



TECHNOVATE

INSIDE

Fostering the Solar Industry
Ameliorating the TVET Services
Revolutionizing Industrial Manufacturing
Testimonial of TUSDEC/EU TVET Programme
Rural Salvation through Off-grid Electrification

ISSUE 5
Newsletter

TECHNOLOGY UPGRADATION AND
SKILL DEVELOPMENT COMPANY

Editorial



TVET – A Road to Economic Restoration

A country must acknowledge the accumulation of skilled human capital as an inherent element of policy framework aiming to create socio-economic upheaval for the accomplishment of its development goals. Incessant support to the TVET sector can certainly contribute in the formation of a competitive and productive manpower upgrading the economic façade of the country.

Pakistan is aggravating on its population with daunting figures of poverty; every third Pakistani is caught up in the vicious cycle of poverty estimating around 58.7 Million. Lack of education, poor governance, inflation, non transparent resource allocation and

lack of safety nets are a few highlighting reasons ascribed to escalating poverty numbers. To roll the economic wheel and prosperity, there is a need to enumerate the literacy rate but also to cultivate the youth in employable trades. The current infrastructure of TVET sector is not capable of servicing the rampantly rising population flaring the unemployment figures further. The acclivitous population pyramid signifies Pakistan among the fastest growing labour forces with an addition of 1.2 million people every year. The infrastructural support is an obstruction to pass over for the transformation of potential youth dividend into productive and contributing human capital. The industry

demands a million skilled workers but our current system can only contribute 100,000 skilled people in the market. Presently there are only 1647 institutes working in the formal TVET sector providing technical skills to 315,000 youth and only 2.5 percent have received the on-the-job trainings. This depicts that the competence level of our local workforce is meek to efficaciously contribute in enterprise productivity and competitiveness.

Government of Pakistan acknowledges the significance of technically sound human resource and the value of TVET in the economic restoration of the country. The government has kept poverty reduction and human resource development at the heart of every strategic policy framework and is embedded in Vision 2025. GoP initiated the reformation programme at all tiers to bridge the gaps in the fragmented structure through garnering support from international donors. TVET Sector Reform Programme is based on the parameters of access, quality, equity, relevance and service delivery of TVET sector. The programme calls for a brisk involvement of

public and private sector including federal/provincial governments and TVET institutes.

Asserting TUSDEC's confluence to the significance of TVET overhaul, the company is engaged in the implementation of two gargantuan projects co-funded by the Delegation of European Union to Pakistan for supporting TVET sector for the socio-economic uplift of rural marginalized communities of KP, FATA, AJK and Sindh. TUSDEC has conducted numerous courses of vocational and technical trainings, on-job trainings and women oriented vocational courses aligning itself to the orientation of realizing Government's vision. TUSDEC has been collaborating with BISP, BBSYDP, PSDF, USAID, GiZ and NAVTTC in the multiplicity of its skill development efforts. Recently TUSDEC has concluded a skill development programme in the field of solar technology as a premier institute offering technical trainings in solar technology. The vocational trainings conducted in the rural terrains for the marginalized stratas have improved their livelihood prospects and uplifted the economic

profile of the communities. The network of five NIDA centres has been imparting courses in advanced computer applications in order to bridge the digital divide prevailing in the engineering sector of Pakistan. The teaching factory models and skill development centres conceived by TUSDEC are augmenting the economic sphere of the country with the pool of adept and agile human resource.

Several development partners such as USAID, DFID, JICA, ADB, World Bank, European Union and GiZ are playing a pivotal role to bring out a formidable change into the TVET sector of Pakistan alongside the Government. Stipulating the successful execution of the TVET Reform programme and with the productive contribution of TVET stakeholders and partner organization, Pakistan shall be enabled with a fecund TVET structure striving to build a flourishing economy affluent in its human capital.

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From the CEO Desk

The countries surfing in the global limelight have adopted knowledge management as an element to build and uphold their competitive advantages. In my view, accomplishment of knowledge directs the achievement of national aspirations and builds on national integrity.

TUSDEC has been established with the vision of becoming a premier knowledge management company adjoining the fragments of technological advancement and skill development. The company has so far supported various industrial clusters with technologically adapted infrastructure and agile skill base. Steering its focus towards socio-economic development through quality technical and vocational education, TUSDEC has synchronized its visionary streams with the enlightened goals of Government of Pakistan aimed at building a National Skill Base. In collaboration with Federal and Provincial Governments, various international donors and local nonprofit organizations, TUSDEC has been striving to shift the TVET mechanism of Pakistan from a supply driven to a training system that is compelled by the industry's demand for skill in the curricula, training methodologies and foremost the areas of training. From training the managers, machine workers and acute product design engineers to employable skills disbursement for vulnerable groups, TUSDEC has successfully carried through each strand of industrial support.

Interpolating the service profile, the company has broadened the ambit of its operations by implementing TVET reform projects of the Delegation of European Union in KP, FATA Sindh and AJK. Training of Trainers sessions in OB trades were conducted for refurbishing the teaching and training methodologies for better access, quality and

service delivery of TVET. These two mega-scale projects will capacitate the youth with skillsets and haul them into productive members of the mainstream economy. I feel pride to enunciate that the company is also working for the capacity building of women with modest socioeconomic backgrounds and have launched vocational trainings in conventional and non-conventional trades to fuel their economic melioration.

Upholding to the strategic commitments, we are substantially pursuing to corroborate various industrial sectors of Pakistan. TUSDEC aims to tap various industrial niches in terms of the provision of latest technology and skill cultivation to expand the yielding sectors for national economy. Pursuing the orientation, pervasive assessments in plastics, automotive, renewable energy, footwear and technical textiles have been initiated to address the lacunae hampering the progression of the industrial clusters on international façade. TUSDEC is also establishing three Light Engineering Centres in Lasbella, Hyderabad and Peshawar outfitted with modern machines & equipment to provide precision manufacturing solutions and trained manpower to the local industries while augmenting the employment prospects and economic activity in the area.

Here I would like to take the opportunity to vouch on my organizational commitments towards excellence while valuing organizational ethics and integrity. We at TUSDEC are determined to establish a prosperous Pakistan through venturing in diverse orbits of industrial and socio-economic development with high-grade technology and adept manpower in order to connect Pakistan to the global value chain.

News & Updates

MOIP Sojourning TUSDEC Head Office, Lahore

Minister for Industries and Production Mr. Chulam Murtaza Jataoi visited TUSDEC (Technology Upgradation and Skill Development Company) head office, Lahore to review the company's intervention in accord to its strategic commitments. The Ministerial

delegation was apprised on TUSDEC accomplishments over the years of its establishment, progress on its running projects and imminent contemplations towards new technological horizons for industrial support. The Minister extolled TUSDEC interventions to support the industry with the provision of sophisticated technological solutions and technical manpower and emphasized on the further expansion of the programmes in emerging industries like solar technology. The Minister was also briefed about the progress on three engineering support centres being established at Peshawar, Lasbella and Hyderabad. The centres will facilitate the SMEs operating in the three provincial territories with the affluent support in precision manufacturing, product design, training and technical consultancy while augmenting the livelihood opportunities for local workforce. The initiative was avidly

commended by the Minister, as he showed expectancy for a socioeconomic amelioration of the industrial estates pertinent to these light engineering support centres.

Minister MOIP Mr. Chulam Murtaza



Jataoi lauded TUSDEC for its efforts in contemporary technical skill development through which 12000 people in various technical and engineering trades have been trained and another pool of 12000 is going to be trained in KP and FATA under the project of TVET sector reform. The Ministerial delegation visited the facilities at CR&DI (Cement Research and Development Institute) and NIDA (National Institute of Design & Analysis) and showed great satisfaction on the centres' operations. TUSDEC entire crew of senior managers accompanied by the CEO Mr. Basit Maqsood Abbasi was present to attend the Minister and guests from MOIP.

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Teaching Entrepreneurship Development to KP Instructors

In the persuasion of Supporting TVET sector in Pakistan, TUSDEC Programme Facilitation Unit, Peshawar organized two sessions of a one day Training of Trainers (ToT) workshop on Entrepreneurship Development at Peshawar and Abbottabad on June 11, 2014 and August 22, 2014. A pool of 41 instructors has been trained as master trainers, selected from the TVET institutes operating in the impoverished areas of KP. The training sessions were headed by Mr. Faisal Mehmood, TVET Advisor at TUSEC. Mr. Faisal apprised the sessions about Entrepreneurship while accentuating the socio-economic benefits that can be extracted from its maturation. Each session was followed by the development of business plans to

pragmatically impart the intricacies for a successful business venture. The participants of the workshop came from the TVET institutes of Peshawar, Nowshera, Charsadda, Swabi, Kohat, Karak, Bannu, Laki Marwat, DI Khan, Haripur, Mansehra, Battagram and Haveliyan. They will be stationed back at their respective institutes to further build the capacity of students in the field of Entrepreneurship. Towards the end of the workshops, the participants were awarded certificates by Muhammad Shafia, Senior Vice President of Khyber Pakhtunkhwa Chamber of Commerce & Industries (KPCCI) and Ms. Amina Ms. Amina Sardar, MPA-KP and also member of standing committee of Technical Education.



Bolstering Skill Profile of Southern Punjab

SkillTech International Karachi, a subsidiary of TUSDEC has successfully initiated the training programme in the domain of Electrical and Electronics Engineering for a pool of 100 students selected from the rural backdrop of Punjab. The trainings are funded by the Punjab Skills Development Fund (PSDF). This association of TUSDEC with PSDF would expand the horizon of internationally recognized qualifications in rural peripheries for a productive human capital to trigger the economic development. After the completion of this course, the successful candidates

would be able to undertake their career as supervisors, technicians, design support engineers etc in electrical and electronics trades. This programme will not only improve the skills and knowledge but will also enhance the employment opportunities of the beneficiaries in local as well as international job market.

Cultivating Youth with Solar Technology Skills

A ceremony has been organized at TUSDEC head office to award certificates to the solar technicians trained by TUSDEC. In the pursuit of enabling technological sophistication to uplift the industry, TUSDEC joined hands with GIZ Pakistan to foster the solar power industry with the provision of technically trained manpower in the specialized areas of Photovoltaics and Solar Water Heating. TUSDEC trained a pool of 125 students as solar technicians to consummate the programme objectives. The programme was co-funded by the European Union, the Embassy of the Kingdom of the Netherlands and the Federal Republic of Germany and implemented through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with National Vocational and Technical Training Commission (NAVTTTC). A meticulous display of candidates' assignments on solar equipment has also been arranged at the high tech solar lab

that the company has established with the cost of 3 million to impart the practical training sessions. TUSDEC has outfitted the solar lab with most modern equipment and engaged seasoned experts from enterprises and solar engineers to contrive curricula for the trainings, punctuating focus on dexterous solar technicians to bridge the gap of skilled manpower in the solar industry. Copulative efforts from public, private and the non-profit sectors to work up the alternate energy sources will certainly help suffice the country's accelerating energy needs on sustainable basis.

Following the certificate distribution ceremony, a job fair was organized by TUSDEC which thronged with numerous employers from the solar industry. The event was attended by the prominent officials from TVET (Technical Vocational Education and Training) sector, public sector and private industries in solar technologies.



NIDA Peshawar Trainees receives Accolades by Provincial Minister



NIDA (National Institute of Design & Analysis) organized a ceremony at Nishtar Hall, Peshawar to award the certificates to the beneficiaries trained by the NIDA centre. The Provincial Minister of Science & Technology, Mr. Shahram Khan Tarakai along with CEO TUSDEC, Mr. Basit Maqsood Abbasi presented awards to the graduates of the programme. NIDA joined hands with the Directorate of Science and Technology; Government of Khyber Pakhtunkhwa to foster the local industry with technically skilled manpower. The programme was funded by Government of Khyber Pakhtunkhwa for the capacity building of technicians/para-technicians through technical training courses to transform them into a productive workforce to trigger the wheel of economy.

NIDA Peshawar has launched a series of training courses in the field of electrical, electronics, mechanical and civil engineering under the programme and apprised the students with an operable curricula with additional emphasize on practical training so that they can effectively deploy the acquired skills for better livelihood prospects. A pool of 1000 trainees was trained in a short time span of twelve months and now they will also be facilitated in finding paid or self-employment avenues. The graduates at the ceremony asserted that they had been imparted with comprehensive theoretical and practical trainings and they are determined to contribute to the development of their country by productively utilizing their learned skills.

Conclusion of Three Month Duration Pilot Phase Trainings



TUSDEC Programme Facilitation Unit, Peshawar has concluded the first phase of three month duration trainings conducted under the project of Supporting TVET Programme in KP and FATA. In the first phase of trainings, TUSDEC has launched three month training programmes in confluence with 18 training institutes from all across KP and FATA region and trained a pool of 599 students in market driven trades assessed through a comprehensive

baseline assessment. Subsequent to the trainings, the students appeared in the examination conducted by TTB (Technical Training Board) and the entire examination process was proctored by TUSDEC and TTB team for transparency. The graduates of the project will be extended with full support to pin-down the employment prospects through mobilising and engaging private sector for paid or self employability.

Developing Teaching Skills in Solar Technology

TUSDEC organized a ToT (Training of Trainers) Programme in solar technology for the instructors belonging to the TVET institutes of Sindh in the month of June. The programme has been organized in collaboration with Research & Development Foundation, Hyderabad. In pursuance of TUSDEC's skill enhancement pursuit, it has inked an agreement with RDF to train two batches of instructors in the specialized area of Photovoltaics. The objective of the programme was to introduce a new



and innovative stream of solar technology in the training portfolio of TVET institutes operating in the remotest of regions to prepare and connect the students with contemporary demand driven market trades for the supply of productive workforce to the industry. The trainers have edified the candidates with latest trends and designing techniques in Photovoltaics. During the two week training sessions, two batches were equipped with practical training along with special sessions on solar cell manufacturing, renewable energy and Competency Based Trainings (CBT), Competency Based Curricula (CBC) and assessment techniques. TUSDEC has instigated an innovative training programme in solar technology and believes that the opposite and evocative trainees would contribute in catalyzing the development and promotion of renewable energy sources.

Training of Trainers at Lahore

TUSDEC has organized a TOT (Training of Trainers) programme in Lahore to train 14 TVET (Technical Vocational Education and Training) instructors in the field of motor cycle repair and maintenance. 15 days TOT session has been organized by TUSDEC as a consortium partner with ACTED (Agency for Technical Cooperation and Development) and PMN (Pakistan Micro-finance Network). Three years project is aimed at training 75 TVET instructors from seven districts of Pakistan who will further train 8000 men and women from rural and underprivileged communities. To attend the TOT of motorcycle repair, the instructors were mobilized from Muzaffarabad, Swat, Upper Dir, Lower Dir, Shikarpur, Kashmir and Jacobabad. After an extensive training course, the instructors have been stationed back to the institutes in their respective districts where they would be training 1000 men as motor cycle mechanics in an estimated span of two years. The field of motor cycle mechanic has rarely been adopted to be taught formally at various technical and vocational training institutes operating in marginalized areas of the country. Formal training in this area would enhance the service quality while enabling better livelihood opportunities for the area inhabitants. The programme on conclusion after three years aims to improve the access, quality and service delivery of TVET sector for rural, marginalized communities through innovative approaches. The programme intends to transform the local TVET set-up with upgraded curricula, instruction facilities and training methodologies for a consequential socioeconomic betterment of these impoverished areas.



Top Grade Cement Testing and Training Services

CR&DI (Cement Research and Development Institute) has augmented its cement testing portfolio with the addition of PS: 5313-2014 and PS: 5314-2014. These latest standards have recently been embraced by PSQCA and CR&DI took an endeavor as a pioneer launching the testing for common and masonry cement at the institute. The institute has facilitated the construction industry with exceptional service standards and inducted internationally accepted quality

parameters in testing through its state-of-the-art testing facility to enhance exports and channelize the accession of local industry into global market. It is extending meticulous cement testing services to notable construction projects of Bhasha Dam, Motor Way M4 Project, Neelam Jehlum Hydro Power Project, Guddu Power Plant, Metro Bus Project, Bahria Town Projects, Benazir Bhutto International Airport Islamabad and Mangla Dam Raising Project.



Honoring the Cooperation !

Striving for interdependence is an answer to the illusion of staunch independence. True interdependence is the foundation of a functioning and progressing system where idealistic constitutions and superlative actions when enforced in harmony through assentient associations vignetting greater good for the overall beings.

"As long as there is poverty in the world I can never be rich, even if I have a billion dollars. As long as diseases are rampant and millions of people in this world cannot expect to live more than twenty-eight or thirty years, I can never be totally healthy, even if I just got a good checkup at the Mayo Clinic. I can never be what I ought to be until you are what you ought to be. This is the way our world is made. No individual or nation can stand out boasting of being independent. We are all interdependent." - Martin Luther King

The transcending profile of initiatives to effectuate its doctrine of technology upgradation and skill development hurred TUSDEC into credible and reclaimable synergies to capitalize on the common objectives while minimizing redundancy and improvidence. Over the years of its operations the company has attained excellence on various fronts where there exists a vivid margin of development and improvement. Creating the ideology of synergistic efforts, TUSDEC has entered into a few new alliances with public and private sector organizations credited for their contribution towards national development.



Joining hands with UET Peshawar

TUSDEC has joined hands with UET (University of Engineering and Technology) Peshawar through an MoU to facilitate the key industrial sectors in the country in their ambit of sophisticated technology transfer and relevant skill development. The MoU binds both organizations to identify the need to induct contemporary technology and pertinent skills among the strategic industrial sectors. Both organizations would conduct joint sector studies and researches to aid the industry in amplifying its productivity and competitiveness to gain grounds specifically in export markets and will help in the creation of a knowledge-based economy. Effective liaison between the industry and academia sets the concrete grounds for sustainable economic growth. TUSDEC is contemplating various interventions of technology transfer and skill base development for various industrial sectors where each project is reared by a divisive sector study, hence the MoU will help the company in a seamless and more precise contemplation and implementation of the programmes. Mr. Basit Maqsood Abbasi, CEO TUSDEC and Mr. Imtiaz Hussain Gillani, Vice Chancellor UET Peshawar penned the MoU in Lahore at an affable gathering held at HEC regional office.



Inked an MoU with CECOS University

On January 10, 2014, TUSDEC signed an agreement with CECOS University Peshawar for the establishment of a state-of-the-art engineering support centre in the premises of CECOS Industrial Liaison Centre in Peshawar. The centre will extend the modern product design, fabrication solutions, training and technical consultancy specifically to the Small and Medium Industrial units comprising the light engineering centre in KP. TUSDEC has been cognizant to the significant role of academia to uplift the national industry and in the same vevre, TUSDEC has reached on an agreement with CECOS University to erect the high-grade engineering support centre within the land site spared at Industrial Liaison Centre keeping in view its immensely suitable proximity to the industrial units operating in KP. The agreement signing ceremony held at TUSDEC Head Office in Lahore where Mr. Engr. Muhammad Tanveer Javed, President CECOS University and Mr. Basit Maqsood Abbasi, CEO TUSDEC penned the agreement. The central objective of this agreement is to enhance linkages between the industry and the academia in the facilitation pursuits for the uplift of the industry at large.



Collaborating with Bureau of Quality Management

TUSDEC has linked up with BQM (Bureau of Quality Management) in Lahore through a Memorandum of Understanding guiding both organizations to pool their efforts and available resources to carry out programmes of HRD (Human Resource Development). In its mission of industrial development, TUSDEC deems to upscale the prospective and employed workforce in various industrial clusters to promote effective business practices specifically among the small and medium enterprises. Under the MoU, both organizations will mutually initiate various ventures of human resource development through seminars, conferences and other avenues of confabulation. Both organizations will coordinate in the areas of quality excellence & standardization, management training and consultancy to feed the rudiments for the creation of a knowledge based economy. Mr. Basit Maqsood Abbasi, CEO TUSDEC and Mr. Fazal Ahmed, CEO BQM penned the MoU at a formal gathering organized at TUSDEC Head Office in Lahore.



Collation with PIRT

NIDA has joined hands with PIRT (Professional Institute for Research & Training) through an MoU to promote technical and professional education and training for industrial proliferation and economic melioration. The MoU binds both organizations to facilitate one another in pursuing joint programmes to magnify the accessibility, quality and service delivery of technical & professional education and training through inducting contemporary technology and pertinent skills among diverse industrial sectors. The association will conduct and organize training programmes in diverse technical areas including Advanced Construction Materials, Building Materials & Construction, Environmental Impact Assessment, Structural Analysis Program, ETABS & SAEF and TQM etc. to abridge the dearth of adroit and technically adept manpower for technological proliferation. Institutional collaborations serves concrete grounds for sustainable economic growth and NIDA-PIRT collaboration is oriented towards efficacious service delivery and hyperbolic outreach by consolidating learning, knowledge sharing, capacity building, quality and cost effectiveness. The association will help the company in contemplating more precise skill development interventions. Mr. Basit Maqsood Abbasi, CEO TUSDEC and Mr. Shahid Warsi, CEO PIRT signed the MoU in Lahore at an amiable gathering held at TUSDEC office.

Stroke of Accomplishment

Fostering the Solar Industry

Pakistan is exposed to staggering amount of solar radiations. The only obstruction is the appropriate utilization of this reclaimable resource for sustainable power generation to surpass the acute energy perturbations. Sun leaves ajar a door of comparatively greener energy production source and opting for an ecologically friendly source is a step towards entering into a league of Greener Economy which will also constrict us from being the flagrant offenders for technologically driven environment devastation.

TUSDEC is empirically inclined to be an ecologically conscious organization and has always strived to promulgate technologically sophisticated solutions aimed at rectifying the malfunctions jeopardizing our eco-system. While substantiating its doctrine to address the pressing issue of the hour - "POWER", TUSDEC has been pursuing distinctively diverse initiatives to propagate the sources and modes of renewable energy production considering it a viable solution at hand. Hailing through the same docket, the company has successfully concluded an action of skill development to assist the solar power sector of the country in collaboration with GIZ Pakistan. TUSDEC implemented a one year programme of skill development in solar technologies. The programme was co-funded by the European Union, the Embassy of the Kingdom of the Netherlands and the Federal Republic of Germany and implemented through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in collaboration with National Vocational and Technical Training Commission (NAVTC).

Under this programme 125 candidates were trained in the areas of Photovoltaics and Solar Heating Systems (SHS). TUSDEC initiated the programme by launching a three months course of Photovoltaics (PV) on September 02, 2013 recruiting 50 candidates from all over Pakistan. To emphasize the practical component of the trainings, a state-of-the-art solar lab was setup at NIDA Lahore. TUSDEC engaged immensely proficient trainers and consultants from the industry to devise an operable and

market-driven curriculum for the courses. Placing an emphasis on pragmatic aspects of training, on-site demonstrations were also organized specifically in the disciplines of Water Pumping and Solar Dryer where master trainers delivered the lectures, employing the infrastructures originally deployed in Lahore and the suburban territories of Shiekhupura.

The Programme Skill Development in Solar Technologies was contemplated as a result of an extensive and inclusive research assessment and analysis comprising of focus groups and in-depth interviews with major Enterprises (Suppliers, Manufacturers and Assemblers) of solar industry. The assessment divulged huge dearth of local trained manpower in the industry stymieing major ascension in the solar energy sector in spite of its tremendous need and viability for the country. The curricula for the courses were also formulated in perfect cohesion with industry's demand. The candidates with a diploma in mechanical and electrical engineering or with an experiential base in the similar fields were enlisted from all over Pakistan, while industrial nominations were also encouraged for the programme.

The solar lab was setup with an investment of more than PKR 3 Million at NIDA Lahore and is outfitted with the most modern equipment to punctuate more focus on the practical and industry driven trainings in solar technologies ascertaining a robust absorption of graduates in the job market. It was ensured that the graduates will be imparted with comprehensive theoretical and practical trainings in the testing, installation and trouble shooting of numerous kinds of solar panels which are currently in demand by the solar industry in the country.

The one-year programme was culminated in March 2014 by lauding the performance of the programme beneficiaries in a certificate distribution ceremony. Following the certificate distribution ceremony, a job fair was organized by TUSDEC which thronged with numerous employers from the solar industry. The event was attended by the prominent officials from TVET (Technical Vocational

Education and Training) sector, public sector and private industries in solar technologies. The programme was focused at rearing the renewable energy sector in Pakistan pertaining to its dire indigence in the running energy crisis by providing technically adept and skilled solar technicians in the market.

Development in the sphere of renewable energy is one of the priority areas that Government of Pakistan and other donors are focusing to propagate and develop infrastructure and skills ensuring sustainable socio-economic development and national prosperity. TUSDEC is cognizant to the need of stimulating innovative approaches in skill development for a bountiful technological intervention in industrial sectors. Technical trainings in conventional trades have germinated massive redundancy among the blue collar workers, it is the need of the hour to set a forward-looking approach for technical skill development to produce both adept and employable youth. The on-tap apposite workforce would also catalyze the development and promotion of renewable energy sources. In order to harness the vital prospects of building a solar power industry in Pakistan, TUSDEC collaborated with GiZ Pakistan for implementing "Skill Development in Solar Technologies" under the initiative of FIT (Funds for Innovative Trainings). Adding to the fibril are many projects of skill development and technology transfer that the company is implementing to facilitate the sector with the provision of sophisticated technology and technically adept workforce. TUSDEC is contemplating to develop a Common Facility Centre for Solar Energy offering salubrious services including testing & certification, indigenous product development, training and consultancy besides pursuing initiatives of providing technically equipped manpower to the industry. Government of Pakistan and multi-funding agencies have exhibited interest in TUSDEC initiatives aimed at attaining sustainable solutions to energy perturbations in Pakistan. Copulative efforts from public, private and the non-profit sectors to work up the alternate energy sources will certainly help suffice the country's accelerating energy needs on sustainable basis.

An Ace of Facilitation

Recognizing the significance of TVET sector evolution for the economic restoration of the country, TUSDEC has conducted numerous TVET (Technical and Vocational Education and Training) activities. The aim is to effectively utilize the expansive human capital for improving the overall prevalent socio-economic scenario. The adept workforce, trained by TUSDEC in multifarious vocations through its network of skill development centres scattered all over Pakistan, are significantly contributing in the socio-economic development. TUSDEC ideology embeds the concept of inculcating skills in the youth along with technology induction in industrial sectors to connect Pakistan to the global arena. The company ciphered that the socio-economic restoration of marginalized communities is attainable through cultivating in them skills and realized through equipping the quake survivors with skills for sustainable rehabilitation.

Skill Development Centres

In 2005, when the earthquakes created a havoc leaving countless families homeless with their properties damaged significantly. The need to revive the lost skills was revealed as a result of assessments for sustainable rehabilitation. Every effort at the time was diverted to relief thus, TUSDEC planned to serve the notch of rehabilitation through enabling livelihood opportunities to the affected population. Pursuing the assessment insight, TUSDEC established 04 Skill Development Centres in Battagram and Khaki within a short time span of 3 months to help the victims regain their source of living through capacity building while assisting the cottage industry which proceeded them towards economic recovery and enhanced sustainable rehabilitation. The centres brightens the life of around 6000 earthquake victims who have all either gained employment in various service sector establishments, managed to start their own enterprises or contributing in national prosperity through remittances.



Technical Upgradation of Garment Industry



The textile and garments sector is indisputably a major breadwinner of Pakistan but was in need of aid in order to enhance its production capabilities to counter international competition. With the mission to upgrade industrial sectors through skill enhancement, TUSDEC put in place a Training of Trainers (ToT) programme, TUGi (Technical Upgradation of the Garments Industry), to facilitate the exporters and manufacturers of textile and value added garments. Under this programme, 24 foreign experts were engaged on a long term basis for transfer of technical & specialized knowledge in the field of sewing, dyeing, finishing, printing and machine maintenance. The programme trained 96 workers of the 12 beneficiary companies as master trainers who subsequently transferred the skills to their factory workers. Considerable production improvements were reported by the beneficiaries after undergoing the perceived upgradation.

National Institute of Design & Analysis

Reverse engineering, product designing and prototyping are crucial elements of the production process in any industry. These processes require designing and developing prototypes in 3D using CAD/CAM tools. Until a few years back, the penetration of CAD/CAM was not nearly as widespread in the industry as was needed. In order to rectify this, TUSDEC established NIDA (National Institute of Design & Analysis) offering industry specific CAD/CAM training courses which boasted five centres in Lahore, Karachi, Peshawar, Sialkot and Quetta. The courses conducted covered basic to advanced level design techniques. Since commencement, the centres have trained more than 12,000 students and industry professionals who are serving in various local as well as international firms.



SkillTech International



Cognizant of the unfortunate shortcomings of local workforce in international job market, the company established SkillTech International in Karachi with the goal of instilling modern technical skills in the youth to instigate employment prospects in both local and international job markets. SkillTech International steers trainings contesting the international standards & curricula and has linkages with City & Guilds UK and NED University of Engineering and Technology Karachi for the accreditation of various short courses. Since its inception, it has executed training programmes in Electronic & Electrical Engineering, Automation & Control Engineering, Chemical Engineering, Basic Information Technology, Construction Engineering, Renewable Technologies, Communications and Management Skills. It has arranged customized training solutions for numerous organizations and altruistic wings. Upon gaining extensive experience in training and development, the centre currently plans on inaugurating its own DAE programme.

Skill Development in Solar Technology

Recognizing the acute energy shortfall in the country, TUSDEC introduced skill development programmes in the solar technology in confluence with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The programme spanned over a period of one year during which courses of three months duration were conducted in the areas of Photovoltaics and Solar Water Heating Systems. TUSDEC formulated curricula and engaged seasoned experts to deliver the trainings along with onsite practical demonstrations. TUSDEC is pursuing the initiative and is now working alongside multiple organizations and Government of Pakistan to overcome the dearth of skilled workforce in renewable energy.



Supporting TVET Sector in KP, Sindh and AJK

TUSDEC has partnered with ACTED (Agency for Technical Cooperation and Development) and PMN (Pakistan Microfinance Network) to implement an EU funded project in the areas of Upper Dir, Lower Dir, Swat, Muzaffarabad, Kashmir, Shikapur and Jacobabad. The project is aimed at improving access, quality, equity and service delivery of TVET services through innovative approaches to stipulate improved livelihood opportunities for the beneficiaries. TUSDEC, as a programme facilitator, developed curricula and executed Training of Trainers (ToT) workshops in Building Electrician, Refrigerating & Air Conditioning, Motorcycle Mechanic, Industrial Electrician, Solar Technician, Generator Technicians, Dress Making and Hand/Machine Embroidery. A pool of 75 master trainers are cultivated with contemporary teaching and learning methodologies and are now stationed back to improve access and service delivery of trainings. The curricula prepared by TUSDEC for the trades have received wide acclamation and adopted by National bodies as a benchmark in their efforts of standardization.



Vocational Training Courses in Punjab & Sindh

TUSDEC organized short term skill development programmes in multidimensional trades (plumbing, masonry, gas & electric welding etc) for PSDF (Punjab Skill Development Fund), Engro Foundation, PCESSDC (Pakistan Chemical & Energy Sector Skills Development Company), BISP (Benazir Income Support Programme) and BBSYDP (Benazir Bhutto Shaheed Youth Development Programme) to build the national skill base. The trainees were apprised on the fundamentals of entrepreneurship, basic life skills, business ethics and small business management to help the vulnerable in flood affected communities skillbase in inflation livelihood prospects while guaranteeing sustainable rehabilitation.



Women Empowerment

TUSDEC initiated women empowerment programmes through its network of associates in the field of fashion design, CAD/CAM, embroidery design, dress making, accessories design and making, home crafts, footwear, digital lawn design & printing and product packaging. Pursuing its commitment towards gender equity, TUSDEC collaborated with First Women Bank Limited and launched vocational trainings under USAID's Gender Equity Program. Similar collaboration was established with PNWA and organized technical trainings in both conventional and advanced trades to empower women from marginalized socio-economic fractions. TUSDEC's women empowerment initiatives have revealed magnificent transition of trained women becoming entrepreneurs augmenting their family income streams.

TUSDEC is striving to realize its mission of upgrading skills and through copulative efforts of its stakeholders; the company has earned a reputation of being a premier project management company. The project portfolio of TUSDEC is set out to alleviate poverty through enabling livelihood generation of able members of the populace while ensuring the perpetuity and propagational impact of these initiatives.



Revolutionizing Industrial Manufacturing

In recent years, the scramble for competitive advantage in manufacturing largely revolved around finding new and abundant sources of low-cost labor. However, as wages have risen rapidly in China and other emerging markets, manufacturers worldwide have been forced to achieve dominance the old-fashioned way by improving their productivity. A confluence of forces—falling prices and rising performance of enabling hardware and software, the digitization of industry, increasing connectivity, and mounting pressure on manufacturers to be more flexible and eco-friendly—is accelerating the adoption of the next generation of “advanced manufacturing” technologies. These technologies encompass a set of highly flexible, data-enabled, and cost-efficient manufacturing processes, offering a range of benefits, which combined, could redefine the economics of global-manufacturing competitiveness in a number of industries. In fact, leading-edge manufacturers, such as Ford and General Electric, are already using some of the most advanced tools to make high-precision components. This is because advanced-manufacturing technologies dramatically increase flexibility by making it feasible for manufacturers in various industries to offer customers the option of customization. In addition, manufacturers are enabled to make products in small batches for specific customers; thereby adjusting production lines in response to design changes, and speeding up time to market by generating prototypes rapidly. Advanced-manufacturing technologies can boost innovation as well, allowing manufacturers to create product prototypes that are impossible to make cost-effectively employing conventional processes. As of now, we believe that the following five technological tools have the greatest potential to influence the manufacturing landscape and improve productivity in the years ahead.

Autonomous Robots are a new generation of automation systems linking industrial robots with control systems through information technology. These robotic and automation systems are equipped with sensors and standardized interfaces for complementing—and, in some cases, eliminating—human labor in many processes. Thus enabling manufacturers to cost-effectively produce items at smaller scales and improving their ability to enhance quality.



Integrated Computational Materials Engineering (ICME) allows creation of computer models of products, simulating their properties before they are fabricated—rather than building and testing multiple physical prototypes as a result of which, engineers and designers can develop products in a better, faster, and cheaper manner.

Digital Manufacturing takes advantage of the virtualization technologies and can be used to generate complete digital factories that simulate the entire production processes. Among other things, digital simulation can help engineers save time and money by optimizing the layout of a factory, identifying and automatically correcting flaws in each step of the production process, and modeling product quality and output. Entire assembly lines can be replicated in different locations at relatively lower costs.

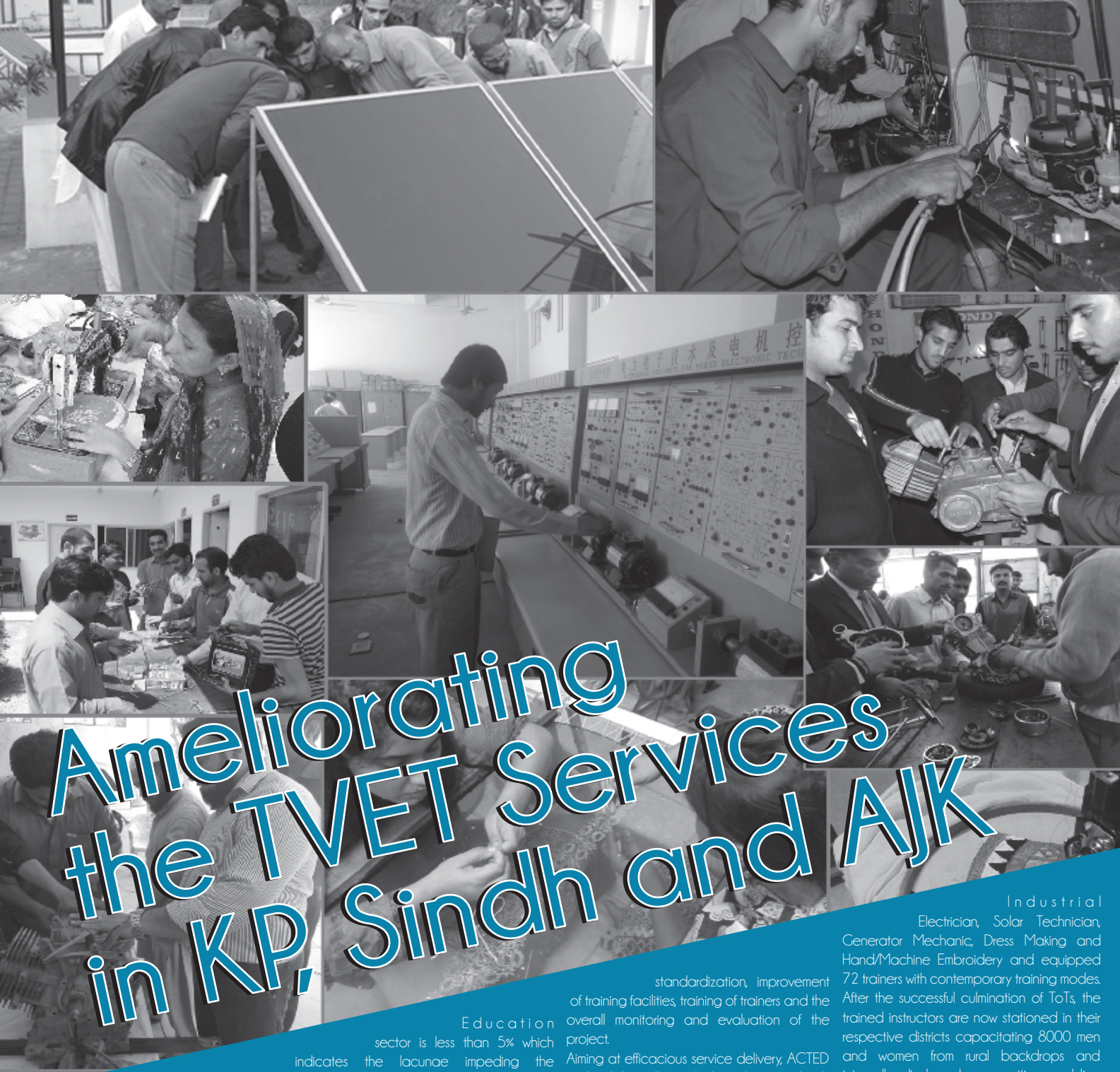


The Industrial Internet and Flexible Automation establishes linkages between various manufacturing hardware interfaces so that the machines are able to communicate with one another and automatically adjust production parameters based on data generated by sensors. They can essentially “see” into the supply chain.

Additive Manufacturing, also commonly known as 3-D printing, creates three-dimensional objects based on digital models by successively depositing thin layers of materials. Such processes are already starting to be used for making prototypes in some industries, including aerospace, automotive parts, and basic consumer items. In the future, these processes are expected to be used to build small batches of new kinds of products made out of one solid piece of material, such as hollow spheres that have no seams. The material science of 3-D printing is still evolving, with significant advances required to make it viable and cost-effective for many substrates and particularly for end-use parts.



Leading-edge manufacturers are already employing each of these advanced-manufacturing tools to varying degrees with remarkable results. Rapid advances in information technology, sensors networking, and nanomaterials have dramatically lowered the costs of leading-edge manufacturing processes, simultaneously enhancing their performance. Slowly but surely, digitization has begun to permeate every aspect of the production process, from engineering to management of the supply chain to the factory floor—making production systems more intelligent and highly networked. Factories of the future will combine the efficiency of mass production with customized manufacturing: each machine will be capable of producing a variety of bespoke goods that are made specifically for the needs of customers—something that is difficult and often prohibitively expensive, to accomplish using conventional manufacturing processes. According to existing research in this domain, a combination of these tools could help reduce production costs (excluding raw materials) by 20 to 40 percent. Advanced-manufacturing technologies will enable companies to manufacture goods faster, better, and cheaper—leading to quantum leaps in productivity.



Ameliorating the TVET Services in KP, Sindh and AJK

Pakistan as a society is marked with extreme socioeconomic marginalization specifically in the rural terrains and low income communities. 63% population is residing in rural peripheries and has limited access to quality education and over-reliance on on-farm livelihoods which collectively integrates to hike the poverty level. The picture gets grimmer with women being confined in the boundary walls of their homes and the perilous indebtedness has engulfed the rural inhabitants deeper in the vicious cycle of poverty. The need is to stimulate an economic and social overhaul through investing in human capital, enabling people to learn skills and knowledge while shaping the attitudes making them productive members of the society. This will be achieved by focusing on technical and vocational education which has drastically aided momentous economies like Japan and Germany in their economic and social superiority. Presently, the enrolment rate in Technical and Vocational

Education sector is less than 5% which indicates the lacunae impeding the promotion of technical and vocational education in Pakistan. Recognizing the significance of TVET in economic progression and consummating the strategic orientation of skill development, TUSDEC has teamed up with ACTED (Agency for Technical Cooperation & Development) and PMN (Pakistan Microfinance Network) to implement a three year programme co-funded by the Delegation of European Union to Pakistan aiming at supporting the TVET sector in AJK (Azad Jammu & Kashmir), KP (Khyber Paktunkhwa) and Sindh. The objective of the project is to improve the access, quality, equity and service delivery of TVET sector for rural, marginalized communities through innovative approaches. The project intends to reinvigorate the TVET service profile of the impoverished and rural terrains specifically Swat, Lower Dir, Upper Dir, Jacobabad, Kashmore, Shikarpur and Muzaffarabad. TUSDEC is facilitating the partners in perking up the TVET scenario through curricula development &

standardization, improvement of training facilities, training of trainers and the overall monitoring and evaluation of the project. Aiming at efficacious service delivery, ACTED probed the skill needs through an in-depth market assessment divulging a set of 8 trades, signifying enormous potential of linking the skilled workforce with job market for economic prosperity. Encapsulating the findings from the assessment, TUSDEC engaged the most proficient curricula development experts to formulate innovative, progressive yet immensely adaptive course of study. TUSDEC has not only upgraded the curricula and instruction methodologies but also refurbished the TVET institutes with state-of-the-art machines and equipment. The service philosophies of shortlisted TVET institutes from KP, Sindh and AJK have been upgraded in terms of its capacity and resources to ensure efficacy in the training delivery. TUSDEC postulated its commitment to strengthen the TVET façade of the regions by orchestrating the Training of Trainers sessions for the area inhabitants. The company has organized TOT sessions for the trades of Building Electrician, Refrigerating & Air Conditioning, Motorcycle Mechanic,

Industrial Electrician, Solar Technician, Generator Mechanic, Dress Making and Hand/Machine Embroidery and equipped 72 trainers with contemporary training modes. After the successful culmination of ToTs, the trained instructors are now stationed in their respective districts capacitating 8000 men and women from rural backdrops and internally displaced communities enabling them to sustain their homesteads and generate their livelihood. The approaches deployed by TUSDEC for the realization of project objectives are inclusive; enhancing the access of area inhabitants to qualitative technical and vocational education. Successful accomplishment of ToTs has set forth the direction of company towards the second phase of the project execution - Monitoring & Evaluation. TUSDEC will now be monitoring and evaluating the project including the trainings and the impact on the livelihood chancels of the local community. The company is presently assertive in supporting the TVET sector of Pakistan realizing a retrograde connection of TVET with economic progression and the rewards can be capitalized if the potential workforce is transformed into an adept and productive human resource for the country.

Notes of Testimony!

Illuminating the home!

Sultan Zeb, 26 is a recent graduate of a TVET course for electricians. Before the course, having left school after he matriculated – Sultan was earning Rs 10,000 from the small karyana store he had set up in his home. Tightly knitted community in FATA garnered a loan for his workshop. Today, he is an owner with no liability and earning three times as much.



Ray of Hope!

Nasser Khan is 19, but could easily pass for a lot less. Yet his evident bashfulness belies a strong entrepreneurial spirit. For the star Autocad student of TUSDEC EU TVET programme has already won two contracts, just three months into his six-month course. Nasser embodies hope among his community and classmates for better livelihood opportunities.



Sewing the Dreams!

Stitching clothes at home was not helping Bibi Asliya suffice her with expense roll. Then she met the fortune and complimented her sewing skills with a professional embroidery course offered under TUSDEC/EU TVET programme at Chitral. Asliya is an entrepreneur and providing embroidered items to her community women and is making decent money with no middlemen hindrance.





Carving Lustrous Future!

Two months in to the three-month course, already 5 of the trainees have started working in carpenters alongside their course work. A class of 25 in Lower Dir is putting the finishing touches to a series of stools. They are assertive that they will now work productively to fuel their family's income wheel and they seem to be right. 05 of the classmates have started working as carpenters alongside trainings paving their way towards social security.

Set to Earn the Dreams!

Rabbaniya, an unemployed graduate at Chitral is stitching clothes accumulating a meager monthly income of PkR 6000. Then an opportunity knocked her doorsteps and she enrolled herself in an advanced tailoring course by TUSDEC. Now after three months of course culmination, Rabbaniya has setup an enterprise, doubled her monthly income and training other community women for decent living.



Journey from despair to hope!

Haseena 17, from Chamkani village has completed 3rd standard in her basic elementary education. She is four sisters & three younger brothers and her father is a gardener with the monthly earning wages of 10,000 PKR. A visit by a team from TUSDEC transformed her despair into hope lessening her miseries of life through employable skills. A delightedly faced girl Haseena; after hearing about the EU funded programme not only enthusiastically enrolled herself but gathered community support and registered 15 other girls for the TVET training programmes.

TUSDEC Way Forward

Amassing the command from its own mission of latest technology transfer and pertinent skill development, TUSDEC contemplated projects for the establishment of Common Facility Centres for Automation and Solar Industries



Pakistan Institute of Industrial Automation (PIIA)

TUSDEC aims to establish PIIA (Pakistan Institute of Industrial Automation) in order to render a training platform to consummate the shortage of skilled manpower in the local automation industry. A pervasive baseline assessment has revealed the dearth of formally trained workforce for equipment maintenance, troubleshooting, installation and programming of pertinent equipment. PIIA will not only act as an ordained institute for manpower training but will also steer the planning and implementation of PLC (Programmable Logical Controller) and Industrial Automation Projects in the country. The institute will extend consultation and advisory services acting as an adept solution provider for industrial automation problems faced by the Industry. PIIA will also substantiate the concept of industrial incubation under which, infrastructural support and consultancy will be extended to the Automation Equipment Manufacturers or Suppliers for setting up or upgrading their own labs and production units. Figures from Pakistan Bureau of Statistics reveal that import of modern machinery and equipment during 2010-11 was worth USD 6,547 million which then rose to USD 7,167 million in 2011-12. The accelerating figures indicate the mounting demand of PLC based systems in Pakistani industry. PIIA, a CFC intervention of TUSDEC, will serve the mounting PLC demand of Pakistani industrial sectors in most efficacious ways by supplying them with skilled manpower trained on latest equipment in the sphere of automation thus helping the industry to recuperate its productivity to achieve global competitiveness.



National Institute of Solar Energy (NISE)

Energy shortages have cost the country up to 4% of GDP over the past few years, slurring industrial sector growth and exacerbating unemployment. The Government of Pakistan's National Energy Policy 2013 emphasized on inexpensive power generation by using indigenous resources. Solar Power generation is one possible solution being largely dependent on the Sun with PV Solar Panels as an intrinsic element. Presently, about 95% PV Solar Panels are being imported while hardly 5 % demand is met through local production in private sector. More than 90% of these panels are non-certified and non-graded. Their efficiency ranges from 8% to 15% with price per Watt variations from PkR 50 for D-Grade to more than PkR 100 for A-Grade Panels. With financial and efficiency constraints, there is a need for the testing and certification of PV panels. In this vein, TUSDEC administered an extensive baseline assessment and divulged the need of a dedicated institute which could extend international standard testing, skill development and advisory services for sector dominance at national forum. The institute will be aided with contemporary technology for the production of PV Solar Panels using Mono Crystalline Silicon Cells and ensure requisite quality checks. The institute will promote indigenization by furnishing a one-stop solution, contributing towards national acclivity through import substitution, job creation, enhancing productivity, creativity and innovation by a bundled service portfolio of solar products testing, trainings in solar technology and technical assistance in terms of consultation and common facility services.

Engineering Support Centres

In its quest to facilitate the industrial turf of the country, TUSDEC is in the process of establishing three Engineering Support Centres in collaboration with Asian Development Bank as a part of Government of Pakistan's 5 years SME Sector Development Programme. TUSDEC Project management Unit (PMU) is administering the implementation of two Light Engineering Support Centres in Peshawar and Lasbella whereas an Engineering Support Centre is being setup in Hyderabad.



HESC - Hyderabad Engineering Support Centre

In order to address the dearth of technical assistance in manpower training in the metal manufacturing, light engineering and automotive sectors, TUSDEC is implementing Hyderabad Engineering Support Centre with a total cost of PKR 223.49 Million. The centre will facilitate the agricultural equipment, Automobile, Plastics and Metal Production units with precision design and development, technical assistance, CAD/CAM solutions, precision manufacturing on modern CNC Machines. The centre will also offer short courses and diplomas for pertinent skill development and will extend advisory services for product and process quality enhancement. The centre is progressively heading towards culmination and will soon start its operations to propel great socioeconomic improvement in the area with numerable job prospects and common facilitation of modern machinery.

LEUC - Light Engineering Upgradation Centre Baluchistan

TUSDEC aimed to foster the SMEs in Baluchistan and conducted a need assessment in the area revealing the dearth of support in light engineering sector to support the Automobiles, Steel Products, Electrical Goods and Metal Parts Industry prevalent in Lasbella. The centre is being setup at Hub Industrial and Trading Estate (HITE) Lasbella in close collaboration with Lasbela Chamber of Commerce and Industry. The Centre will be comprised of Fabrication Workshop, Electrical Workshop, HVAC Workshop and Carpentries Manufacturing Workshop whereas there will also be a Quality, Designing, R&D, Skill Development and Technical Training Centre for equipment manufacturing, repair, maintenance, testing and quality evaluation services. The centre will provide certified diplomas in basic and advanced technical trades to the local manpower which will enumerate the job prospects for inhabitants while elevating the production precision and quality standards for the industry. The centre is fast moving towards completion to uplift the manufacturing and skill profile for competitive advantage.

PLEC - Peshawar Light Engineering Centre

Most of the production units in KP are being run with dilapidated machinery operating on conventional machining processes resulting in low quality production. Cognizant of the industrial need, TUSDEC is establishing a sophisticated state-of-the-art Light Engineering Centre in Peshawar to facilitate small and medium industrial enterprises with the services of modern design, manufacturing, technical assistance and consultancy. It will also offer short courses and diplomas in various advanced engineering disciplines to consummate the paucity of local trained workforce. KP is mainly a manufacturing hub of sugar, cement, steel, paper & board, tobacco, matches, metal work, plastics, marble and hunting arms and Peshawar being flocked with engineering clusters of Electronic goods, Automobile, Metal, Aluminum Products, Hunting and Sporting Arms. These industrial clusters will be greatly benefitted with the establishment of Peshawar Light Engineering Centre which is in-process and its completion in the coming year will foster outstanding livelihood opportunities for the local workforce while accelerating the export of SMEs in the district.

Rural Salvation through Off-grid Electrification

A quick glance at the world electrification map depicts rural areas in immense need of affordable and reliable electricity sources to achieve sustainable development. In this vein, the existing literature on rural electrification signifies renewable energies (RES) as one of the most suitable and environmentally friendly solutions to provide electricity within rural areas. Autonomous decentralized (off grid) rural electrification based on renewable energy power generation on site through the installation of standalone power systems in rural households; when combined with electricity distribution mini-grids containing smart metering system, fed by RES (or combined), have proven capable of delivering high quality, theft free and reliable electricity for lighting, communication, water supply and motive power, among others.

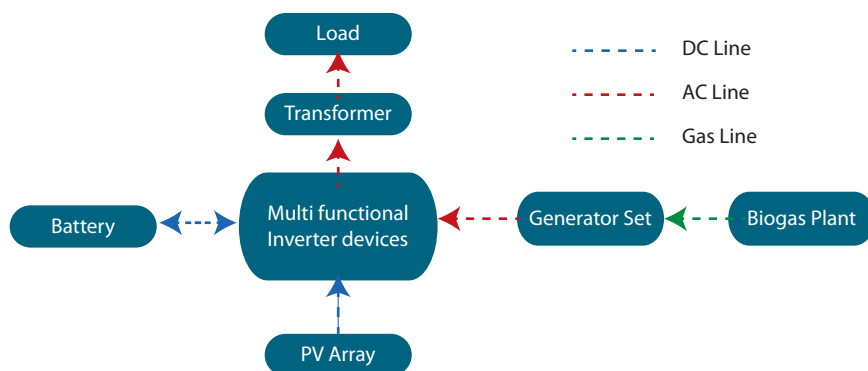
Off grid renewable energy technologies satisfy energy demand directly and avoid the need for long distribution infrastructures. A combination of diverse but complementary energy generation systems based on renewable energies or coupled (RES- with a backup of Liquefied Petroleum Gas (LPG)/diesel/gasoline genset), constitutes hybrid power systems. These hybrid systems capture the advantageous features of different energy resource and provide "grid-quality" electricity, with power ranging from 1 kilowatt (kW) to several hundred kilowatts. They can be developed as new integrated designs within small electricity distribution systems (mini-grids) and can also be retrofitted in diesel based power systems. Hybrid

systems can cater to steady community-level electricity requirements, such as village electrification, offering the potential of grid connection in the future. Additionally, due to their high levels of efficiency, reliability and long-term performance, these systems can also be used as an effective backup solution to the public grid in case of blackouts or weak grids, and for professional energy solutions, such as telecommunication stations or emergency rooms at hospitals.

Smart metering technology can help answer the energy providers' main challenges while better understanding and responding to end customers' energy needs. The main components of a smart solution are the household meter and the mobile enabling services required to serve customers. The main benefits of smart solution deployments include:

Improving billing efficiency: Inefficient billing systems are one of the main challenges faced by energy providers resulting in manual collections, leakage of revenues due to a lack of transparency in collection and poor repayment rates. A smart billing solution, allowing for pre or post-payment of energy bills allows the energy provider to monitor payments and ensure repayments while offering the end customer an efficient way to pay for the service.

Better understanding of customer usage: Currently most on-grid and off-grid energy providers must visit their customers' homes to take meter readings, or to evaluate or service decentralized solutions. Remote monitoring and control of infrastructure via a smart meter improves clarity on customer usage and demand, allows for easier detection of illegal connections or early warning systems for technical issues and for the remote shut-off of customers.



TUSDEC has devised a solution to induct sustainable and affordable energy in un-electrified rural peripheries for economic progression & poverty alleviation. The pilot project aims to electrify the rural areas through installation of mini-grid running on locally available renewable-energy (RE) resources (solar, biogas and wind). This project focuses on rural communities isolated from public grids with no prospects of connection to the grid in the next 15-20 years; having a certain load demand and serving a concentrated group of 90-100 households. Using solutions from past rural electrification models, pre-paid meters are going to be installed, the consumers can pre-pay using their mobile phone, while the system keeps deducting credit based on actual usage.



TECHNOLOGY UPGRADATION AND SKILL DEVELOPMENT COMPANY

Editorial Crew: Ansa Rabia, Aamina Hassan

Designed & Illustrated By: Atif Ilyas & Hammad Hassan



TUGi



Technology Upgradation & Skill Development Company Ministry of Industries and Production
State Cement Corporation Building, Kot Lakhpat, Lahore 54770, Pakistan
Tel: (+92)-42-111-000-143 Fax: (+92)-42-35121658 E-mail: info@tusdec.org.pk www.tusdec.org.pk