Energy Efficiency in Nepal Potential, Issues and Challenges

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Outline

- Understanding Energy Efficiency
- Energy Efficiency (EE) Potential
- Issues and Challenges to promote Energy Efficiency (EE) in Nepal

Understanding Energy Efficiency

What Energy Efficiency (EE) is NOT ?

NOT a sacrifice to comfort

NOT a challenge for production

NOT just saving , BUT Sufficiency

What does EE mean ?

- **EE** : efficient consumption of energy by using or re-using appropriate **tools**, **technology** or **appliances**
- EE condition is measured by the amount of **energy required to produce per unit of goods or services (specific energy consumption)**

  e.g. *for light of 1600-1800 lumens*

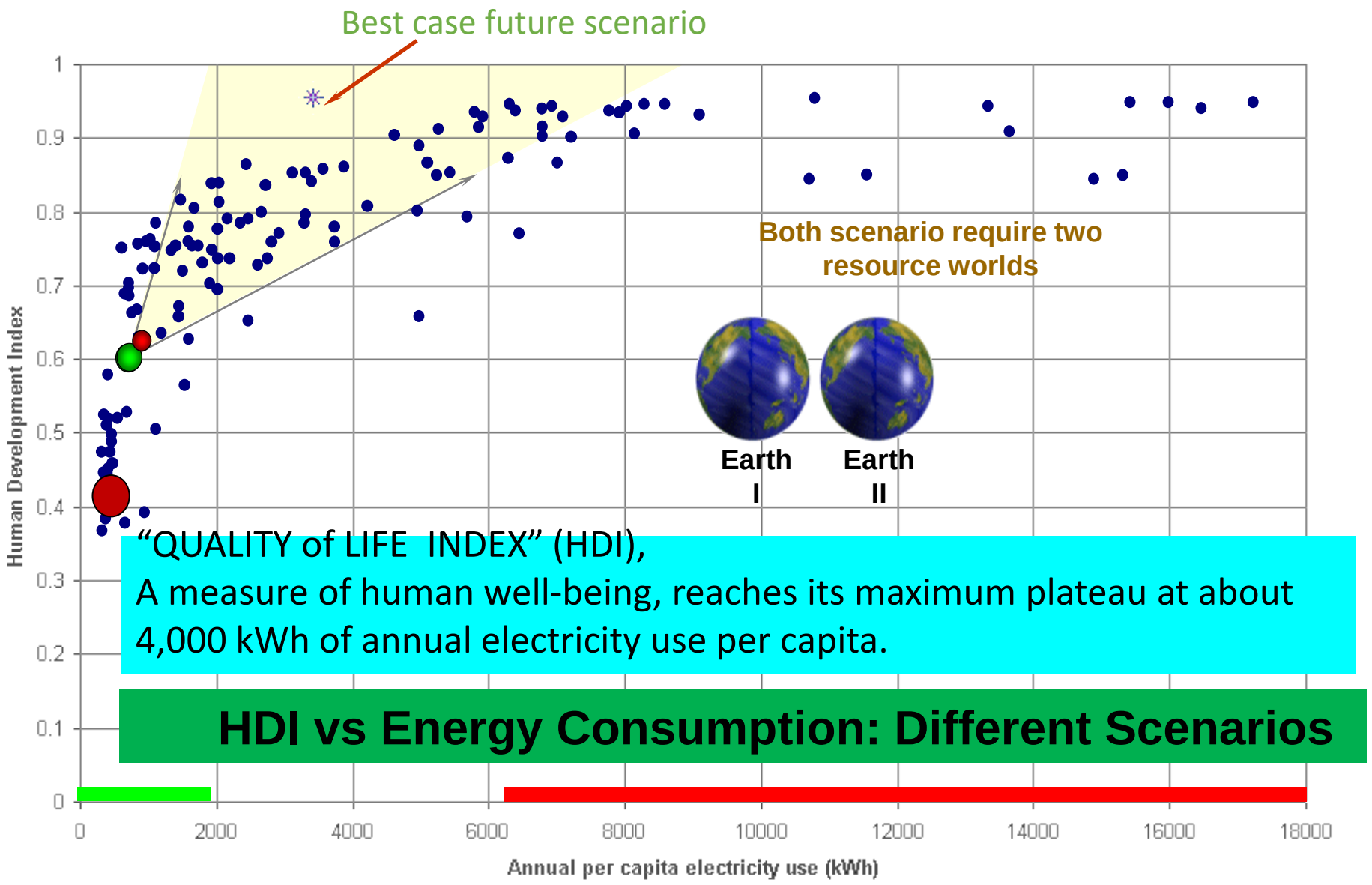
Incandescent bulb	*CFL*	*LED*
100 W	*23-30 W*	*8-10 W*

- **National EE** is measured by **energy intensity** (i.e. amount of **energy consumption** required to produce per unit of GDP
- **EE** for any country is the **Path** to **Prosperity**

Nepal is performing not so well in terms of energy and development indicators

Country	TPES/capita (GJ/capita)	TPES/GDP (GJ/1000 USD*)	Electricity use/capita (kWh/capita /year)	HDI (2021)	Prosperity Index, 2021 (rank)
Nepal	20.7	22.21	231 *(350)*	0.58	50.2 *(114)*
India	28.7	14.45	782	0.65	53.6 *(101)*
China	101.5	9.71	5119	0.76	62.2 *(54)*
USA	282.0	4.64	12744	0.92	77.1 (20)
Germany	148.3	3.44	6606	0.94	80.6 (9)

*Note: * 2015 USD* *Source: IEA, 2021 ; UNDP, 2021; Legatum, 2021*



"QUALITY of LIFE INDEX" (HDI),
A measure of human well-being, reaches its maximum plateau at about 4,000 kWh of annual electricity use per capita.

HDI vs Energy Consumption: Different Scenarios

Energy Efficiency Potential

1000 billion USD – Global EE Spending

- Global energy efficiency spending during 2020-2022
- Two thirds of total clean energy recovery packages during that period

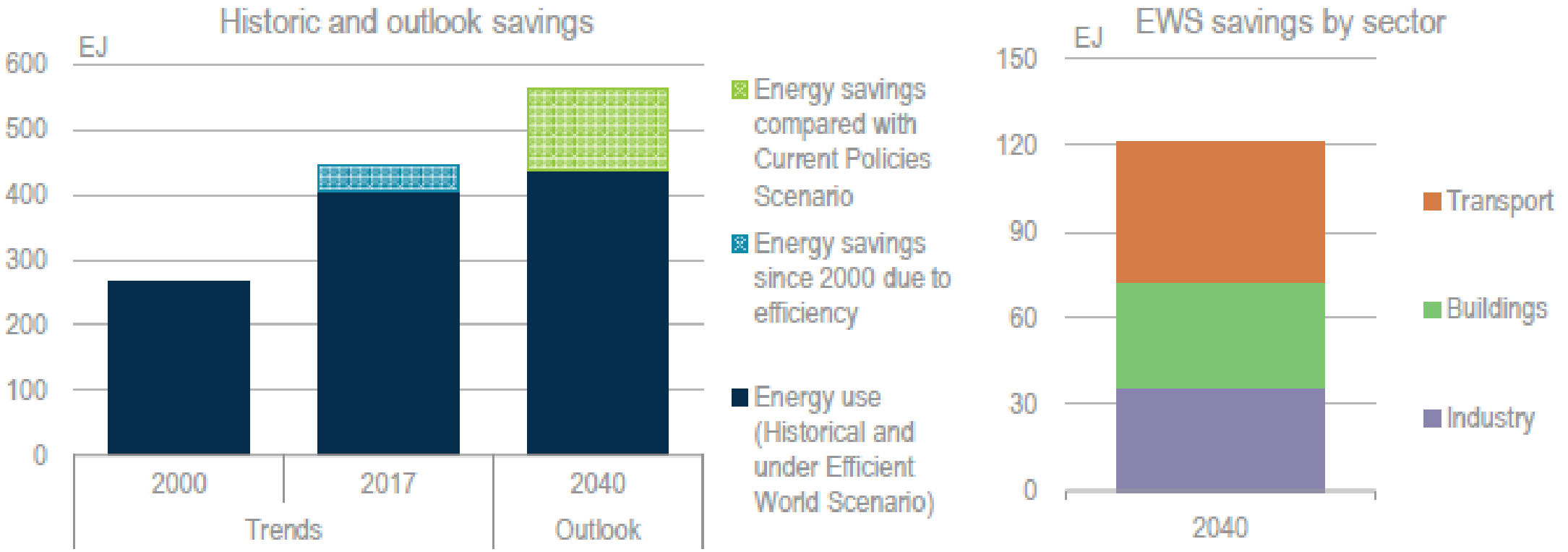
560 billion USD – EV spending

- Global investment in EVs and fuel-efficient vehicles in 2022
- 16% rise from the previous year in EV spending

12% Energy Saving by EE

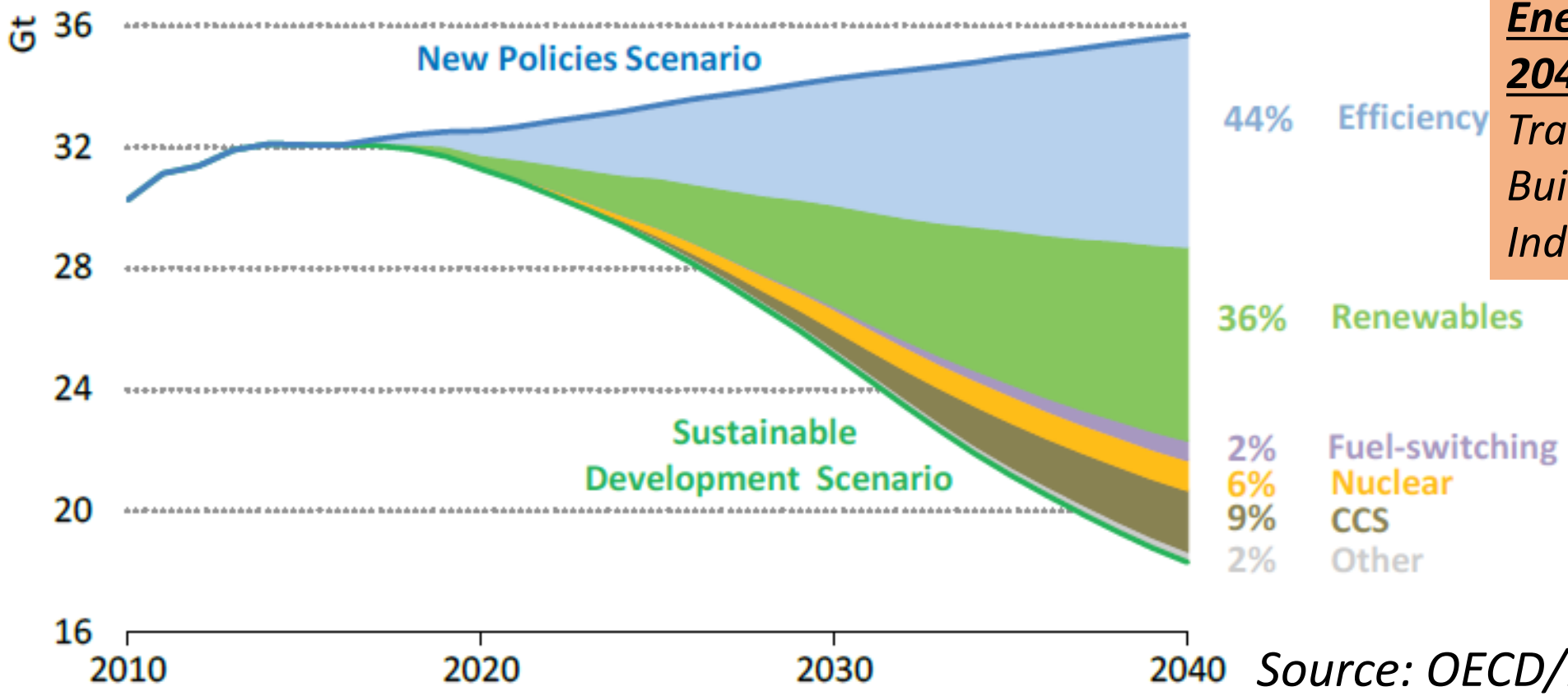
- Efficiency improvements saved 12% of energy in 2017 (i.e. 37 EJ), which is equivalent to total energy use of Japan and India combined in that year
- EE actions in IEA countries lowered energy bills by USD 680 billion in 2022
- Saving : **Industry = 19 EJ(51%); Buildings= 14 EJ (38%)**; Transport = 4 EJ (11%)

EE has good potential for Energy Saving



Source : IEA, 2018

EE could be the largest contributor to reduce global CO_2 eq. emission between 2010-2040



Energy saving in 2040 by EE

Transport = 38%

Building = 33%

Industry = 29%

Source: OECD/IEA, 2018

Despite a good potential of EE, the world has not been able to trap its full benefits yet

- Increasing energy prices are driving a cost-of-living crisis, worsening energy poverty and public health – EE can support to address this issue
- Energy efficiency ensures economic growth, pollution reduction and promotes energy security
- Proper legal and regulatory frameworks can contribute to the achievement of more than 40% of GHG mitigation targets
- As IEA's estimate, if proper legal and institutional frameworks on EE were in place in 2017 :
  - If all the countries in the world could have used highest fuel-efficient vehicle, the world could save daily 3.5 million KL of petroleum fuel.
  - If all countries would have used most energy efficiency electric motors, the world could have saved 15% of electrical energy used by industries
  - If everyone have used top 10% most efficient refrigerator, we could have saved 20 billion US dollar equivalent of our annual income

More than 100 energy audits of energy intensive industries show substantial saving potential in Nepal

Nepal Energy Efficiency Programme Baseline Study (2012)

- Soap & chemicals (36%); Cold storage (20%); Hotel (39%); Brick (33%);
- Metal (18%); Pulp & paper (7%); Cement (42%); Food & beverage (11%)

Analysis of 76 Investment Grade Energy Audits carried out under NEEP (2013-2017) revealed the benefits of implementing EE measures :

- Annual energy saving: Thermal: 619 TJ **(19% of baseline use)** ; Electrical : 28.2 GWh **(18% of baseline use)**
- Invest. : **2.9 Million USD ;** Annual saving : **1.0 Million USD; Payback < 3 yrs**

A study carried out by PADECO Japan through ADB support (2019):

- Analysis of the energy audits of selected Nepalese industries revealed an investment requirement of **40 Million USD** for implementing suggested EE measures with a potential annual saving of **17.5 Million USD** (**Payback < 3 yrs)**

Energy Efficiency Issues and Challenges

EE Issues and Challenges in Nepal

- Information, Communication and Education (ICE) Gap :
  - **EE understanding** : **Non, poor or even wrong understanding**
  - **EE consideration** in building design and construction: **non or the least among others**
- Coordination Gap : EE's multidisciplinary nature poorly considered (engineering, finance/economics, management, social science, environment) and poor coordination among different agencies/professionals
- EE not yet in the mainstream of energy and development planning
  - Supply-side dominated energy policies, plans and mind-set
- Regulatory and Institutional Gap:
  - Lack of appropriate energy efficiency policy and regulatory framework (policy, acts, rules, regulations, guidelines, standards, codes)
  - Lack of proper institutional framework for coordination, planning and implementation
- Financial, Technological and Human Resources Gap

Addressing challenges in Building Energy Efficiency

- Mainstreaming EE in overall energy and development planning
- Awareness raising on EE: ICE (information, communication, education)
- Establishing proper policy, regulatory and institutional framework to support EE (act, rules/regulations, guidelines, codes, MEPS, S&L on EE)
- Developing market players of EE industry (technology, suppliers, service providers, human resources, ESCO)
- Establishing EE financing and incentive system – fiscal and non-fiscal (credit, grant, recognition/awards, subsidy, tax rebates, etc)
- Creating appropriate energy tariff/pricing structure (electricity, fuel)
- Establishing appropriate system of EE benefit sharing(e.g. renter-rentee)

Thank you

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