

REPORT

Roundtable Discussion on Virtual Institute on Energy Security



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EXECUTIVE SUMMARY

The mission of the Coordinating Secretariat for Science and Technology (COSTI) is to establish a world class National Research and Innovation Eco-system to generate strategic and sustainable technologies and innovations to win the "economic war" by, focusing on areas of core competencies and resource linked opportunities, preparing our people for a knowledge society through improved scientific literacy; and upholding sustainable principles in all spheres of activity. It has identified energy as one of the most important area that will be the determinant factor for all the industries in Sri Lanka at present and in future.

In order to facilitate Science, Technology and Innovation (STI) intervention to the energy sector in Sri Lanka, COSTI organized a round table discussion on Virtual Institute on Energy Security on 16th of September, 2014 at Sri Lanka Institute Development Administration (SLIDA) "Sankathani" auditorium. The purpose of this round table discussion has to develop an interaction between industry and the researchers scattered throughout the country and also to discuss their strengths, weaknesses, opportunities, threats and seek ways and means to overcome their problems. As such, this report presents a summary of presentations made by the speakers and the valuable points emphasized during the roundtable discussion.

People involved in energy related research from Universities and all other research institutes along with people involved in industry and trade were participated for this event. Presence of the Hon. Senior Minister for Scientific Affairs Prof. Tissa Vitharana provided considerable encouragement and assurance to the participants and his speech clearly indicated his interest to safeguard country's energy trade. On the other hand, the minister's presence and his speech was an incentive for participants to speculate the possible energy policy change that could benefit the country. As a first step in initiating this program, Prof. Ajith de Alwis, Project Director COSTI, delivered the welcome address and emphasized the program's objectives.

The roundtable discussion was enriched by presentations from several resource persons from universities, research organizations and the industry. They shared their valuable research findings, their problems and possible solutions. As such, for those involved in this trade the event was an excellent platform for networking.

Thereafter, a panel discussion took place under the chairmanship of Prof. Ajith de Alwis. It was on topics such as renewable energy, non-renewable energy, transportation, petroleum products, etc. The industry as well as government institutes raised a number of important issues and some of the problems were deeply discussed then and there with the cooperation of participants.

The reader may refer to the main report, for detailed description of the workshop proceedings, key outcomes and the personnel involved.

AGENDA (Round table discussion)

Roundtable Discussion on Energy Security

September 16, 2014

“Sankathani” Auditorium, Sri Lanka Institute Development Administration (SLIDA)

Agenda

09.00 am	Registration
09.15 am	Welcome and roundtable discussion objectives – Virtual Institute (VI) framework and their role <i>Prof. Ajith De Alwis, Project Director - COSTI</i>
09.45 am	Address by Chief Guest – Ensuring an uninterrupted power supply in Sri Lanka <i>Prof. Tissa Vitarana, Hon. Minister (Senior) of Scientific Affairs</i>
10.05 am	Discussion
10.30 am	Move forward 20% of renewable energy by 2020 : Research and development challenges <i>Dr. Thusitha Sugathapala, Director General-Sustainable Energy Authority</i>
10.50 am	Refreshments
11.10 am	Energy security and current states in Sri Lanka <i>Mr. Buddhika Samarasekara , Chief Engineer-Ceylon Electricity Board</i>
11.25 am	Research related to energy security : Opportunities & pitfalls <i>Mr. Harsha Wickramasinghe, Deputy Director General-Sustainable Energy Authority</i>
11.40 am	Sri Lankan wind energy industry: Why we should do it ? <i>Dr. Mahinsasa Narayana, Senior Lecturer-University of Moratuwa</i>
11.55 am	Biogas usage for next decade – What should we be doing ? <i>Dr. P.G.Rathnaseri, Senior Lecturer-University of Moratuwa</i>
12.10 am	Sri Lankan grid connected dendro power: Furthering the vision <i>Mr. P G Josph, Consultant-Sri Lanka Carbon Fund of Sri Lanka</i>
12.25 am	Renewable energy development in Sri Lanka - Issues for participating credit institutions <i>Mr. Tyrone de Silva, Executive Vice President (Lending and Investment Banking)-DFCC Bank</i>
12.40 am	Transforming transportation <i>Prof. Saman Bandara, Senior Lecturer-University of Moratuwa</i>
12.55 pm	Panel discussion <i>Chaired by Mr. Namiz Musafar, Country Manager-Practical Action Consulting</i>
13.55 pm	Summery and vote of thanks <i>Mr. Sanjaya Thilakarathne, Project Scientist-COSTI</i>
	Lunch

OBJECTIVES (Round table discussion)

The roundtable discussion on energy security was organized with the following objectives:

- ❖ Promote energy sector of the country by forming a network or interlink among the researchers involved in the energy security and the industry to harness the maximum output.
- ❖ Provide a common platform for people having the same interest to assemble and discuss their problems; thereafter, seek solutions through dialogues and coordinated R&S.
- ❖ To identify the present status in terms of availability and utilization of energy of the country.
- ❖ To form stakeholder clusters based on priority areas to develop next generation projects in energy security toward economic development and to explore factors that obstruct the rapid contribution from the sector and seek appropriate solutions.
- ❖ To initiate a process towards the development of National Innovative Programmes / Projects (NIPs) – (Next Generation R&D Projects) to ensure Sri Lanka's energy security activities and ensure that its components are utilized in a sustainable manner for the economic development of the country.
- ❖ Networking among R&D organizations and industry to implement the NIPs and encourage collaboration.

PRESENTATIONS SERIES – I

Summary of Presentations

Presentation 1:

The event commenced with the welcome address and introduction by **Prof. Ajith de Alwis, Project Director, COSTI**. At the outset he welcomed Prof. Tissa Vitharana, Hon. Senior Minister for Scientific Affairs and the distinguished guests. Stating that COSTI is the brain child of Prof. Tissa Vitharana, he explained the COSTI's main responsibility is to coordinate and monitor the scientific affairs in the country.

He discussed the main architecture of energy security which consists of five key components, resources, generators, users, energy services and policy making. He also elaborated sub clusters of each five clusters.

The presentation included introduction to COSTI and its mandates in scientific affairs in Sri Lanka in which three key areas where COSTI is active; that is coordinating and monitoring science

technology and innovation in the country, value addition and commercialization. Achievements of COSTI during the last one and half years and presented the national STI coordinating and monitoring framework and the operational mechanism of Virtual Institute (VI), which is the virtual platform to bring together likeminded individuals to discuss STI interventions and build transformational projects and programs of national relevance and to optimally mobilize resources in STI space. He stated that through VI it is intended to establish partnerships by forming specific clusters that represent stakeholders from various sectors, disciplines – the private sector, academia, financial sector, researchers, experts in the community, and professionals to collaborate across various areas to share their expertise and knowledge to achieve a common goal. He explained why research outputs and innovations should contribute to the economy and the responsibility we have, when we use money allocated from treasury through NSF, NRC, CARP etc. Then he explained why VI on energy security comes under social justice pillar in COSTI's framework and also importance of STI interventions to support sustainable development. He emphasized the necessity of bringing energy security in the country with local science and innovations which enables economic development. Inviting all the experts in the energy sector to the virtual institute he mentioned that actual dialogue will begin once they joined through the basecamp. With the preferences of participants they can work on clusters and sub-clusters of energy security like energy efficiency, policy, financing, innovations in renewable energy



Fig. 1 Prof. Ajith de Alwis delivering welcome speech

or how to make best use of coal power in order to ensure the sustainable use of energy. In future these discussions will turn into innovative projects which may take care of by national planning and budgetary decisions. Illustrating clusters in the energy sector Prof. Alwis said the energy equation consist of resources, generators and users where policy makers will decide whether to go for external resources or local renewable energy resources. His presentation focused on five clusters of energy security, i.e users, generation, resources, policy making and energy services. He also explained the main architecture of each cluster. In this scenario energy service sector also play a vital role through research, promotions and enhancing efficiency. Members of the VI can contribute either to one cluster or multiple clusters. With both foreign and local examples he described that we need to think about next generation projects to have a paradigm shift in the energy industry.

The presentation contained the achievements of the COSTI during the last one and half years, which were not covered in other institutions. He also pointed out that COSTI is 3 years project and it has a mechanism to continue in future too. Further he pointed out COSTI governance structure and its VI position for energy security and explained the operational mechanism of VI on energy security.

He also discussed few examples “how science should convert into rupees?” emphasizing Korean and USA examples. Finally he summarized his talk with the objectives of this workshop.

The full presentation is at Annex 1.

Presentation 2:

Hon. Senior Minister Professor Tissa Vitharana did his presentation in the area of “Ensuring an uninterrupted power supply in Sri Lanka” and brought to light many valuable points.



Fig. 2 Prof. Tissa Vitharana is delivering his lecture

In his presentation Prof. Vitarana said that he chaired the cabinet subcommittee which has set up to bring suitable proposals for uninterrupted power supply for the country. He pointed out that, the need of the country to acquire socio-economic development in a sustainable manner and the development needs energy/power. He elaborated the basic components of energy security with regard to Sri Lanka, types of users such as industrial, commercial, domestic and transportation. According to the minister we can achieve energy security if we rely on our own resources and we need to develop energy potentials

depending on type of use in the future industries. He said availability of electricity is not a problem with 3900MW; the maximum demand is about 2100 MW. However these supplies are diverse with uncertainty and affordability where problem with contract agreements with power generators and low power plant factor. Further he explained that if user can't afford it availability become meaningless. The government should take a policy decision to give subsidy for first 60 units and to become an industrialized nation power supply should be at acceptable level to reduce COP of the products in order to compete in the international market. He also mentioned that country should needs to have a serious look at energy conservation, reduction of network losses to increase the efficiency (introduce LED) and increase of renewable energy contribution to the national grid (wind, bioenergy). To reduce the loss incurred to energy industry in Sri Lanka he suggested to have high level technical analysis for coal power plants and cost reflective tariff policy. Our effort should be to utilize natural gases, and if possible renewable sources, for the energy security in the country. Further it is important for certain sectors like hotels should have their own power supply channels and it has to become mandatory. Hon. Minister wants to promote research and development in the renewable energy sector in order to ensure that those resources could help economic development, building sectorial capabilities and initiate KPI's for power sector performance.

Further he stated that what kind of activities that he has to do as a Senior Minister and explained how COSTI was formed and objectives of COSTI is to coordinate and monitor all the ST&I activities in Sri Lanka (what are they doing and what is going on) and link all of them for the betterment of Sri Lanka. He also requested the audience to join with the COSTI and to you can share their ideas on virtual platform.

The full presentation is at Annex 2.

Panel Discussion

Summary of discussion

After the Hon Minister's speech the discussion was started. The round table panel discussion was chaired by Prof. Ajith de Alwis, Project Director, COSTI.

Comment 1: Dr. Priyantha Wijesooriya

Dr. Wijesooriya highlighted the advantages of having hybrid energy model in Sri Lanka.

"In 1996, there was a seminar by SLIMA and Mr. Shavi Fernando GM, CEB gave valuable comments, stating he likes to move out Standard Power Purchasing Agreement (SPPA) and move to Renewable Energy (RE). Now CEB has changed the idea. Currently power model is not fit with the renewable energy intake. The reason for that is renewable energy depends on the seasonal availability. So need to have seasonal availability to be synchronized and also think about the storing (Bumps storages). And grid is the best way to transport the energy."

He told that "third energy model is "Hybrid" energy model and emphasized the need of innovative thinking to uplift the sector. Taking all the possible energy resources such as biomass, wind, solar etc combine and include hybrid model and distribute it. Still we have same tariff structure for single mode and hybrid mode power energy generation. There are no any tariff benefits to accommodate hybrid energy."

Comment 2: Eng. Mr. Ranatunga

The Mr. Ranatunga pointed out practicality of taking the availability factor instead of plant factor.

"In Hon. Minister's presentation, he mentioned that plant factor, but when we are talking about the energy availability it is better to talk about availability factor. Availability factor and plant factor are two different things. Plant factor can be lower than availability factor due to some reasons. It is not because of the plant is not available but because of the system is not ready to absorbed. When you say 35% plant factor then the availability factor is over 70% for Norochcholai."

He also added important point about the roof top solar panel and leverage with net metering. He mentioned that it has lot of problems and he totally agrees with the Hon. Minister's statement as it is favor with the richer and harmful to the poor. Further he mentioned that the solar, which is available at off peak (off peak mean low value electricity), and trading to the same person at premium electricity during the peak time and that's not equitable.

"Other issue with solar is it is an intermitted energy and not firmed energy. Person who uses solar panels use this intermitted energy and firmed energy both. All the other countries that

are using net metering will not trade it at equal price. That is buying and selling prices are not equal. What they buy at lower price and sell it at higher price. Don't forget that industries have peak in day time. Solar energy should have harmony with the peak. But in Sri Lanka it is off synchronized."

Comment 3: Mr. Sarath Gammanpila

Mr. Gammanpila shared his experience in growing "Willow" instead of "Gliricidia". "I am from tea industry and we grow "Gliricidia" that can be used as biofuel and then got to know about "Willow" and I have grown it in three acres. They grow very fast and can be used as fire wood as in coal power plant. I feel these are better than "Gliricidia", because grow very fast and have high calorific value. Our tea factories can make use of it and have the benefit of low cost energy and COSTI should pay attention in this regard."

Comment 4: Mr. Muzafer

Mr. Muzafer asked direct question from Hon. Minister regarding the behavioral pattern of the people regarding the energy consumption.

Question: "You discussed lot about uninterrupted supply of electricity but at the same time you mentioned about the consumptions and demand and also behavioral pattern of the people. Is there any opinion for breakthrough the change of behavioral aspects of people in sustainable consumption Sir..?"

Answer from Minister: "Yes extremely important to discuss about this and we have to change the behavioral pattern, so that we minimize the wastage in both household and industrial level and something that should be part of our culture."

Comment 5: Eng. Mr. Athula Jayamanna

Mr. Jayamanna discussed about production of biogas using the waste water.

"Wastewater is a problem. DCD mills, Rubber mills and hotels create lot of waste water. Waste water COD is between 60000 - 80000. They use waste water to produce biogas and use it to run the broiler. We make energy from waste water which generates bio gas and very successful stories are there. And also this helps to minimize the environmental pollution too."

"Currently this industry does not have any government grants or loan schemes."

He suggests to the Minister to propose a grant or a loan scheme for industry people like them.

Comment 6: Mr. Bandula Chandrasekara

Mr. Chandrasekara highlighted tariff policy in Sri Lanka.

“I think tariff policy should mainly base on the cost of generation and supply. If we consider a domestic customers and considering the social status, it is more complex, earning the income as daily payments and livelihood patterns are complex. So, tariff policy and mechanism should be a multidisciplinary approach which does not exist at the moment and second is not only the pricing policy, and also we had to think about consumer friendly relevant modes.”

“Further I would like comment on formulating long term generation plan which is under the CEB and it has to be changed and make it in a multi sectorial approach.”

Comment 7: Mr. Vidura Ralapanawa

Mr. Vidura emphasized very interesting two points, i.e climate change and technology implementation in energy sector.

“We have to think about the climate change and environment also in the energy security. Now it has continued to be increased with adding significant amount of the coal and it is going to disproportionately impact on poorer. When we look at our future, we are completely depending on export market. It is likely that product level emission standards will be imposed in multiple countries in next five to ten years. Introduce about the carbon foot print in products is unique achievement in Sri Lanka. Now carbon foot print products are cottage industry. It has become slow mainstream. It is not infeasible to think this is a projection and if we keep adding more and more emission per unit of electricity in this country in five to ten years’ time what will happen to our export competitiveness.”

“Emission integrity of our grid is very important factor that have to be considered.”

“Second point is, we can’t bring ourselves away from technology, because the issue like roof top solar, whatever the tariff we put it is going to be a reality in this country not only in the domestic but also in the industry. Some time I feel that when we plan our energy future we don’t consider those factors for consideration. We try to think our future with the position of technology that we are conversant, that is at present. For example it is very feasible if we look at the way that battery technology improved in past 10 years and it is quite feasible that the micro level storages make sure to transform each community, couple with solar and as a future plans. We are talking about very simple technologies, coupling batteries and solar. This will transform our energy industry in the country. Loading our grid by massive scale of power means we are blocking ourselves out of those technologies that are continuously reducing the cost of energy of this country.”

Finally he mentioned that “Planning of energy future of this country should not be a primary domain of the economist and engineers. There should be social scientists, environmentalist and futurist etc.”

Comment 8: Prof. Ben Basnayake

Prof. Basnayaka highlighted importance of find the substitute for coal.

“We should find and grow materials/ plants that can substitute coal. We have to think in terms of replacing Norochcholai. That should be the reform. Then we are in win-win situation.”

After Prof. Basnayake’s talk, three comments were given by Mr. Vidura, Mr. Ranatunga and Prof. Ajith

Comment 9: Mr. Vidura Ralapanawa

“The question is not about Norochcholai. What about the 1000MW putting in Trinco. Norochcholai is not the issue.”

Comment 10: Eng. Mr. Ranatunga

“Biomass can be used as a base of the coal plant. If we can find LNG, we can easily use LNG instead of coal. Biomass can use now, mixing with coal 95% and biomass 5%. There should be planning process at government level to make it a practical reality.”

Comment 11: Prof. Ajith de Alwis

“Now we can find examples of 100% usage of biomass in USA.”

Comment 12: Ms. Preeni Gunawardana

Ms. Gunawardana emphasized that “Petroleum Resources Development Secretariat (PRDS) is an only regulator for oil & gas exploration and production in Sri Lanka. Now PRDS is having meeting with all the national institutes to discuss how NG introduce to energy mix. Energy security is kind of slight balance of supply and demand of energy. Coal plant can be converted to NG plant. We had discoveries in Mannar basin. That will be two trillion cubic meter volume of gas.”

Minister : “When would it be available ?”

They are ready to available

1. Dorato – 8and half years
2. Bellakula-

Minister: “Are they cost effective?”

“We have singed production sharing contract with investors. We will get more than 60 % if you consider the government share as well and the effective price will be less.”

Comment 13:

He did the suggestion regarding the energy mix.

“We should go for energy mix rather than coal. It is better to have decentralized power generation. The total energy of the country should be protecting in future. If we lose one component of energy mix, there it would collapse. So we should have dendro, coal, solar, hydro, etc. a complementary mix.”

Comment 14: Mr. Nimal Perera

“Energy saving is the key factor in security and that part also has to be taken care. Further we should very much concern about the energy efficiency. Relating to the energy efficiency one outcome of the last week program is Thermal Storage. That is in demand side.”

Comment 15: Hon. Minister Prof. Tissa Vitharana

“I will try to get all those ideas for futuristic developments in the energy sector. I will be grateful if you can send a small note whatever you think and already you have not mentioned here for the development of country.”

PRESENTATIONS SERIES – II

Summary of Presentations

After the tea break the 2nd part of the workshop was started.

Presentation 3: Dr. Thusitha Sugathapala

Dr. Thusitha Sugathapala, Director General-Sustainable Energy Authority delivered a valuable presentation titled “Move forward 20% of renewable energy by 2020: Research and development challenges”.



Fig. 3 Dr. Thusitha Sugathapala is delivering his presentation

He pointed out the importance of giving different weightages to different energy sources. Since most energy sources are exhaustible more prominence should be given for biomass energy. On the other hand coal plants can easily convert into biomass. Only limited energy is coming from hydro power and when there is no rain that too is in danger. As such more research and development need to be carried out for sustainable energy sources. He further elaborate energy can be divided into conventional and new energy sources. Since conventional energy sources are fully exploited the attention must need to give for new energy sources such as geothermal, ocean thermal, ocean waves/tidal etc. On the other hand he added the country must reap the fullest potential of the conventional energy sources too. In this aspect he suggested that resource mapping is very vital.

The full presentation is at Annex 3.

Presentation 4: Mr. Buddhika Samarasekara

Mr. Buddhika Samarasekara, chief engineer in CEB did his presentation in the area of “Energy security and current states in Sri Lanka”. Present states, future plans of CEB and challenges facing was discussed. He mentioned that CEB is in the process of preparation the long term generation plan.

He explained “what would be the energy security?” by asking several questions from the audience.

- Is it the diversification of energy mix?
- Is it the diversification of fuel supply?
- Whether achieved through indigenous resources (Eg. Hydero, wind, Solar, Dendro NG)
- Whether achieved through imported fuels ? (Coal, Oil, LNG, Nuclear) Whether look only into the power sector ?
- Is it able to achieve without any incremental cost?
- Whether people in the country willing to pay more?

After that he showed the electricity generation mixes on 2011 in several countries around the world and briefed that how energy mixes are diverse around the world.

He mentioned that in 1990, CEB was purely depended on Hydropower and was enough that power to cater the demand. Since, 1997 CEB integrated the non-renewable energy to grid



because need of catering the energy demand in the country.

He also explained that electricity generation mix has shown a shift from hydropower to fossil fuel with due to two reasons

Fig. 4 Mr. Buddhika Samarasekara is delivering his presentation

- increasing demand
- unavailability of economically feasible sites for the development of major hydro resources

He explained present capacity mix in Sri Lanka, how NCRE contribution for that and target of achieving NCRE share of 20% by 2020 in completing 100% electrification target on 2015. He told that the national policy on energy was prepared in 2008 and at the moment it is revising and followings are the elements.

1-Providing Basic Energy Needs

Energy requirements to fulfill the basic needs of the people, and to enhance their living standards and opportunities for gainful economic activity will be adequately and continually satisfied at the lowest possible cost to the economy.

2-Ensuring Energy Security

3-Promoting Energy Efficiency and Conservation

4-Promoting Indigenous Resources

5-Adopting an Appropriate Pricing Policy

6-Enhancing Energy Sector Management Capacity

- 7-Consumer Protection and Ensuring a Level Playing Field
- 8- Enhancing the Quality of Energy Services
- 9-Protection from Adverse Environmental Impacts of Energy Facilities

He also talked about the CEB long term energy generation plan (2013 - 2032) and how much each individual energy source contribution for national grid. According to that coal will be responsible for 78% by 2032.

Finally he summarized his talk by discussing the future challenges & issues and proposing solutions for those challenges.

The full presentation is at Annex 4.

Presentation 5: Prof. Saman Bandara - Transforming transportation

In global context, transport sector is the second largest consumer of fuel energy. However in Sri Lanka still it is the largest consumer of fuel.



Fig.5 Prof. Saman Bandara is delivering his presentation

Due to land use and economic development, demand for the transportation has been increased. Major contributor is the bus and that has share of about 65%.

Due to the increase of demand following consequences has been arisen.

1. Excessive energy use for transport
2. Energy wastage due to inefficiencies
3. Time lost due to congestion and delays
4. Environmental pollution

Limitations due to increase of demand are

1. Capacity limitations in existing infrastructure,
2. Resource constraints for infrastructure development
3. Social-Environmental concerns

Therefore efficient systems to accommodate the demand must be needed with technical know-how. And we must understand the user requirements and cost effective solutions that results in co benefits must be suggested.

At the moment any measures that reduce the consumption of fuel is welcome. Hence a large number of different measures have been proposed. But effectiveness and user acceptance of these measures are yet to be identified.

Energy efficiency of transportation can be formulated by vehicle, travel and system efficiencies. All three aspects have to be concerned in the overall energy efficiency in transportation.

Vehicle efficiency can be improved by

Reducing the per kilometer fuel consumption by improving existing vehicles, alternate fuel and new car concepts.

Fuel economy standards such as tax incentives as in Hong Kong

Vehicle technology by engine stop at idling, gear box with long transmission, gear shift indicator, light weight body and interior and low rolling resistance tires

Travel efficiency is achieved through shifting to more energy efficient modes.

Avoiding travel or reduce the need to travel is to be considered for System Efficiency.

Energy saving measures in transport sector can be categorized in to four main areas and they are;

1. Reducing demand for motorized trips
2. Efficient use of transport modes
3. Effective management of traffic flow
4. Effective use of individual vehicles

The demand for motorized trips can be reduced by reducing travel needs and encouraging non-motorized transport modes.

Walking is best to reduce the fuel consumption. Any trip has a walking component and walking is most efficient for short trips. Need more pedestrian friendly facilities.

Bicycle is the other mode of green transportation. Efficient up to 5 km trip length, bicycle friendly road environment. People are to be encouraged and facilities at work place / destination should be supplied.

Considering the public transport, improving efficiency of bus and railway operations, alternate BRT or rail system network and introducing new marketing strategies.

The full presentation is at Annex 5.

Presentation 6: Mr. Harsha Wickramasinghe

He started his presentation mentioning that the generation plan of the CEB is very deep subject and we should have good knowledge to discuss that matter.



Fig. 6 Mr. Harsha Wickramasinghe is delivering his presentation

He pointed out security definition and energy security has many aspects. Security defined monopoly of administration of violence. If we have more diversity then you can get better security.

IEA defines energy security as the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance.

He mentioned that the Center for Strategic and International Studies (CSIS) identified and propose eleven factors as components of an energy security. They are as

1. Diversity of supply
2. Level of imports
3. Security of trade flows
4. Geopolitics and economics
5. Nuclear proliferation
6. Diversity of resources
7. Market/price volatility
8. Affordability / economic impact
9. Energy intensity
10. Reliability
11. Feasibility

He pointed out and asked from the audience that “What have we done to embrace sustainable energy technologies?. He answered this question by explaining his personnel experience taking 3 case studies.

- Manufacturer of hydropower turbines
 - Board of Investment registered company is prevented from selling more than 20% of the output to the local hydropower industry.
 - Company can supply nearly 75% of the local demand

- Will not have VAT concessions, available to competing imported products, tariff incentive abused
- A case for wind turbine manufacturing industry
 - Taking initiatives to enter local market
 - Significant advantages from logistics
 - A reality, dawned sooner than we expected – now a worrisome audit investigation!
- A case for electric vehicle manufacturing industry
 - Long delays, lack of commitment – another worrisome audit investigation..!

He pointed out and highlighted that one of the most terrible problem in innovation in Sri Lanka is audit investigation. So he told that he will not encourage the researchers to do innovations in Sri Lanka.

Finally he concluded his presentation by pointing out followings.

- Strategic alliances must be built
 - Industry, research and catalysts (local or foreign)
- Status and image of research community must be elevated
 - They must be consulted (not the electrician..!)
- Government must take more risks
 - Industry must take some risks
- Few longer term thrusts must be nurtured

The full presentation is at Annex 6.

Presentation 7: Dr. Mahinsasa Narayana

Dr. Mahinsasa Narayana Senior Lecturer, University of Moratuwa did his presentation in titled “Sri Lanka wind energy industry, why we should do it” explained wind energy capacity worldwide and technologies available to harness the resource and also he said wind power installation cost is low compare to solar and coal however the cost is highly depend on site factors.

He elaborated how India become experts in the production of wind power plants and we



Fig. 7 Dr. Mahinsasa Narayana is delivering his presentation

also have the experts for design and construct the tower part and therefore it is better to focus on local contribution in installing instead of going 100% foreign technology.

Further he explained wind

power plants become cost effective over the time because other energy sources become expensive and grid connected-small scale wind turbines are becoming popular.

In Sri Lanka three highly potential areas have been identified in Mannarama, ambewela and Hambantota. Absorptive capacity of wind energy to the national grid has to be increased as there is a possibility to develop further 100MW capacity of wind power in Sri Lanka.

The full presentation is at Annex 7.

Presentation 8: Dr. P.G. Ratnaseri

Dr. P.G. Ratnaseri, Head, Department of Chemical Process Engineering, University of Moratuwa delivered a fruitful oration enlightening the audience on very valuable facts relating to the Biogas usage for next decade.



Fig. 8 Dr. P.G. Ratnaseri is delivering his presentation

He said that he was involved in this trade for nearly forty four years incorporating entirely Sri Lankan technology. Without any support he was able to establish pilot plant in the University of

Moratuwa premises and three-wheeler was powered by the energy generated from the plant. The plant was designed by the University professional and managed by the university students. He further added only the finest category of university students entered to the University of Moratuwa and they are not second to students of any country. With time he was able to overcome all the bottle necks relating to anaerobic digestion. He said his dream was become a reality when Matara town council identifies the importance of his technology and invited to design and establish a plant in Matara. This will ultimately provide solution to all the problems relating to garbage and even generate valuable energy. Finally he said his second dream is to have online controlling station installed in University of Moratuwa where they can control all their biogas plants installed throughout the country.

The full presentation is at Annex 8.

Presentation 9: Mr. P.G. Joseph

Fig. 9 Mr. P.G. Joseph is delivering his presentation

In his Presentation Mr. Joseph pointed out the importance of having local energy sources because uncertainty of supply from Middle East due to war situation, sanctions, disruptions of sea transportation and also value depreciation of rupee. Further he mentioned although we assume we would have gas and oil in the near future since we don't have the technology and cost involve with excavation prices may higher than the international market. With the technological development installation cost for solar and wind power plants are decreasing and once installed resource would be local. So far in our power mix bio mass plays the leading role but in the future coal will play a major role in the production of electricity. Many industries pave their way for their own biomass sources for their energy needs. In addition he elaborated reasons for having integrated systems for harvesting biomass with the agriculture industry and there are about 1.6 million ha. with a potential of cultivation and on that way it will be 4th plantation crop and his suggestion is to have inter-ministerial unit to coordinate bio mass production related activities.

The full presentation is at Annex 9.

Presentation 9: Mr. Kapila Subasinghe

Project finance is the main business of ours and we are covering all the sectors in the country. Long association with SMEs. World Bank has cited DFCC is most successful development finance institute in Sri Lanka.

We have recent link with multilateral institutes, first two are with WB and GLOBAL ENVIROMENAL FACILITY for promotion of renewable energy. Third is the European investment bank of with a credit line for green energy and SME s a 90 million euro. This is the only one active.

Completed are energy for rural economic developments project and energy services delivery projects.

Some of our renewable initiatives are,

1. Credit and grant under the energy services delivery project
2. Credit & grant administration of ESD Project
3. Credit, grant & subsidy administration of RERED Project
4. Financing the pioneering mini hydropower project in Sri Lanka together with equity participation
5. Co-financing the pioneering wind power project in Sri Lanka
6. Financing 64 grid-connected renewable energy projects with a cumulative capacity of 192 MW
7. Financing 34 off-grid community-based renewable energy projects providing electricity to 1,642 households



Fig. 3 Mr. Kapila Subasinghe is delivering his presentation

In energy financing, we focused in five hub concept of the government of Sri Lanka. We don't have rigid repayments structure when we come to renewable energy development, we always matching with cash flow.

Challenges facing the developers are

1. State approvals pertaining to land which is a time consuming task due to land ownership
2. Delays in obtaining approvals from various state agencies
3. Consistent availability of technical expertise to take a project to its maturity
4. Selection of equipment
5. Hydrology and accurate data for ascertaining the commercial viability as well as the suitable design structures for the project
6. Availability of documents and approvals
7. An acceptable resource assessment which makes the project commercially viable
8. Technical expertise ideally by the owner/partner
9. Owner/chief promoter's commitment and availability

And there are some project implementation issues such as

1. Delay in infusion of capital committed by the project promoters
2. Lack of attempts to address any social or neighborhood issues
3. Lack of planning for transport of heavy equipment
4. Unapproved design changes during the project implementation
5. Substantial deviation in performance due to incorrect resource assessment
6. Geological disturbances in the terrain at the project site
7. Incorrect estimation of interconnection expenses
8. Natural disasters

As collateral model which is commonly asked, the machinery and the civil works of the project, land if it is non-government, a primary mortgage over shares of the borrowing company as a going concern, equated or custom made repayment schedule, risk sharing through loan syndications and escrow arrangements to receive funds from the utility.

And macro issues are

1. Most remaining sites are difficult to develop, higher capital requirement
2. Increased loan financing requirement; implications for investment return and debt servicing capacity

And followings are the future plans

1. Bank and equity route both will be actively pursued with the advent of quasi debt in energy enterprises
2. Attractive tariffs will be required for projects such as solar which have longer gestation periods and the IRR would be a key determinant for investors

The full presentation is at Annex 10.

The time limitation of the program was cancelled the last discussion and Mr. Namiz Musafer was asked from the audience to submit the dreamed National Innovation Programs (NIPs) for future security of energy in Sri Lanka.



Fig. 11 Mr. Namiz Musafer is briefing the panel discussion

The submitted NIPs are listed in the following section. Finally the vote of thank was done by the Prof. Ajith de Alwis by expressing his sincere thanks to all the participants, while appreciating their great contribution to success of this roundtable discussion.

Proposed National Innovation Programs (NIPs)

Mr. Namiz Musafar was asked from the audience to submit the dreamed NIPs those have high economic potential to change the Sri Lankan energy sector.

1. **Sampth Kariyawasam** (Head of Sri Lanka Operations. “Gamesa” Wind Turbines

Email : Sampath-kariyawasam@yahoo.com - Tp: 0712080027)

Proposal to develop wind-hydro Hybrid model: To increase wind energy input to the grid.

Problem statement

The percentage of the electrical energy that can be absorbed to the grid based on wind energy is limited due to the fluctuating nature of wind energy source. When the wind based electricity input to the grid is increasing, it affects the grid stability.

Proposed Solution

Introduce wind-hydro hybrid power plant model initially focusing on already developed hydro power plants located at potential areas. That is, if the wind potential is high in a location where there is already developed hydro(or minihydro) power plant, wind turbines can be installed to pump back the water to reservoirs. This will increase the annual plant factor of the hydro plant. Also this concept can be implemented at a suitable location in beach area to pump sea water to a higher elevation and operate wind-hydro hybrid model. Troncomalee is a geographically suitable area for implementing this concept.

Advantages

- No need to improve the grid infrastructure (already existing infrastructure is utilized to harness the wind power potential) hydro power plants and their reservoirs to store pumped water.
- No stability issue to the grid as a result of adding wind base electricity by this method(concept is same as a pumped – hydro but wind energy is utilized for pumping water.)
- We have a lot of suitable sites in up-country where this concept can be implemented. Proper study need to be carried out to identify the potential.

2. **Mr. Renuka Weerasena**

Facilitate waste to energy projects which delivers dual role of generating energy as well as address Environmental issues created by open air garbage dumps.

3. Mr. Sarath Gammanpila (Email : sdsgammanpila@gmail.com)

Develop dendro through energy farming, using hard wood species, similar to energy farm plant in close proximity, harvest every 3 year using chain source, combine harvester type. Plants will copice once more twice as much timber wood, being hard wood it will give more calories of energy. You may gasify get even more efficiency using synthetic gas methanol. Income would more than one acer of tea plantation.

Use the water ways as alternative transport mode, where less energy per kilo meter. You can have breakfast while you travel with the beautiful greenery surrounds.

Have partial electricity generation battery while using a pushcycle (bicycle), mountains climbing high inclination with battery and human power. Healthy life with exercise and no above an extra sugar in the blood system.

Wind turbines and the break water at sea port, wind farm land to sea and sea to land in the night. Over 30 meters above permanent wind no peak hours generation problem.

Cost of energy will be the deciding factor of our export earning, through the cost of production.

We should have bio gas usage as mentioned by Dr Rathnasiri in every district or area. Because there are lots of wastages are dumped without any usages in to the ground and cause pollution. At least we should teach to the people (mostly who have many wastages like villagers) to generate electricity for their need using bio gas. It will help to save their money too.

It should be a nut to have a green country without the satisfaction of power demand.

4. Dr (Mrs) M.Y.U. Ganehenege (Department of Chemistry, Faculty of Science, University of Peradeniya. TP: 0716291572 Email: myug@pdn.ac.lk)

My current research interests focus on 2 issues.

To synthesize catalysts capable of converting water and small environmental pollutants such as CO₂ in to fuels (hydrogen etc.)

To identify the best oil bearing algae to extract algal oil and convert it into biofuel. The specific algae that is capable of living in waste water, is targeted. Sustainable development by using the dual function algae is the ultimate goal. (use of algae to get fuel and purify water)

Suggestions

We should not limit these types of valuable discussions to a "Roundtable discussion".

We as a team should take steps to make the dream come true.

5. Mr. Nimal Perera (President SLEMA)

Developing/ Establishing a zero carbon/ optimal carbon industry park and community zone and introducing to Sri Lanka on show cases to be followed by other/ general public communities to take directions.

These show cases to be totally inclusive of all mechanisms. Such as

Renewable Energy

Energy efficiency

Water

Demand side etc..

6. Mr. Nalaka Chandrawansa, (N.C. Industries- Email:Nalaka_ch@yahoo.com -TP: 0718442135)

I have invented direct heat water pump. This can use Fire wood, rice husk, coconut shell. I think we can reduce production cost of agricultural production.

Please help me to productive out.

You Tube: Store water pumper

wgmÜgu: 2014-01-08

7. Mr. H. Malinda Goonasekara, (Consulting Engineer in Timber care, 57/2 A, Railway Avenue, Nugegoda Email : tmbrcare@sltnet.lk TP: 0112823127/0773018603)

Biomass Energy : Comprehensive mapping for SL covering the entire island.

Agriculture waste : processing industry/ packing/export

Wood waste: coco peal/ paddy husk etc..

Timber harvesting: fuel wood sites

Logging (STC + Large scale operations)

Saw milling/ wood processing + furniture + other wood based product manufacturing.

Promote wood waste: chipping (fuel)/ briquetting/ pelleting

Conversion of conventional green fuel wood(fire wood) to briquette/ pellet (Green energy clean fuel)

“fuel of the future”

End users of briquettes / pellets

- Boiler/ hot water generation of many industries
- Food processing (dyeing/ Dehydrating) including spice for export

- Wood dyeing (Timber dryers/ furniture+ wood products especially for exports)
- Home heating system
- Industry heating system
- Large scale power generation

8. Prof. B.F.A. Basnayake

- Inflation is directly related to fossil fuel usage.
- Excess energy should be used for transport
- Therefore the transport sector should be linked to power electrical.
- Bio mass resources should be developed to replace coal.

We need to develop a sound research culture in the universities/ research institutes and even in the private companies. We should then categorize different research groups understanding separate field like

Bio fuel: Algae . Thermal etc.

There must be a better understanding on invention and innovation commercialization this invention

9. Mr. D.D. Matharaarachchi (TP: 0773258483)

Not meeting (solar) implementation in government organizations such as;

1000 National schools

200 Hospitals

300 Divisional secretariats

25 GA's Offices

All Universities

and other possible government organizations.

Loan scheme to install solar system (wet meeting) for general publics

Introduction of solar technology in university curriculum and A/L student.

10. Mr. Thilanka Alwis (Industrial Service Bureau)

Sri Lanka have number of resource persons. Therefore we categorize team and get the support of government under the knowledge discussion. This is the good support for next energy generation.

11. Mr. Mahesh A. Weerasena (Laugh Petroleum (Pvt) Ltd)

Introduce biogas be the next energy source to substitute conventional energy sources in Sri Lanka.

12. Mr. V.R. Rupesinghe (Sri Lanka Transport Board TP: 0771056056)

As you know Mr Ray Wijewardene is generating power out of Gliriseediya sticks in his own estate “kohombe” in Chilaw area.

But he doesn't like other people studying his invention. Local authorities can take steps to study this process, to develop this and make it popular.

In order to make this process popular, Gliriseediya cultivation should be increased. For this task, government should take steps to stop plotting and selling of lands.

13. Mr. Chamila Jayasekare, (Sustainable Energy Authority – Email : chamila@energy.gov.lk TP: 071534420)

The energy policy is being reviewed at present, and if we can correctly identify the strengths and weaknesses as a country in context of energy, and get the maximum coordination of the institutions related, and accordingly if a very practical scenario for the future can be conceptualized and the necessary policies are developed accordingly. It will be very important towards a sustainable energy future for Sri Lanka.

14. Mr. Malinda Ranaweera (Email : malinda@aea.gov.lk TP: 0776099543)

My observation on theme of “Energy Security”

In terms of energy security Sri Lanka is now in very risky position. Because our most of power generation (60%) based on fossil fuels and coals.

In addition, according to the future power projection, within next 30-40 years Sri Lanka haven't opportunity to import coal, fossil fuels from other countries.

NCRE not shown significant growth rate when compare with the investment of the technology.

We have more focus on Nuclear generation & thorium resources mapping in Sri Lanka.

15. Promotion of electricity vehicles

CEB can provide power at off peak

This will improve the load profile
Benefits: Lower oil bill, high efficiency on coal power plant

16. Building coal power plants is not an innovation strategy but a regressive strategy

17. Mr. Harsha Wickramasinghe (Sustainable Energy Authority)

Develop 3-5 flagship ideas and prepare a fairly long term plan/roadmaps based on foresight/ scenario creation methods.

18. Affordable electricity to consumers

Continuous improvement of electricity product attributes. i.e. quality, continuity and safety

Solar + wind based sustainable home energy system for Sri Lankan households.

19. Mr. Bandula Chandrasekare (Energy Forum, National electricity consumer network)

Consumer friendly payment modes for electricity (pre-paid, seasonal etc..)

Increase the base load (day demand) by connecting electricity based transportation.

20. Make Sri Lanka self-sustaining in energy and export energy.

Develop the country as a home for energy intensive industries using sustainable, renewable energy.

Develop a clear policy or market for energy supply via on-grid projects.

21. Mr. Danesh Subasinghe (Mobitel (Pvt) Ltd)

My dream for Sri Lanka

A country which is operating with “No” damage to the nature with an uplifted life style through the “... and the policy maker” joint approach for a “sustainable future for our next generations” in the aspect of energy.

Vision

Sri Lanka to be the Asian hub for innovative technologies on Energy solutions with larger collaboration with Sri Lankan expertise.

22. It is need to do more R&D in energy efficiency and improve the energy security to get the best use of energy in sustainable development in the country.

When implementing power plants it is essential to do environmental impact assessment to overcome the environmental damages.

Renewable energy promotions are very important as the fossil fuel are rapidly diminishing. The development process of the country should continue in a sustainable manner.

23. Mr. W.B. Palugaswewa (Director of Irrigation, Central Zone, Kundasale w_palugaswewa@yahoo.com TP: 0718191413)

Then we about more than 3000 reservoirs which can be used for generating hydro power.

Problem is how to incorporate turbines and generation to the irrigation sluices, since it is not advisable to cut open ancient bund to construct penstock.

And also grid is not at proximity

Not economically viable.

24. Breakthrough innovation in behavioral changes on energy security for climate/ energy/ consumption friendly environments.

25. Dr Chithral Ambawatte, University of Ruhuna TP: 0777681343

Development of controlled Anaerobic digesters to produce bio gas to be used for power generation

As such almost all municipal councils collect huge heaps of solid organic waste and usually dump in landfills. But as practiced in many countries those garbage could be used in anaerobic digestion and produce bio gas and bio fertilizer in an efficient manner. If we control the parameter such as PH, Temperature, mixing etc. Main important aspect is to reduce digestion time from current 100-120 day in conventional digestion to 5-7 days. In such technologies we will be able to accommodate daily collection of garbage and to convert these to valuable energy source and fertilizer.

So I suggest to create an opportunity to have pilot projects in developing these technologies and providing funding for research.

26. Mr. Buddhika Samarasekara, (Ceylon Electricity Board)

In Sri Lanka, energy security word is used to introduce LNG in to the country. This will block the exploration of NG and its use in Sri Lanka.

Sri Lanka should take a policy decision whether LNG or NG. No competition should exist between NG and LNG.

Everyone talking about externalities such as health concerns, environment damage just without any study conducted in Sri Lanka.

Social damage cost due to coal power development.

How can we distinguish the damage done by refinery & inefficient transport sector.

All coal plants emission known & controllable and is it valid to transport refinery?

27. Mr. Gayan Subasinghe (SLSEA - gayansub@gmail.com)

Comments/ suggestions

- Should not leave not the basic concept Energy at affordable, reliable, environmentally and socially acceptable manner which not limit our development capabilities.
- Should not prioritize “Electricity sector”. The projects/ programme should always give similar importance to other sectors, categories; transportation sector, thermal heat, DMS etc.
- Above can be achieved when we define what energy security is, have a broader definition which does not prioritize one, what equally analysis the three concept
 - ✓ Research
 - ✓ Technology
 - ✓ Application

Shared responsibility & authority for future work on energy security.

28. Dr Kumudini Gunasekara

Save our brains in Sri Lanka

More work more audit queries

Less work less audit queries

No work no audit queries

29. Prof. K.K.Y.W. Perera

The most cost effective method of “generation” equivalent is demand side management. Towards the above, those should be a high priority effort of energy

conservation, high energy efficient devices and automatic control of electrical load should be supported through R&D.

30. Micro Hydro

We have already installed hundreds of micro hydro in Sri Lanka in past three decades.

After national grid reached to the remote villages. Now all villages connected to the national grid.

After the worse case happened people are neglecting those plants and now in abundant.

Please make sure mechanism to connect those to the national grid and harness the energy from small hydro plants.

Create awareness on all Sri Lankan about biogas

Can separate waste and handover to municipal council or pradeshiya sabha. Make awareness among them.

People don't have knowledge on bio gas technologies. Arrange media campaign about bio gas and its use.

31. Mr. A.N.R. Amarathunga

- ✓ Study energy saving behavior of a home and publish it.
- ✓ Find alternatives for refrigerator And water pump energy. Which is the major share of house electricity consumption
- ✓ Manage planning of high power using industries to reduce unnecessary grid laying.
- ✓ Replan national grid to reduce the distance transport.

32. Dr A. Atputharajah, (Dean, Faculty of Engineering, University of Jaffna. deaneng@jfn.ac.lk TP: 0777379164)

- ✓ Hybrid operation of wind solar diesel plant. Happy to inform you that our proposal on this (submitted in 2004, resubmitted 2008 and again polished up in 2010) has come to reality with the help of SEA+ADB with title of "Eluvai Theevu electrification(electrification of a small island in North of Sri Lanka)"
- ✓ Happy to inform 50kw solar roof top will be given by SEA to Engineering Faculty to operate as pilot project and report them the operation. Further research on solar is motivated by the SEA with the ADB funding.

- ✓ Small wind turbine of 5kw will be supplied by a wind farm developer. This will help to increase wind power development research.
- ✓ Please help to set up a 5-10kw biomass power plant at the faculty to boost R&D in this direction. It will be good to get all in one and see how we can operate them effectively.
- ✓ Always operating pilot projects in universities are the best to start with example 50kw roof top solar at 4 engineering faculties in the country.

33. Dr Priyantha Wijesuriya (usj1@live.com -TP: 0712288295/0776226485)

Not many people know about COSTI. Can you propagate the concept more widely. Enact the senior scientist of CEB & Ministry of renewable energy for future discussion

Very good event today. But should have more moderation to keep speeches presentation shorter.

Energy cess: Can be changed by imposing a non- renewable energy cost to fossil oil imports at import stage.

34. Mr. P.G Joseph (SLCF – pgjoseph@gmail.com)

In LTGP the least cost to the economy not to CEB or even the consumer. The economy includes all aspect of the country – externalities.

35. Mr. Udaya Bandara (Rashmi Kritom Power Solution – rashmikrito@gmail.com – 077 1067131)

To a great governable power future for Sri Lanka with the mix on renewable power sources

To find and develop new energy resources for our future generation.

New innovative power resources development.

36. Mr. Jayantha Ranathunga

Why are we taking of NCRE and ignore our major hydro. We shell demand the world recognition of any high green credentials. Our per capita energy consumption is 500 kWh / year compared to 80000 kWh/ year in USA. So our use is 1/160 of USA. Our renewable component is 50 % compared to 20 % USA need not place our citizen to pay and higher price to improved our green credentials which is must higher than rest of the world.

37. Ramini Wickramaratna (AAC)

Subsidy to be given to consumers of electricity.
More funding for research on electric vehicles and alternate sources of energy
Better traffic management and increase of other method such as cycling and walking
Better to introduce walking paths

38. Mr. Laxman Withanachchi (withanachchil@gmail.com – 077 2886886)

මම දැනට ලංකාවේ (Solar 4 light System) 8000 pieces අලෙවිකරලා තිබෙනවා.
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කවරුවත් නොකරපු දෙයක් කරන්න මම දෙන උදව්වෙන්.

39. Mr. Sri Mal Thisera

සමාජයටත් පරිසරයටත් සෞඛ්‍යයටත් විපත්තියක් වූ කැලිකසල වචනයේ පරිසමාර්ථයෙන්ම
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සෑම නිවසකටම ජීව වායුව, වසවිසෙන් තොර ආහර

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Attendance
 Roundtable Discussion on "Energy Security"
 16th September 2014 @ SLIDA

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Attendance
Roundtable Discussion on "Energy Security"
16th September 2014 @ SLIDA

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Attendance
Roundtable Discussion on "Energy Security"
16th September 2014 @ SLIDA

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