-60Hz ballast but it reduces lamp life of 3-5 times comparing in using AC50Hz-60Hz Ballast (reference as link: http://www.ldpi-inc.com/resources/ballasts).

The Existing Ballasts supply the AC for the lamps within voltage or current creating the cyclices of rise and fall to make the points lower than the lamp's light threshold, will be the futile energy. But, the points higher than the threshold will devide one part of power to turn into light and the power surplus will turn into unwanted heat. .

\* Superiority of innovation

The new DC Supply Ballast can solve the problem of energy waste and enhance the timelife of the lamps by hold and keep a current or voltage value being equal to the optimal lighting threshold to limit power waste and stables the lamp's brightness within the light in continuously and regularly stable, in combination of much higher luminous flux to save more power up to 50-70% comparing on AC50Hz-60Hz Ballast and 10-35% more than the Electronic Ballast. Especially, it increases upto 2-3 times of the lamp life compared to using AC50Hz-60Hz ballast (see 'H' as below).

1. Describe your specific innovation and the outcomes you expect. Who are your customers/beneficiaries? How will your innovation significantly address the problem at lower cost in a way that has not been feasible before? *Note: Some might describe this as the theory of change.*

- This innovation addresses the wastage of power for lighting and increases the lamp life that other existing Ballasts could not address.

- Production costs of the new DC Supply Ballast will be cheaper or equal to that of Ballast within high net profit about 40-60% for the manufacturing and business

- It easily connects into the lamps. It is also easy to repair and replace a new Ballast.

\* Intermediate customers/beneficiaries:

- Manufacturers and business of lighting lamps. Government and State of the Countries

- Especially, it allows to sustain the traditional lamp manufacturers against competition from the LEDs.

\* Direct customers/beneficiaries:

- Households, offices, factories and public areas as stadiums, roads and more.

- Especially, the poor peoples and poor countries.

- Most suitable for farms and factories, which utilize big amount of light, such as the dragon fruit farms, garment factories...

1. What are the possible avenues (public, commercial, hybrid) for scaling up over the next 3-10 years, and what are your plans to achieve greater scale?

 Hybrid

1. What are the characteristics and estimated number of direct and indirect beneficiaries? Provide the most appropriate estimate of who the innovation will directly affect, including income groups and other demographics. Please explain your calculations, including relevant assumptions. DIV recognizes that precise estimates may be difficult, especially for early-stage applicants, and is most interested in the underlying assumptions to generate what you think represents a reasonable number.

 \* Users of our products

+ Direct beneficiaries:

- households: 3,000,000 in Vietnam

- working offices: 1,500,000

- factories: 10,000

- especially, poor peoples and poor coutries about one half of the World.

+ Indirect beneficiaries: public areas as stadiums, roads… (Government and State) as well as manufacturers and trading dealers of traditional lighting equipments: 500 customers in Vietnam

\* Targets of our products

- humanitarian assistance to the poor people as charity, to be sold cheaply to poor countries

- global trade (mainly) on developing and developed countries such as USA, EU, Korea, Japan…

1. Describe current solutions that exist in the geographic area where you will implement your innovation and outline how your solution will be a better alternative.

 See 'There are 2 popular types of ballasts' in 'A' as above, which shows greater power consumption and limited lamp life. Thus, there are various DC power supply solutions for the lamps to save power but they are unable to overcome the disadvantages.

Our DC Supply Ballast solution aims to overcome those failures (see 'G' and 'H' for more).

1. What activities will you execute under this grant and what results do you anticipate achieving with DIV funds?

¬ International Patent Registrations and International Conference for new technology inventions for our Products: USD80,000¬ 100,000 during 4¬6 months

¬ Office equipment:10,000U$D

¬ Equipments for manufacturing: USD150,000¬210,000

¬ Salary for 12¬15 employers: USD150,000¬180,000 during two years

¬ Rental of factory premises and office space: USD100,000¬ 120,000 during two years;

¬ Materials and components: USD750,000¬850,000 for each mass production batch

- Achieve production output of 1,000,000 ballasts/year

¬ Revenue is expected to reach USD 3 ¬ 5 million in 3rd year globally within our Export¬Product Spin¬Cycle for 3 ¬ 4 months each with two TARGETS in 'D' and 'Direct customers/beneficiaries' in 'B' as above

1. Explain how you intend to assess the innovation, given your stage and scaling path (e.g.. how you will assess proof of concept, commercial viability, causal impact and cost effectiveness, etc.)

\* External Origin: See 'There are 2 popular types of ballasts' in 'A' as above and many specianists, on the World, tried DC supply solutions for the lamps to save energy but tripped the 'cathode ray effect' making a cathode lamp side really dark and 'light screw-line effect' emitting the light was intermittent and unstable.

\* Internal Origin: Our DC Supply Ballast is to overcome the worldwide specianists's failures as to reduce the 70-75% power turned into heat (see in 'H' as below).

\*\*\* Strengths:

- It generates high, continuous and stable brightness within 190-265 lumen/Watt (see 'H' as below) higher than LEDs with just 80-120 lumen/Watt.

- Lower power consumption in comparision to traditional types of ballast as well as more power-saving than LEDs to save 50-70% electricity for lighting globally (see 'H' as below)

- Suitable for all production scales at low cost, commercial price for products is cheaper than traditional ballasts, competive will better than LEDs

\*\*\* Opportunities:

- Lighting needs are enormously worldwide, if saving 50-70% lighting power, it will save 40-60% money for lighting power users to preserve this electricity for production in utilities to grow economic (in average of World, each person paying the total lighting electricity cost from the family to the workplace and public areas to the roads, estimated of U$D1.5-2 monthly or U$D18-24 yearly, so, the whole world consumes about U$D 100 billion of lighting-cost annually).

- Readly to cooperate with all manufacturers and trading partners of lamps to deliver our products to the World with Total sales of lighting products worldwide is estimated at more than U$D20 billion annually. If we occupy 15-25% of the world market, our profit will reach a big value (see 'I' as below)

\*\*\* Weakneses

- Shortage of funding for pilot production and early commercialization

- due to the government policies in the public lighting projects

\*\*\* Threats

- Resistance of incumbents, such as producers of traditional ballasts and producers of LEDs.

- due to the old habits of consumers.

1. What are the relevant metrics you will use to judge the success of this grant and how will you convey those regularly to DIV?

See the link: https://en.wikipedia.org/wiki/Fluorescent\_lamp

and refer for Luminous efficacy between the traditional Lamps with LEDs as link: https://en.wikipedia.org/wiki/Luminous\_efficacy

… it shown that: only 25-30% electricity into light and 70-75% power turned into heat and idle-energy (futile) in the lamps using AC50Hz-60Hz ballast adding 15-35% power more into heat in the Ballast, within 85-93 lumen/Watt.

It saved 25-40% power with 100-120 lumen/Watt in using electronic ballast but it reduces lamp life (see 'A' and 'G' as above).

- Many studies show that the incandescent lamps supplied power with more higher frequency, being more stronger its radiation ions to make its incandescent as faster broken and the electro-ballast with high frequency always creates the blocking pulse in peak very high voltage of 800-1500Vp-p to make the lamp always being in an excited light while maintaining the normal brightness should its high-voltage blocking-pulses makes incandescent faster broken and burn off lighting fluorescent layers to shorten the lamp life.

\* Our Innovation overcomes other technicians's failures worldwide (see 'External Origin' in 'G' as above) by Modulating of 2-5% Level of DC power in aliasing pulse form to create a 'negative differential resistor effect' making the electrons to shot backward after each pulse cycle to offset fill the dark spaces in previous cycle for continuous light, steady and more stable as well as no longer being dark at the cathode side of lamp.

\* Success indicators of this DC Supply Ballast innovation:

- It stables the light brightness to make it friendly to user's eyesight than the LEDs. It is much cheaper than LEDs that allows manufacturers of traditional lamps to better compete to LEDs.

- Thus, our Ballast can reduce 50-70% power which had turned into heat energy and idle-energy (futile) so it will increase efficiency for the fluorescent lamps up to 65-70% comparing in using AC50Hz-60Hz and reaching of 190-265 lumens/Watt higher than LEDs of 80-120 lumen/Watt (see 'A' as above).

- When supplying to the lamp with DC current at lamp's optimum glowing threshold, lamp life is longer…

- Our Ballast promotes the advantages of existing electro-ballast saving power and overcome the weaknesses of electro-ballast reduced the lamp life.

- We are willing to communicate with DIV regularly to exchange information via email, telephone and facebook in tracking our implementation and results for Sustainable Development.

1. Explain how this innovation can be sustained and scaled (operationally and financially) while maintaining impact and cost effectiveness, and how you intend to support the next step in the transition to scale?

With the potential global market of lighting lamps of over U$D20 billions annually and people in the search for save energy divices, the promising new DC Supply Ballast solusion is one of the best choice for customers in the global market in Reference as link: http://optics.org/news/7/8/35

We are calling support from DIV for innitial stage and we then call for global cooperation with manufacturers and business partners of lighting lamps worldwide to expand the scale of production and trade.

In addition, we will find the green energy and renewable energy funds to invest in projects that use solar energy for lighting roads and households in poor communities in the highlands, mountains , the central provinces of Vietnam affected by the contamination of the sea causing by Formosa.

As well as, we also try to find the funds to support clean and sustainable agriculture into the project in combination with solar energy for plant growth stimulation by light with our DC Supply Ballast Products.

In mention above, we will gradually improve skills of management and implementation of projects as well as expand the scale of production and trade in targets as towards the poor countries for the humanitarian assistance and towards the powerful nations for profitability in globalization.

1. Lead Organization: Briefly describe the lead implementing organization, including their mission statement (if applicable) and any relevant experience.

- Our organization mission is the research and development of science and technology with the first priority is the invention to create new products more useful of usability and low price responding to every social class from the poor to high income earners.

- The focused fields are electricity, electronics, telecommunications, automation and high technology...
- We support clean and sustainable agriculture, green energy, renewable energy and energy free to handle clean water, renewable for water environment particularly and living environment generally.

- I myself have over 20 years experience (1994) in the design, manufacture, repair service the equipments of the industry, agriculture, hydropower, thermal power, water and wastewater treatment as well as the environment.

- I founded the company from 2006 until now has 10 years of experience for such activities as above.

1. Project Team: Describe the composition of the project team including key personnel, discussing the skills and experience they contribute to the proposed objectives, and how they can address potential risks and challenges associated with the proposed project.

Specify their % level of effort for this project.

1 - Dr Phuc-Anh TRAN - Inventor and President (full time)

- Doctor in Micro-Processor at the Technical University of West Berlin, Germany, 1997 - B.A. in Solid State Physics at the Hanoi National University, 1993 - Diploma in General Physics at the Hue Pedagogical University, 1991.

- Talented students of Physics - Mathematics of senior high school of Hue National School - 25 years of experience in design, manufacture, repair the Electronics and Automation as well as Telecommunications and Electrics.

- Working in the Military Telecommunication and Automation Institute II - Ministry of Defence 1997-2007.

2 - PhD Luong-Son TRAN - jurisconsult for technology licence and partnership (part time 25%)

- Ph.D. in Physical Chemistry in Metallurgy - Moscow University of Steel and Alloys, Russia, 1988. Got a Fulbright Scholarship of the US Government - Sloan School of Management of MIT and Macro-economics at Harvard University, 1998.

- Masters in Business Administration with a focus on strategic management, technology strategy and entreperneurship.

3 - PhD Nikita SAMSONOV - operation and design and programmer (full time)

- Native: Jewish. Place of birth: USSR - now Russian Federation, Moscow

- PhD "Digital Signal Processing" in Moscow Institute of Radio Engineering and Automation (MIREA) in 2014 - Master degree - “Automation and Control Systems” - MIREA in 2011.

- Master “Chemical Technology and Biotechnology” Moscow State Academy of Fine Chemistry Technology in 2009; Bachelor since 2007,

- Electronic engineering, computer and microcontroller programming, FPGA design programming 4-Test and correct Labors for products (with 10 years of experience)

4 - PhD Anh-Xuan TRINH - Experts stimulates plant growth by light (full time)

- PhD in Polymer Science and Technology - 2001 International Training Institute for Material Science - MSc. Photonic Material Science. 1999 Hanoi University of Technology.BSc. Polymer Science

5 - PhD Ky-Nam NGUYEN - Experts of empirical optimization (part time 25%)

- Ph.D. in Statistics (IASRI, New Delhi) Thesis: Computer-aided construction of optimal designs, 1983. M.Sc in Statistics (UPLB, Los Banos) 1978. B.A. in Human Science (Saigon University) 1973. Diploma in Education (Saigon University) 1971

6 - Master Hong-Diem HOANG - marketing-sale and foreign Affair (full time)

- Master of the Economics, 1997, PFU in Moscow

1. Partners: Describe partner organizations (if any) and what skills and experience they contribute to implementing or scaling the project. Please distinguish between partners that have already agreed to participate, organizations (or types of organizations) that you will target, and organizations providing financial support.

- BK Holdings: a big company for investment and development of technology under the Hanoi Polytechnic University (Hanoi University of Technology) as a website: http://www.bkholdings.com.vn/

- MITFive (www.mitfive.org): entrepreneurship training, support fund for startups and angel

- Truong Thanh Media (http://www.truongthanhmedia.vn/): organizing media events, seeking investors, sponsors and partners

- Hoang-Quy Farm (to test the solutions stimulates plant growth by light) as link: https://web.facebook.com/groups/linhbio/882036755229582/?notif\_t=group\_activity&notif\_id=1477819676452231

- Co-working Group on Internet (volunteers contribute labor and materials, financing to the pilot projects) as link: https://web.facebook.com/groups/595979840580462/

1. Please provide up to three past performance references that can speak to the ability of the applicant to work effectively as part of a team, achieve results, or successfully implement projects similar in magnitude, complexity, objectives and in contexts within the past three years. Please provide applicable awards numbers or other details if relevant, as well as contact information for the primary point of contact. Newer organization or applicants will little or no prior related grant awards may provide alternative references, e.g, professional references for key personnel. When applicants have received a previous DIV award, DIV will also consider the applicant’s past work with DIV. - USAID reserves the right to obtain past performance information from all relevant sources, including those not named here.

- Members of our team prove their experience in the designing and manufacturing drivers - switching power supplies for LEDs lamps and well understand the superiority of the lamps of fluorescent and compact compared to LEDs.

- Besides, we also have many years experience in designing all kinds of switching power for many types of electronics, electrical industry, telecommunications equipments, and thus, we have experience in the design of these types of driver, switching power or Ballast powered high performance, superior power savings for lighting lamps.

- Finally, we also had experience in designing the lighting system to stimulatethe plants to use lamps of fluorescent, compact and high-voltage lamps to improve productivity in the farms to increase theirs crop yields by lighting. The Users are aware of expensive input when using the AC50Hz-60Hz Ballast as it consumes too high current and high cost to replace the lamps as this product shortens the lamp life: Our new DC Supply Ballast was helped the users to save produciton cost while it increases the productivity and crop yield.

**Citations** Please list citations for above sections below (only content written in the LOI will be reviewed as part of the application; these citations will be used to verify factual accuracy if necessary).

1: Inventions published on Sciencific Society of Vietnam: http://www.ssvnjournal.com/tag/dr-tran-phuc-anh

2: Inventions broadcasting in Vietnam Television as link: https://www.facebook.com/groups/595979840580462/permalink/651005271744585/?comment\_id=653449844833461&notif\_t=group\_comment&notif\_id=1477096621850494

3: Dr. Tran Phuc Anh: 25 years experience in the design and manufacturing all kinds of driver and switching power to supply an AC or DC for various types of equipment. He also has experience in compiling some curriculums of switching power as the solution of efficient power saving methods enabling the creation of new types of ballast that is better than the traditional type of ballast being used commonly:

http://tri-heros.net/vi/news/Giao-trinh-khoa-hoc-ky-thuat-cong-nghe/Giao-trinh-Nguon-9/