

ENERGY INFORMATICS: AN EMERGING AND PROPOSED ACADEMIC DISCIPLINE FOR COMPLETE SUSTAINABLE DEVELOPMENT

Prantosh Kumar Paul

FBAS, Bengal Engineering & Science University, Howrah, West Bengal, India

Email: prantoshkpaul@gmail.com

ABSTRACT

Informatics is one of the important subject and practicing field responsible for the Information Transfer Cycle (ITC). Informatics is considered as valuable social engineering field deals with socio-information systems. Informatics is mainly the study and practicing field dedicated to the Information System designing; be it organization, MNC's ,governmental enterprises or for home entertainment. The interdisciplinary research and advancement of computing and social engineering brought to us so many new domain of Informatics like- Bio Informatics, Geo- Informatics, Community Informatics and so on. Energy Informatics is an emerging possibilities and domain of Informatics dedicated to the design, development and study of power system consumption and similar activities. Fundamentally, Energy Informatics may be helpful in all type of organization and enterprises; including house holds. This field may be offered in Informatics or IT or Information Science department in Indian Universities, Institute of National Importance and other institutions to create Eco-Friendly, power consumed Information Infrastructure building. Thus, indirectly this field is also responsible for removing digital divide of the society; and obviously information divide. This paper deals with so many aspects of Energy Informatics; including its needs, roles, and values in Global and Indian context. Paper also try to deliver a message to the academic community; particularly the interdisciplinary intellectuals for designing and development of Energy Informatics as a full fledge academic field or specialization.

Keywords: Energy Informatics, Informatics, Information Science & Technology (IST), Green Computing, Future Trends, Social Engineering, Social Development, Power Management.

INTRODUCTION

Energy Informatics is a potential emerging name in Informatics, Information Science & Technology (IST), Computing Community. Simultaneously it is also a great name to the modern social engineers to build a sustainable society and eco friendly, powered consumed

information infrastructure building. Informatics is actually a Combination of fundamental of Information and Computing dedicated to build better Information Channels and Information Transfer Cycle (ITC) through better Information Systems. Energy Informatics Professionals may be utilized in wide range of practicing field; including Information Foundations, MNC's, E Governance, Entertainment and Community Information System building.

Energy Informatics programme is actually combination of IT, Information Science, Management as well as Biological Sciences. More clearly for layman it is a combination of Green Computing and Informatics with a slant to Environmental Science & Engineering. Universities may start this programme preferably at Masters, MPhil and Research Level, as it is required broader interdisciplinary skills among the Economic development; Energy Informatics may be helpful, directly and indirectly to meet the Globalization.

OBJECTIVE

The following are main and key objective of this study:-

- To learn about Informatics and its basic nature and domain;
- To learn about Energy Informatics and its basics;
- To learn the need and contemporary values of Energy Informatics and its possible utilization to build Green Society and atmosphere;
- To know and find out the main possibilities of Energy Information Education in the Academic Community;
- To Give and illustrate a message to the advance techno savvy social worker and social engineers about the potentiality of Energy Informatics [EI] for better Governance and healthy Knowledge Economy to all spectrum of the Society.

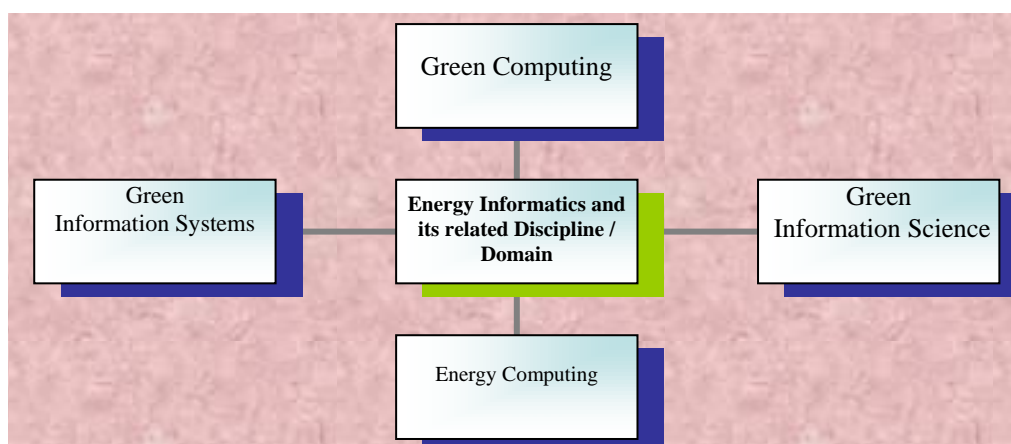


Fig: 1. Representing some related domain of Energy Informatics at a glance

Energy Informatics: Core Areas

Energy Informatics [EI] is the interdisciplinary domain responsible for sustainable, eco friendly, energy consumed Information Systems design, energy informatics is to some extend related with Green Computing. Application of Green Computing and Green

Technology to the information systems and information infrastructure building directly and indirectly called as Energy Informatics. Some core areas of Energy Informatics [EI]. Some core areas of energy informatics are as follows—

- Application of Clod Computing Principles;
- Optimization;
- Resource Allocation;
- Flow Networks and so on.

Virtualization, power management, material cycling are another name for healthy Energy Informatics. Energy Informatics [EI] may contain Informatics and its principles and Green Technology and Computing Principles. Energy Informatics may also involve Electronics, IT, Information Science, Power Management and other Gradients.

Energy Informatics [EI]: Beneficiaries and Applied Zone

As far as beneficiaries are concerned Energy Informatics may avail the benefit for following stakeholders:-

- Information Systems professionals which includes Chief Information Officer [CIO], Chief Technology Officer [CTO], Information Manager, Documentation Officer, Information Officer and others;
- Some Information enterprises like Information Center, Documentation Centre, Data Center, Information Networks, Information Grids, Digital Libraries, Digital Repositories and so on;
- Governance; better E-Governance, E Commerce, E learning is positively possible with Green Computing and Energy Informatics principles;
- Ultimately both suppliers, consumers of Information System will be benefited by healthy Energy Informatics practice.

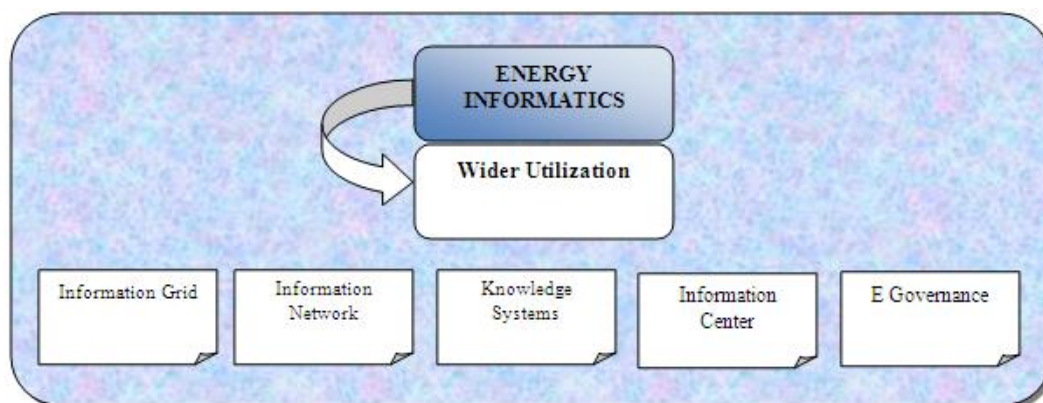


Fig: 2. Wider applied Field of Energy Informatics at a glance

Energy Informatics [EI] as an Academic Field: Possibilities and problems:-

Informatics is combination of Information Technology [computing] and Information fundamentals; thus it is responsible for information activities like- collection, selection, organization, processing and management of information. Though disseminating information is also an important task of Informatics practice.

Earlier Information was considered only as practice field or gradients, however during 1980's and 1990's several US and Canadian schools are introduced Informatics as an academic specialization to the UG/PG Degree. Even in some universities already have started full fledged UG/PG Degree on Informatics like-MS [Informatics].

The healthy Research and development on Information brought to us so many new subfield and dimension of Informatics. Fundamentally we can category Informatics in to two broad fields' i.e. Pure Science foci Informatics and Bio Science Foci Informatics. These are as follows—

<u>Bio Related Informatics</u>	<u>Pure Science Related Informatics</u>
Bio Informatics	Geo Informatics
Medical Informatics	Chemo Informatics
Environmental Informatics	Cloud Informatics

Fig: 3. Showing two main foci of Informatics domain

Out of these specializations such as Geo Informatics, Bio Informatics, Community Informatics gain academic popularity. Energy Informatics of course has suitable and responsible possibilities for an academic specialization; both come as full fledged Degree and partial Honours or specialization with MS-Informatics Degree.

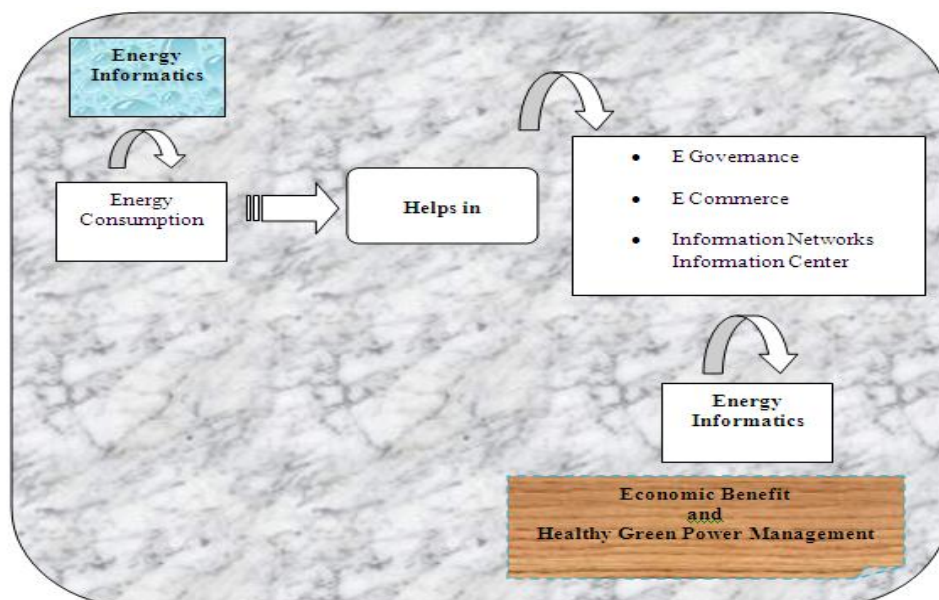


Fig: 4. How Energy Informatics promoting Healthy Environment and Economy

Academic community which includes Informatics, Information Science, Information Science and Technology [IST], Information Systems, Information Technology, Computing, ICT need to be aware about Energy Informatics and essential to introduce Energy Informatics as an academic programme. Though the level may be choose based on requirement. The foci are also an important area of Informatics; whether that will be biased on Information or Computing needs to take care by concerned department or schools.

However, recently introduced concept or pedagogy I-Schools may also avail the opportunity to offer distinguished programme on Energy Informatics. The figure 3 illustrated how Energy Informatics is helpful to build Green Power Management; while Fig 4 highlighted the probable courses on Energy Informatics from basic to advance level.

In India Energy Informatics may started as a speciation of Engineering [Computer/IT] and may offer with the nomenclature of MTech-Computer Engineering [EI] or MTech- Energy Informatics [EI] as full fledge programme.

Energy Informatics [Probable Bachelor Degree]	Energy Informatics [Probable Masters Degree]
BSc/BTech- Energy Informatics	MSc/MTech- Energy Informatics
BTech-Computer Science/IT [Energy Informatics]	MTech-Computer Science/IT [Energy Informatics]
BCA [Energy Informatics]	MCA [Energy Informatics]
BSc-Information Science/Systems [Energy Informatics]	MSc-Information Science/Systems [Energy Informatics]

Fig: 5 showing probable academic programme of Energy Informatics field

Energy Informatics [EI] and Sustainable Development

Green Computing and its advantage limit crossed when Energy Informatics [EI] may involve. Structure wise Energy Informatics [EI] is bigger than Green computing and even than green information systems. It is an interdisciplinary knowledge cluster incorporated with electronics, information systems, informatics, green technology, social science. Fundamentally it is utilizable for several causes like—

- Energy saving and consumption;
- Cost effective information system designing and development;
- Keep organization ‘Environmental policy fit, and for healthy environmental practices;
- Designing and development of an information system which should be reliable and based on energy star;
- For more centralization of information system products including computer, server, printer, network accessories;
- Building a green relationship between the stakeholders of information systems; these are data centre, information centre and so on.

Practically, healthy energy informatics may bring eco friendly information systems and that ultimately able to brought to us a healthy energy saving information system responsible for less carbon emission; thus it is ultimately responsible for complete sustainable development.

FINDINGS

- Energy Informatics [EI] may be an important academic and practice field;
- EI is broader field than Green Computing because it is also involved Electronics and Information Systems/ Science;
- Research on Energy Informatics [EI] still very minimum in academic and R/D;
- Still countries like India has limited awareness on Energy Informatics [EI] and its practices;
- Designing eco friendly Information Systems to the community level also essential for building Eco Friendly Information Infrastructure.

What Can Be Done

There are several things need to tack care be it academic development by introducing Energy Informatics [EI] as an academic specialization in the informatics programme or related programme or as complete degree programme on EI. As far as Governmental agencies and authorities are concerned, EI needs to take care for overall development as healthy Green making policy or Environment policy. Government need to put agenda and mission on 'Energy Informatics [EI]' and its practical utilization. From community side there are several things to do like putting importance on Energy Informatics Systems building, keep our society clean and Green and use of less our society clean and green and use of less consumed information system product. From researcher side some important things are possible like- designing better material cycling systems, more consumed Information Systems machines, value added network communication within Information Networks, Knowledge Grid, and Energy Efficient algorithm design and so on.

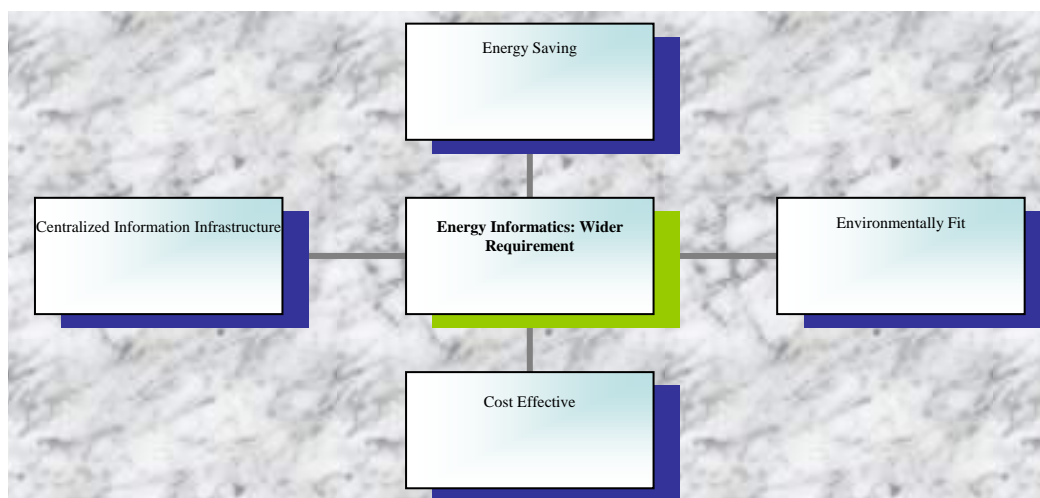


Fig.6. Shows why Energy Informatics is essential in today's age

CONCLUSION

Apart from researcher, scientist, academician, governmental stakeholder and community several stakeholder need to involve in EI practices. Ultimately Information professionals needs to much more aware about EI and its practical utilization for creation of energy efficient information systems, thus; they need to do research on EI and other emerging areas of Applied Information Science rather than their traditional/discussed area like web 2.0, ICT in LIS, Barcode, societal development, community integration is many ways depends on EI. We need to take initiative on flow networks, sensor networks, intelligent utilization [as mention Watson, 2010] for healthy Informatics powered by Green Electronics.

REFERENCES

1. "IEEE Technical Committee on Services Computing", Tab.computer.org. <http://tab.computer.org/tsc>. Retrieved 2010-08-22.
2. "Cloud Computing : the future of computing is here" , Microsoft Interface | April - June 2010.
3. Abdul Azeez, T.A. "How to Design A Digital Library", SRELS Journal of Information Management, Vol. 40, No. 3, September 2003, Paper Z. P267-273.
4. Adhikary, Madhabmohan, and Amitava Nandi, "Ideas of Ranganathan's Classification Theory Pervaded by Oriental Philosophy", SRELS Journal of Information management Vol. 40, No 3, September 2003, Paper AA, P275-284.
5. Roy S. and M. Bag, "Green Computing – New Horizon of Energy Efficiency and E-waste Minimization – World Perspective vis-à-vis Indian Scenario", Emerging Technologies in E-Government.
6. Agarwal, Ritu and Viswanath Venkatesh, "Assessing a firms web presence: A Heuristic Evaluation Procedure for the measurement of usability" , Information Systems Research, Vol. 13, No. 3, September 2002.
7. Aladwani, Adel M, "An integrated performance model of information systems projects", Journal of Management Information Systems, Vol. 19, No. 1, September 2002.
8. Alleman, James,, "Real options real opportunities" Optimize Magazine , January 2002.
9. Aparajita, "Virtual Information Center: How Close To Reality", SRELS Journal of Information Management, Vol. 42, No. 4, December 2005, Paper A.E., P419-426.
10. A P J Abdul Kalam, "IT Strategy in Defense Environment", DESIDOC Bulletin of Information Technology, Vol. 20, Nos. 1&2 , 2003, P 7-12 .
11. Aries, James A Subhankar Banerjee, Marc S Brittan, Eric Dillon, Janusz S. Kowalik and John P. Lixvar. "Capacity and Performance Analysis of Distributed Enterprise System", Communication of the ACM, Vol. 45, No. 6, 2002.
12. Attewell, Paul and James Rule. "Computing and organization: what we know and what we don't know", Communications of the ACM, Vol. 27, No 12, 1984.
13. Raftery, Tom, "Is Coud Computing Green", <http://www.enterpriseirregulars.com/44736/is-cloud-computing-green>.
14. www.en.wikipedia.org

ABHINAV

NATIONAL MONTHLY REFEREED JOURNAL OF RESEARCH IN SCIENCE & TECHNOLOGY

www.abhinavjournal.com

15. Prantosh Kr. Paul, K V Sridevi, B B Sarangi, Ramanna Chetri, Roshan Rai “Community Informatics: Role, Values and Challenges emphasizing need as an Academic Specialization” in IJCSMA, Vol 6 No 3-4,Page- 121-127,July Dec-2012
16. Prantosh Kumar Paul, Minakshi Ghosh, S Govindarajan, K L Dangwal “Community Informatics: The Emerging Field and Dimension of Advance Informatics” in IJRDBMS, Vol 6 No. 2 Dec-2012, Page- 403-410
17. Prantosh Kr. Paul, D Chatterjee, K Kumar, Minakshi Ghosh, “Green Computing: Wider Prospects, Opportunities and Challenges in 21st Century for Healthy Energy Management” in International Journal of ESCE, Vol 4 No. 2, July Dec, 2012,, Research Science Press, Page-123-126