DRAFT 2ND NATIONAL ENERGY EFFICIENCY ACTION PLAN FOR THE REPUBLIC OF ARMENIA

Renewable Resources and Energy Efficiency Fund

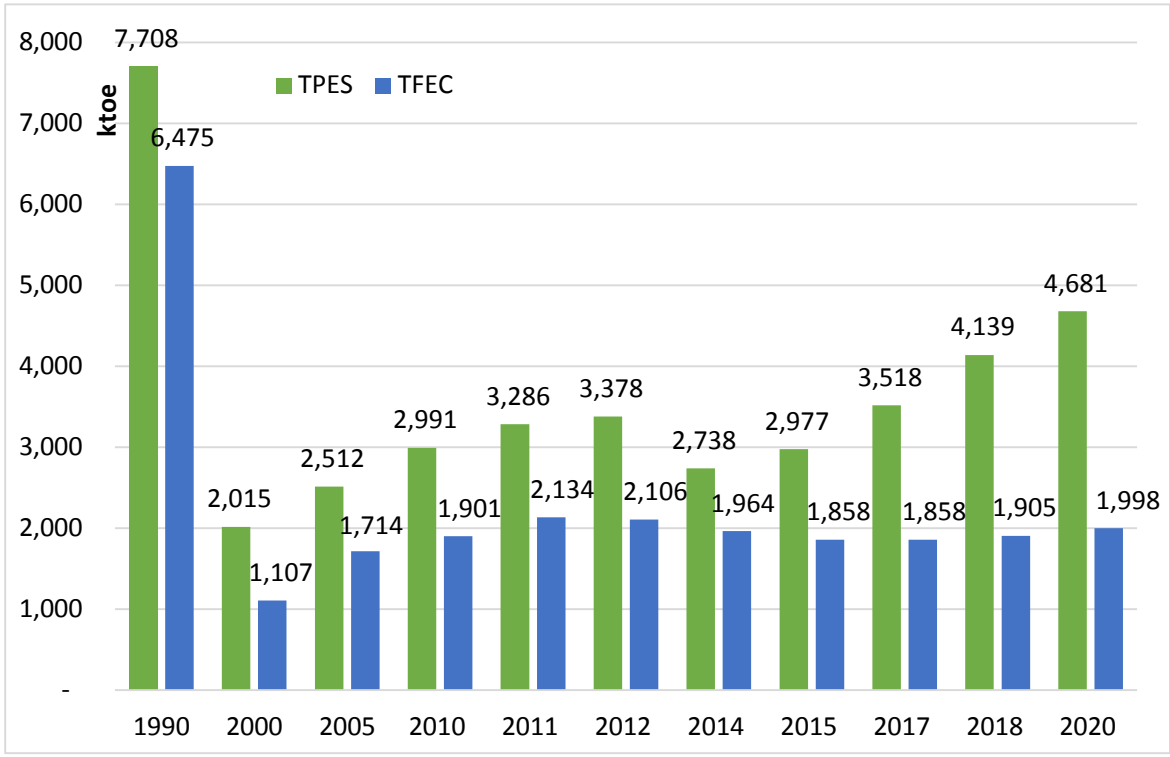
World Bank / Global Environmental Facility

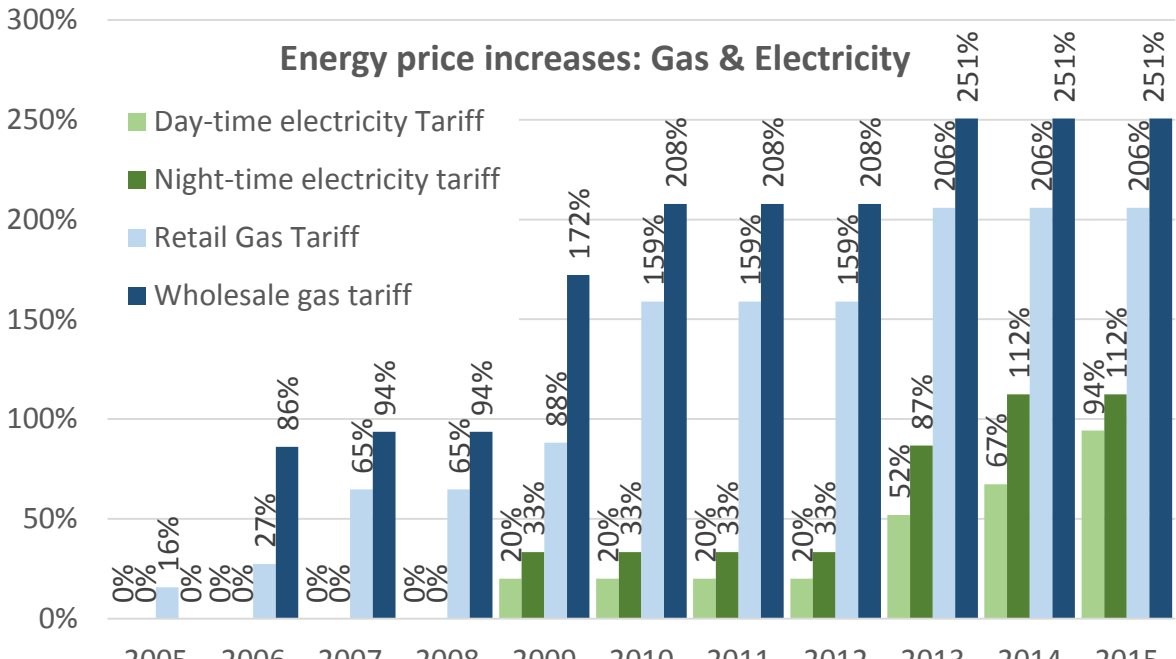
Government of Armenia

Astghine Pasoyan, Team Leader

Energy Efficiency – why care?

- **2/3 of all energy resources imported**
- **Emerging supply gap:**
  - Demand grew and forecasted to grow further, existing supply capacities insufficient to meet the growing demand
  - Future demand supplied by aging capacities to require 2-3 times more TPES
- **Energy price hike in the last decade poses affordability and competitiveness problems**
  - Electricity price rose by 94-112%
  - Natural gas price rose by 200-250%
- **Armenia's economic indicators dragging:**
  - Global competitiveness index dropped from 117 to 85 during 2013-14 (WEF)
  - GDP growth dropped from 7.2% to 3.4% during 2012-14 (WB)





Why is Energy Efficiency Important for Armenia?

Energy Efficiency can:

- create conditions for economic growth while improving the country's energy security.
- reduce the energy intensity of the national economic output, improve cost-effectiveness & competitiveness
- maintain a safe, sustainable and affordable energy supply, while mitigating climate change
- help meet increasing energy demand, capturing "lost opportunities" for saving energy in new construction
- Improve the quality of life for the Armenian population, create jobs and help local economy
- reduces utility bills for all consumer groups
- reduces use of limited natural resources and pressure on endangered forest resources

Under conditions of extreme energy import dependence, energy that Armenia's citizens, businesses, and infrastructure do not use is the cheapest, cleanest, and most secure energy resource.

Quantifying Energy Efficiency for Armenia's Economy

Realizing full economic potential of energy saving, can rise Armenia's domestic energy supply may rise by 50-70% (reduced energy imports)

Economic gain from energy saving equivalent to 5% of GNP, or 80% of state budget deficit

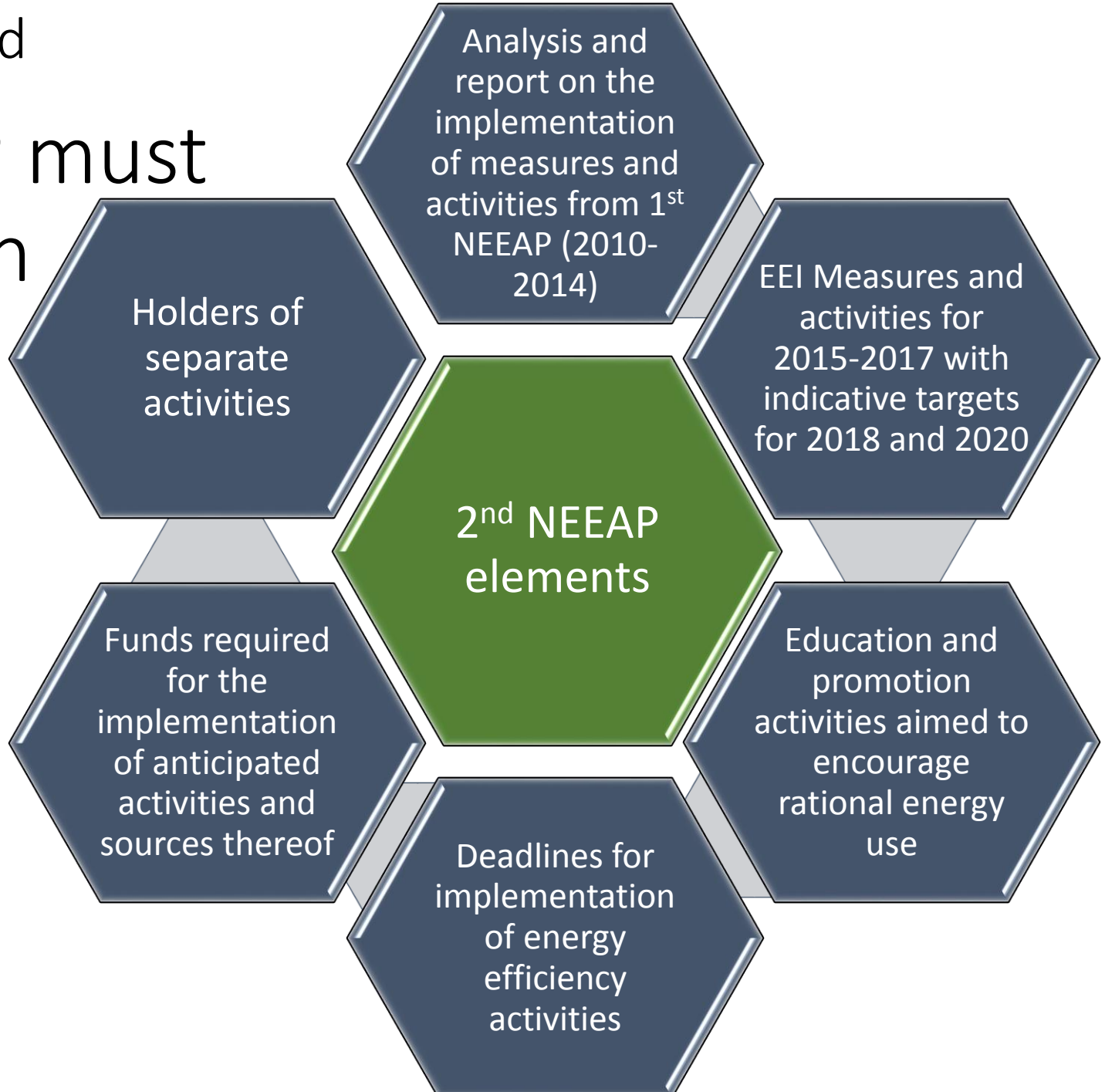
$1m^3$ of imported natural gas costs twice more than investments to reduce $1m^3$ natural gas consumption

Building 1kW new capacity costs 5 times more than saving 1kW energy on demand side

NEEAP Process Introduction

- NEEAPs in Southeast European Countries (West Balkans, Moldova, Ukraine, pending Georgia)
  - focus on documenting ongoing efforts,
  - identify cost-effective and/or low-cost/no-cost measures to promote energy efficiency,
  - under conditions of limited availability of funds from state budget, rely on IFI lending and private sector participation
- 1st National Energy Efficiency Action Plan (NEEAP)
  - developed in 2010 for 2010-2013, assessed for 2010-2014
  - Set energy saving target for 3% by 2013;
- 2nd NEEAP
  - Assesses the 1st NEEAP progress (2010-2014)
  - Sets forth targets for the next 3-year period (2015-2017)
  - Sets indicative targets for 2018 and 2020
  - Outlines the allocation of institutional roles and monitoring duties

The 2nd NEEAP must contain



NEEAP also includes

- Primary energy savings (separate section), which will include description of measures addressing the primary energy saving potential and primary energy savings targets (in production, transmission and distribution of energy, i.e. electricity, thermal energy); this may include gas and electricity tariff structure improvement, other DSM measures,
- National target for nearly zero energy buildings – not quantitative;
- Possible improvements of the primary and secondary legislation necessary for achieving the energy efficiency targets; this may include mechanisms for energy efficient public procurement, new regulations and standards for enforcement of new energy efficiency technologies, etc., and
- Other data as proposed in the template, as well as data that are not required in the template but are deemed to be necessary and important to be included such as the financial aspects and savings.

Key NEEAP Pillars for Armenia

Reducing energy demand by improving the efficiency of energy end use	Improving national energy security by reducing the need for imported energy resources	Decreasing the energy content of the key economic outputs to reduce costs and raise the competitiveness of output	Addressing growing energy affordability concerns through energy efficiency solutions (instead of relying on social aid)	Providing impetus for behavioral change by decoupling growth from energy use, and thus enhancing the quality and sustainability of development

Sectoral Scope

Buildings

- Residential: existing building retrofitting
- New construction: Regulatory framework

Public sector

- Public Buildings
- Services: Municipal Street-lighting, etc.

Industry

- Power sector: generation, transmission, distribution
- Heavy industry/large enterprises
- SME

Agriculture

- Irrigation,
- Aquacultures,
- Greenhouses, etc.

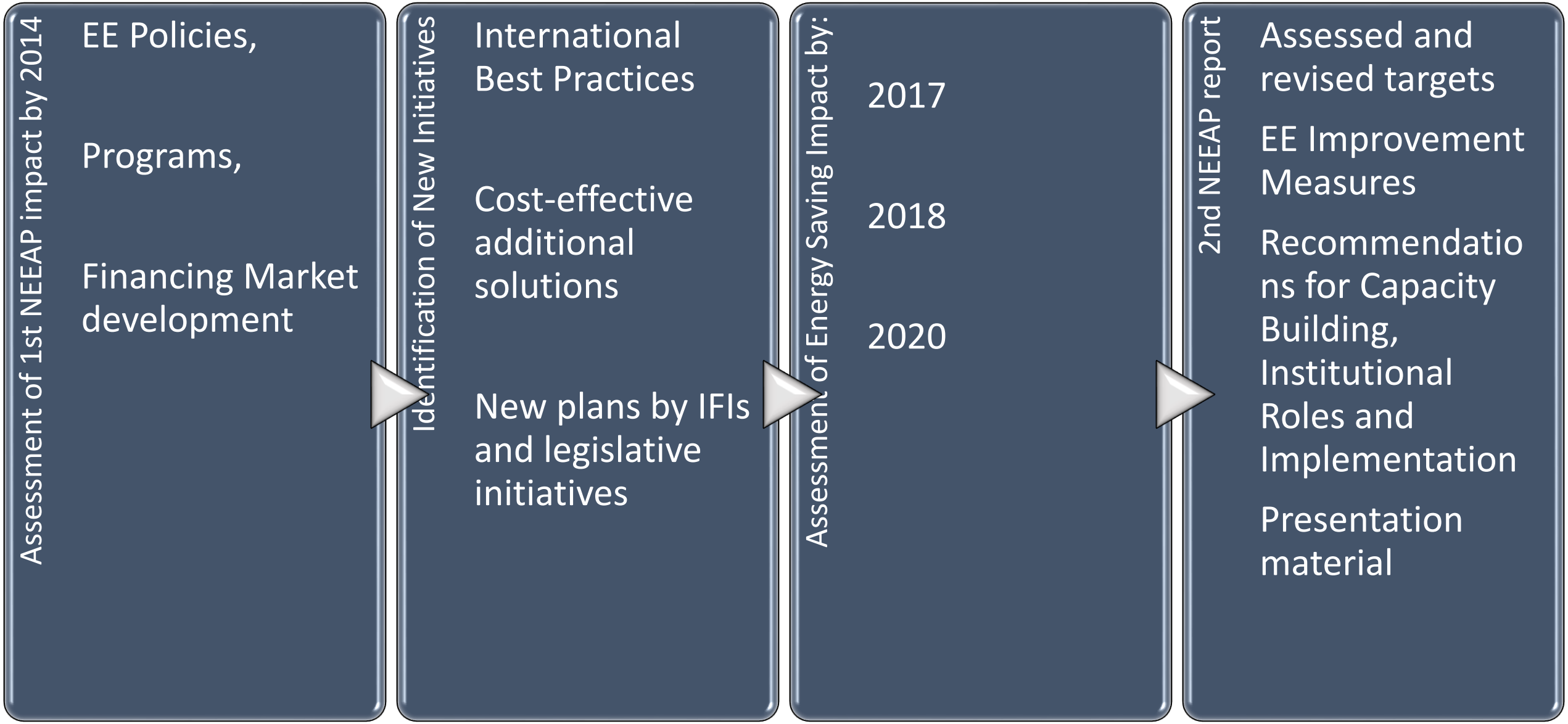
Mobility (transport)

- Electric transport,
- Road infrastructure,
- Fuel switching,

Horizontal measures

- policy measures (energy audits, SEAPs, public procurement, codes/standards, BATs, etc.),
- grants/subsidies,
- TA (audit templates, EE calculators, guidebooks, sample RFPs/contracts,
- ESCO development) and
- information (training, awareness, info. centers).

Scope of Assessment



Review of Policies, Strategies, Regulations in EE

Energy policies and instruments and their implementation

- Energy Sector Development Strategy of 2005
- Law on Energy Saving and Renewable Energy
- National Program on Renewable Energy and Energy Efficiency
- 1st National Energy Efficiency Action Plan
- 2012-2025 Long-Term Strategic Development Program
- National Energy Security Concept
- Least Cost Generation Plan
- RE Roadmap & SREP Investment Plan 2014

Secondary Legislation & Regulatory Framework

- Resolution 1504 on Mandatory EE In State Investment Programs
- Draft Technical Regulation on “Buildings and structures/premises, construction materials and products. Safety”
- Draft Technical Regulation on “Building Energy Efficiency”
- Normative-technical documentation

International Treaties

- Energy Charter Treaty
- Observer Status in Energy Community
- United Nations Framework Convention on Climate Change
- EU Covenant of Mayors
- Eurasian Economic Union documentation

Assessed IFI & Donor activities in Energy Efficiency

United Nations Development Program (UNDP) / Global Environment Facility (GEF):

- Green Urban Lighting Project
- Improvement of EE in buildings Project
- EE in Municipal Heating and Hot Water Supply Project

United States Agency for International Development (USAID):

- Residential Energy Efficiency for Low-Income Households (REELIH) Program
- Energy & Water Program,
- LEDS Project and least cost generation planning
- STIP initiative and plans for water and energy efficiency solutions in fisheries

Eastern European Energy Efficiency and Environment Partnership (E5P)

- Pipeline of municipal infrastructure EE projects:
- 1.District Heating;
- 2. Water and Wastewater;
- 3. Solid Waste Management;
- 4. Street Lighting;
- 5. Insulation of public buildings or residential housing;
- 6. Urban Transport.

European Commission

- SUDEP EE & RE for Spitak & Vayq Communities
- INOGATE Technical Secretariat
- NIF grant co-financing for selected IFI loan products

World Bank/GEF

- Public/Municipal/Social Building Energy Efficiency Credit Line Via ESA Scheme

International Finance Corporation (IFC)

- Sustainable Energy Finance Project on-lending through banks for corporate and residential EE through 2 PFIs

European Bank for Reconstruction and Development (EBRD):

- Caucasus Sustainable Energy Financing Facility in Armenia providing corporate & residential energy efficiency loans through 5 PFIs with free TA & LEMA, and 10-15% grant investment incentives
- Direct loans with sovereign guarantees
- Leveraged funding from EIB

KfW lending activities and planned initiatives in the field of energy efficiency:

- EE-integrated reinforcement of schools (may leverage ADB)
- Financing solar water heaters
- Housing EE (conceptualizing)
- EE in SMEs

Green for Growth Fund

- EE & RE Loans through PFIs

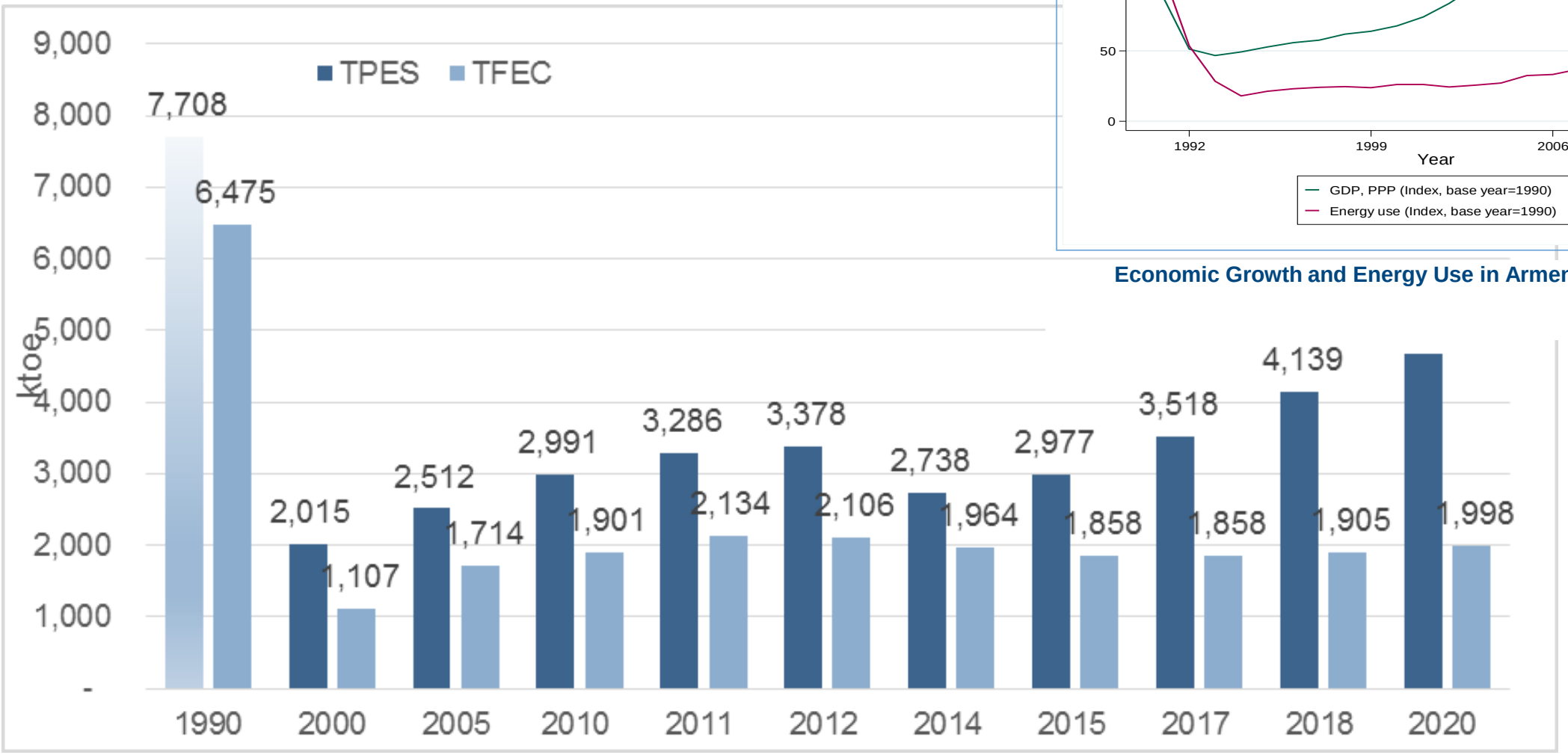
French Development Agency

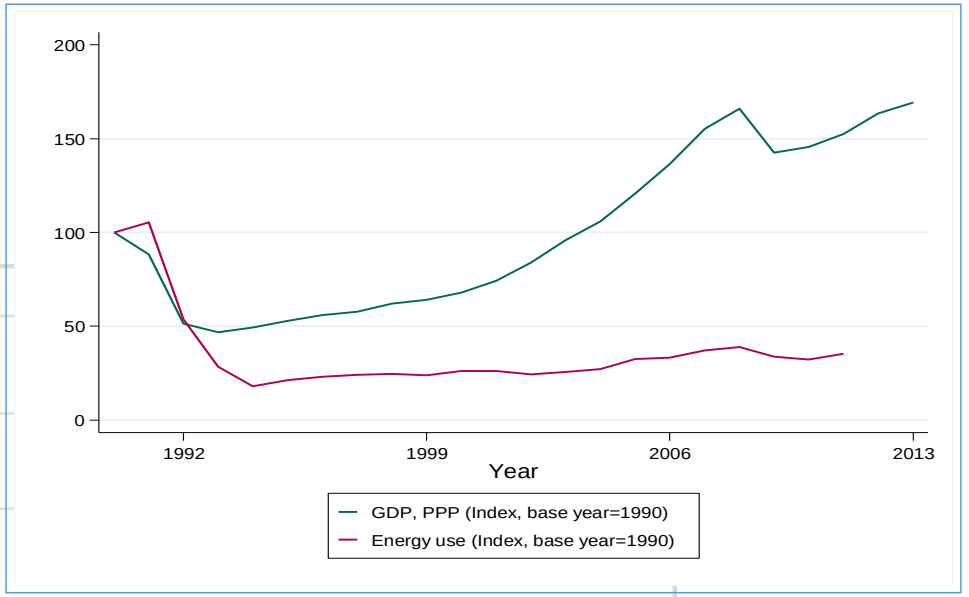
- Residential EE Loans to low-to-middle income HH with 5-10% grant incentive through NMC

Operated data

- IFI survey up to 2014, no projection for future
- Energy Balance for 2010-2012, which contradicts PSRC and customs data
- Data provided by Municipality of Yerevan on transportation
- National Statistical Reporting

Background Conditions

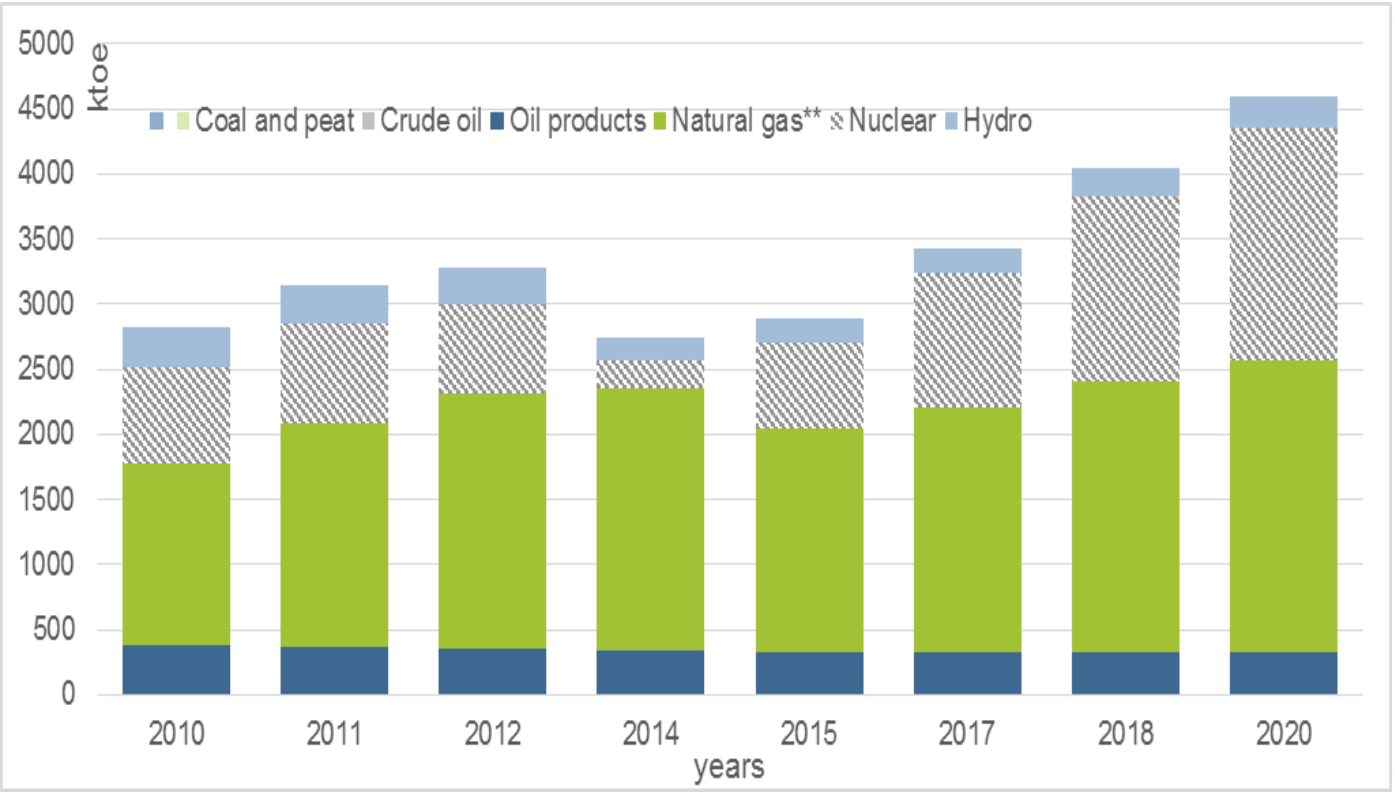




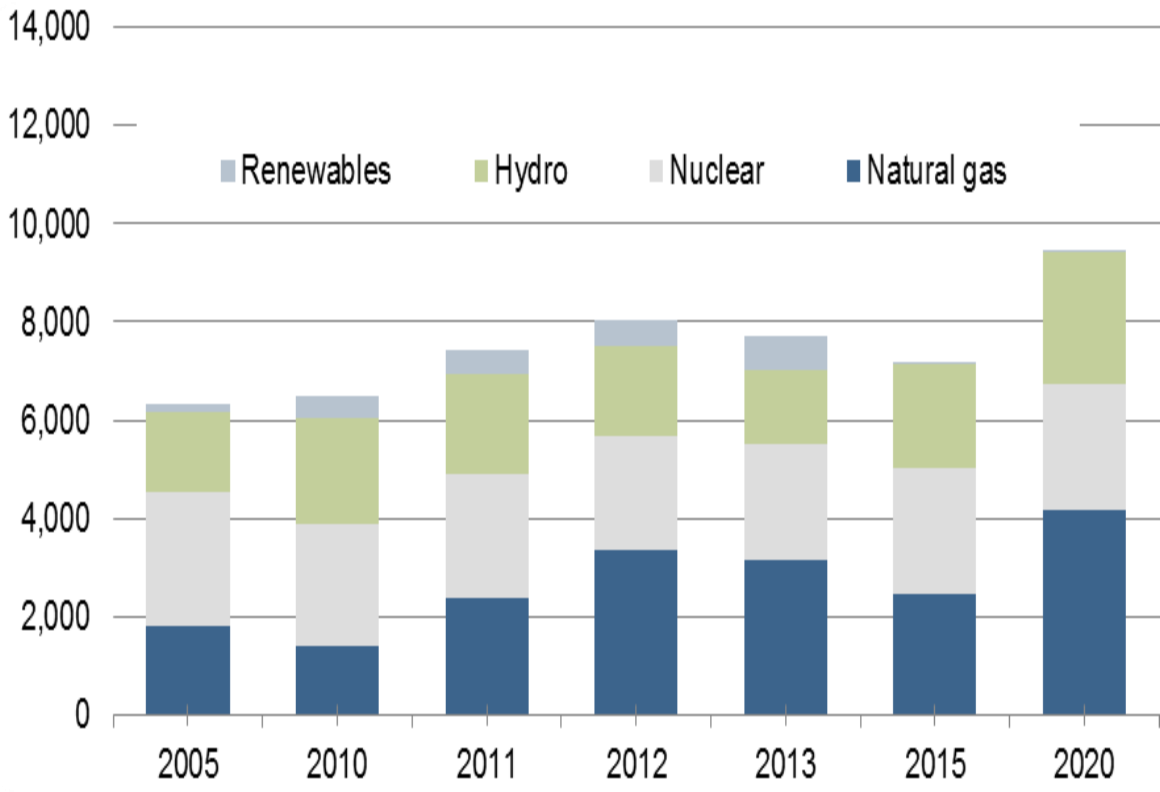
Economic Growth and Energy Use in Armenia. WB 2014

Final energy consumption & Electricity Generation

Final energy consumption in Armenia by sector



Electricity generation by fuel (in GWh)



Source: USAID, 2012. Reference scenario for 2015-2030.

**Data for 2000 and 2005 are from IEA, Statistics*

Source: Annual Report of the Ministry of Energy and Natural Resources of RA

1st NEEAP Assessment

Sector/Measure		Baseline Final Energy Consumption	Estimated annual savings SECTOR TARGET based on 2010 baseline (% and ktoe)		Sector target in 2014 (ktoe)
		2010 (in ktoe)	Annual savings	Cumulative 1st NEEAP TARGET set for 2014 (in ktoe)	ACHIEVED
I.	**Horizontal Measures (Cross-cutting investments in AG.IND, RES)**	no target	NO TARGET		
			Cumulative (ktoe)		35.5
II.	**Building Sector (Residential)**	695.7	Cumulative (%)	2.7%	0.0%
			Cumulative (ktoe)	18.8	0.1
III.	**Public Buildings & Services**	206.9	Cumulative (%)	1.7%	26.6%
			Cumulative (ktoe)	3.5	55.1
IV.	**Industry Sector**	358.3	Cumulative (%)	6.7%	0.4%
			Cumulative (ktoe)	24.0	1.4
V.	**Transport Sector**	499.6	Cumulative (%)	3.1%	14.1%
			Cumulative (ktoe)	15.5	70.6
VI.	**Agricultural Sector/ Forestry**	140.1	Cumulative (%)	1.1%	0.1%
			Cumulative (ktoe)	1.5	0.13
VII.	Total	1900.6	Cumulative (%)	3.3%	**8.6%**
			Cumulative (ktoe)	63.3	**163.1**

1st NEEAP Analysis: Lessons learnt

- EE credit lines for various borrower groups operating through banks on commercial terms – successful!
  - Due to the mixed reporting on lending, impossible to separate sectoral impacts
- The lending for public building energy efficiency very successful!
- Efficiency upgrades in transport sector successful both in public and private sectors
- Energy Tariff increase has had a direct impact on curtailing consumption
  - Not only through efficiency, but also through sacrificed comfort, hence utility affordability is an issue
- Despite crisis, slow economic growth, lending and EE investments grew
- Need aggressive policy reform to accelerate EE In other sectors, where progress has lagged

Achievements

- Legislation, programming, strategic documents, planning, technical regulations for promoting energy saving and energy efficiency
- Significant expansion of RES utilization, including EE-integrated renewables
- Combined heat & power development (Yerevan TPP, Hrazdan TPP 5th unit, Avan DH)
- Establishment & successful operation of R2E2, public sector EE lending and ESCOs
- Populated donor & IFI community: WB,IFC,EBRD,GGF,USAID,ADB,AFD,KFW,UN, GEF,E5P
- Detailed energy balance for 2010-12
- Initial steps in direction of modernizing EE standards and norms

Positive Steps & Successes to Date and Remaining Issues

Policy reform initiated (ES&RE Law, ES&RE Program, EPBD, 1st NEEAP, etc.)

More drafting needed, Enforcement lags, institutional capacity insufficient

Standard & norms being updated to meet international best practices

Only small part, done with donor-funding, | Enforcement lags

Several studies assessed the potential for energy saving at 30-40% of overall national use

Potential largely remained untapped

Donor-funded pilot projects demonstrated a sufficient set of technical solutions for EE

Not always found administrative models & financing mechanisms for replication

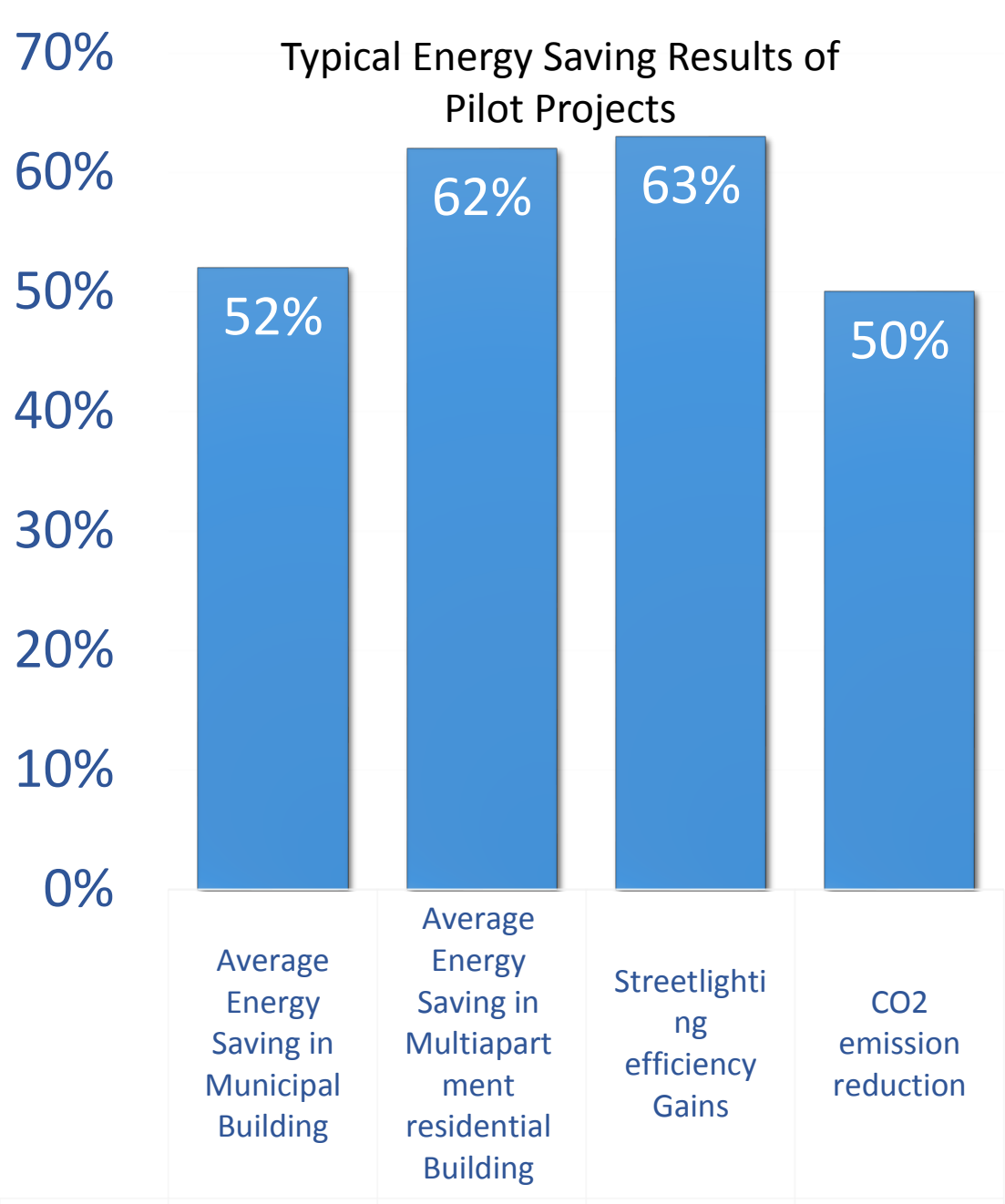
Credit lines functional for corporate, SME, households and municipal EE

Grant-funding for potentially bankable investments, duplication in some cases | Multi-apartment housing EE underserved

Local authorities slowly taking the lead (CoM/SEAPs)

Municipalities lack skills and resources for energy planning and project development

The public awareness and outreach not adequate



Gaps for Energy efficiency

The lack of enforcement in the existing EE regulations, including enforcement procedures for	The latest Government decree on mandatory compliance with EE requirements in state investment projects and residential construction
	Energy auditing regulations
	Standards & Codes for all sectors
	Labeling of appliances and buildings
	Energy performance in buildings
Associated legislative initiatives have been put forward, but adoption and/or enforcement lags	Technical regulations on building safety and energy performance,
	Amendments to the Law on Urban Development,
	Law on Yerevan City Center
	Amendments proposed to housing legislation, need a holistic policy reform
No financial incentives for EE	Failed enforcement of the voluntary provisions of the Law on Energy Saving and Renewable Energy
	Introduction of benchmarking through best available technologies also requires strong legal provisions coupled with incentives
Not all sectors adequately covered by financiers	Not all EE credit lines have financing terms adequate for energy efficiency borrowers
	Some sectors have multiple credit lines serving (e.g. public buildings, households, corporate), multi-apartment building niche not covered by any
Lack of capacities	LFIs lack skills and knowledge to adequately partner with private sector for EE investment financing
	ESCOs lack skills for bankable project preparation and negotiations with LFIs
	Industrial enterprises lack knowledge and understanding of EE and its true costs & benefits
	Multi-apartment buildings' capacities to serve as a lending partner for EE investments
	Municipalities lack capacities in energy planning and project development
	Central Government lack capacities in monitoring and reporting on EE Plans
Imperfect information and lack of awareness among all user groups	Lack of information dissemination about the opportunities and benefits of EE, RE, technical and financing solutions, service & material vendors
	Lack of information on subsectoral energy consumption patterns, utilized technologies, energy saving potential
	Lack of MRV on the effectiveness of various policy, capacity-building, and financing efforts

Ways to Eliminate Gaps and Move Forward…

Continued reform:	• Amendment of the Law on Energy Saving and Renewable Energy • Adoption/ enforcement of bylaws on energy auditing and EE in public procurement • Development/ enforcement of EE standards, codes and labeling for all uses
EE funding:	• Continued operation and expansion of R2E2 Fund operations • Smooth integration of E5P grant co-financing for non-bankable projects • Leveraging IFIs & LFIs resources to address underserved segments of EE financing market
New/improved housing legislation:	• Create favorable investment environment in multi-apartment buildings • Introduce private sector participation through private maintenance companies & ESCOs
Tariff reform:	• Revise tariffs to incentivize energy efficiency • Low-income assistance for implementation of energy efficiency measures
EE-integrated renewables:	• Incentives for wider combined energy efficiency-integrated renewable energy application
Information and outreach:	• Improvement of energy efficiency data collection and periodic energy balance calculation • Development and provision of technical assistance in best available energy efficiency technologies for the industrial and agricultural sectors (e.g., greenhouses and aquaculture)
Capacity Building:	• Strengthen capacities among HOAs, SMEs, ESCOs, municipalities to plan and implement EE • Strengthening the institutional capacity of the State to develop and implement EE policy. • Create/assign capacities to oversee NEEAP implementation, conduct MRV

New Baseline & Target: TPES, TFEC, energy intensity

	2010	2011	2012	Baseline (3-year average)
Total Primary Energy Sources (ktoe)	2,991	3,286	3,378	3,218
Final energy consumption (ktoe)	1,901	2,134	2,106	2,047

Source: USAID "Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) Program in Armenia" Implemented by Tetra Tech, Preliminary Results of National Energy Balance Calculation for Armenia for 2010-2012

Population	2010	2011	2012	Average
Total area of housing stock, ths. km^2	88,633.5	92,597.7	93,411.8	
population *1000	3,262.6	3,021.4	3,026.9	
Electricity consumed by population	138,548.2	155,460.4	163,508.2	
Natural gas consumed by population	442,492.4	452,386.1	445,198.8	
TOE per capita	0.58	0.70	0.57	0.58

	2010			2011			2012			
Sectors	ktoe energy use in sector/ subsector	Sectoral GDP (AMD bln)	Energy Intensity (ktoe/bln AMD)	ktoe energy use in sector/ subsector	Sectoral GDP (AMD bln)	Energy Intensity (ktoe/bln AMD)	ktoe energy use in sector/ subsector	Sectoral GDP (AMD bln)	Energy Intensity (ktoe/bln AMD)	3-year ave-rages
Industry	358.27	824.40	0.43	356.43	999.00	0.36	371.72	1,121.90	0.33	0.37
Transport	499.62	116.53	4.29	523.76	117.42	4.46	538.83	130.60	4.13	4.29
Agriculture	140.15	636.70	0.22	141.94	795.00	0.18	155.11	841.50	0.18	0.19

Cross-cutting & Horizontal Measures

Regulatory

- Implementation of a regular national " Energy Statistic" (with annual updates)
- Implementation of a "National EE&RE Energy Agency"
- Financial Support for Energy Efficiency measures in all Sectors
- Information campaigns,
- training, education in EE
- improvements
- General Regulatory demand-side measures
- Removing inadequate gas & electricity tariff structure to encourage EE

Programmatic

- Financing for Energy Efficiency: GGF
- Financing for Energy Efficiency: IFC EE loans for households and SMEs
- Financing for Energy Efficiency: EE loans for residential and business clients, EBRD ArmSEFF
- Financing for EE: Eastern European Energy Efficiency and Environment Partnership (E5P)
- Removing inadequate gas tariff structure to encourage energy savings
- Support to Armenian Municipalities in Sustainable Energy Action Planning

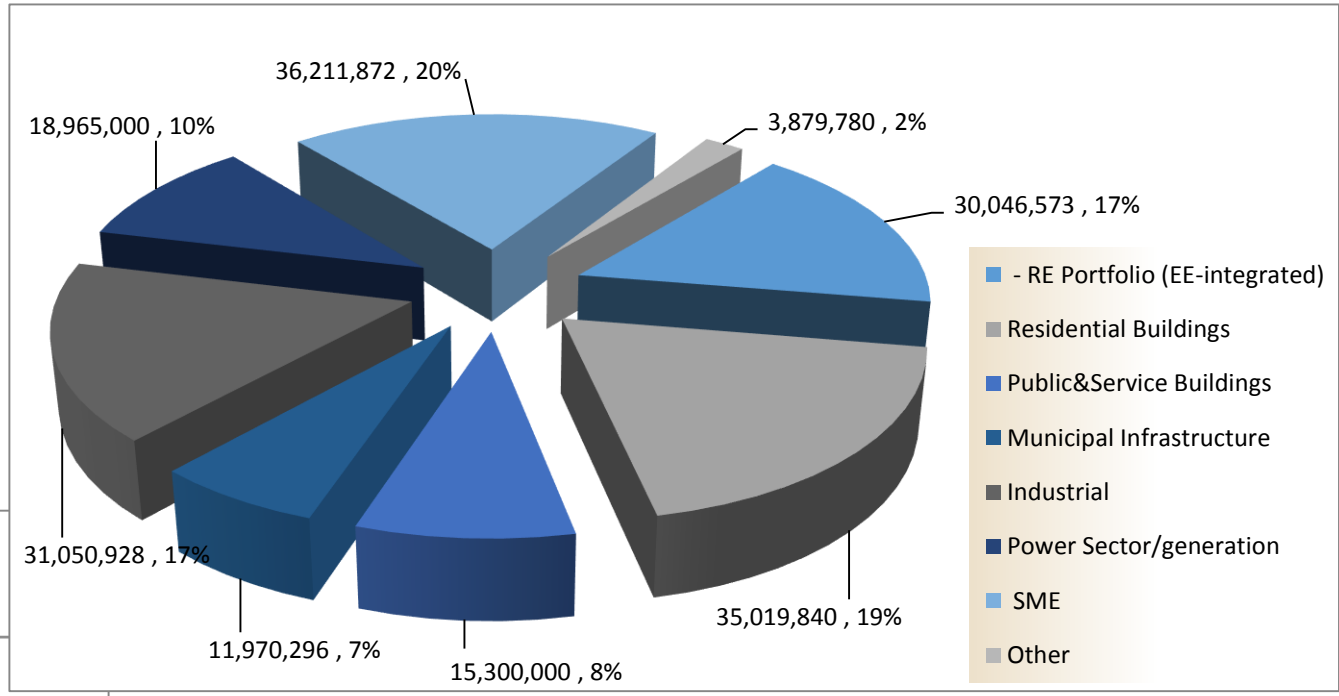
Cross-cutting Measures: as set forth in the 1st NEEAP and progress

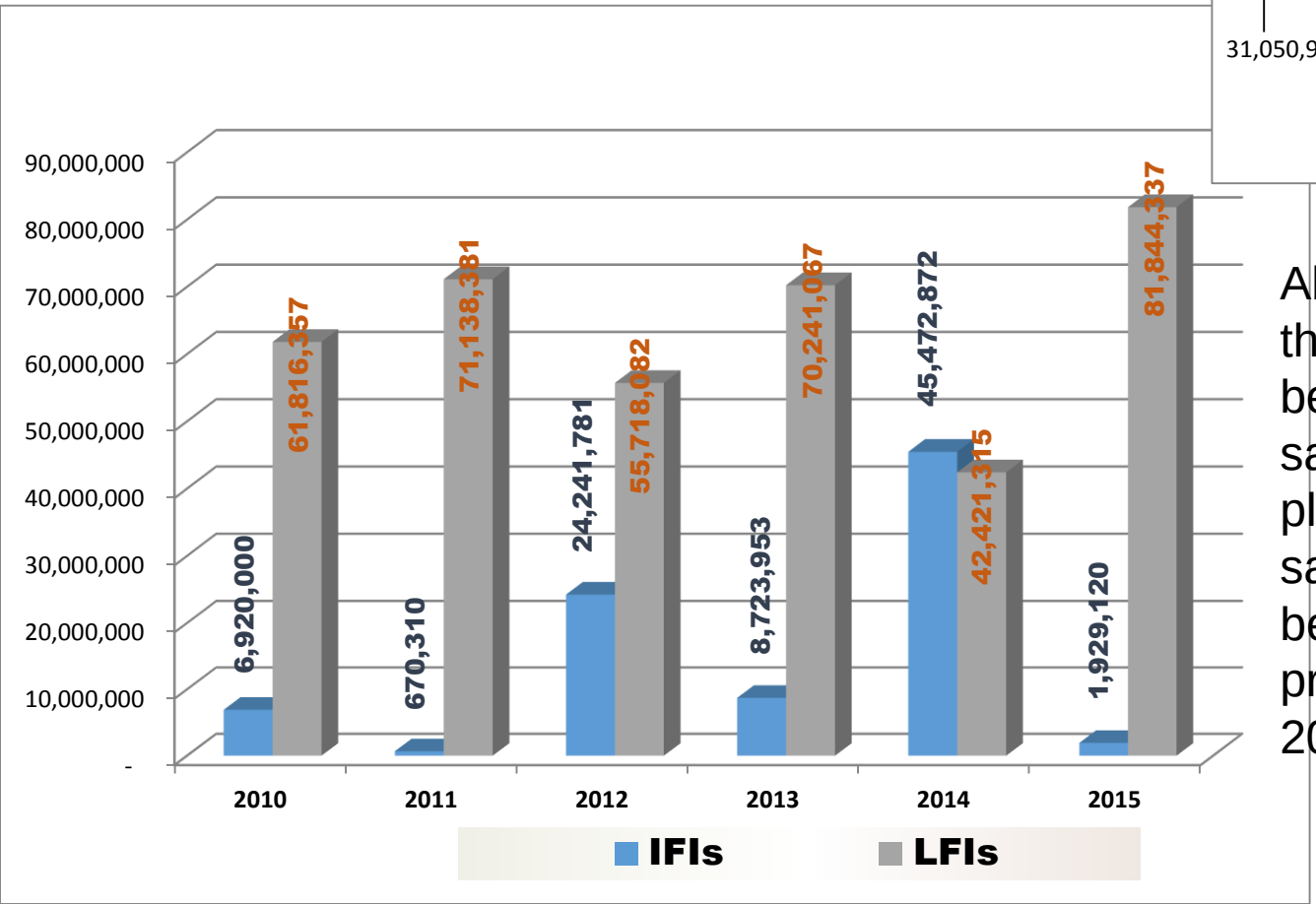
I.	Horizontal Regulatory measures		Description of the energy saving measure	End-use target	Duration
I.1	Implementation of a regular national "Energy Statistic" (with annual updates)	I.1	USAID LEDS Program supported development of national energy balance according to IEA and Eurostat requirements for years 2010-2012. The National Statistical Service, Ministry of Energy and Natural Resources and INOGATE Technical Secretariat have signed a memorandum on "Cooperation in the field of statistics" including an action plan related to actions necessary the energy balance. However, no regular procedure for routine preparation of energy balances for following years was put in place.	horizontal	2010-2012
I.2	Implementation of a "National EE&RE Energy Agency"	I.2	The National Agency was not established, instead the R2E2 has been tasked with many of the functions that traditionally national agencies perform.	horizontal	
I.3	Financial Support for EE measures in all Sectors	I.3	Over $86 million has been committed to EE and EE-integrated renewable energy investment during 2010-2014 via various donors and IFIs, such as WB, IFC, GEF, EBRD, IFC, GGF, EIB, KfW, and UNDP. In addition, these donor and IFI funds have had a market transformation impact on the financial services sector. According to Econoler experts' estimations, the local financial institutions and universal credit organizations have also tapped into this market and financed EE & RE investments from own resources in addition to on-lending portfolio with the IFIs. By expert assessment, over $420 million has been invested by LFIs and UCOs in diverse loans, with average equity financing of 17.5% which leverages approximately $89 million in equity participation. Overall, it can be concluded that approximately $595 million has been invested in EE and EE-integrated RE solutions during 2010-2014.	horizontal	2010-ongoing
I.4	Information campaigns, training, education in EE improvements	I.4.a.	Awareness raising campaigns by UNDP/GEF, R2E2, INOGATE	horizontal	2012-2015
		I.4.b.	Professional trainings by UNDP/GEF, R2E2, INOGATE, EBRD	horizontal	2012-2015
I.5	General Regulatory demand-side measures	I.5.a.	Amendments to the Law on Energy Saving and Renewable Energy	horizontal	2012-2015
		I.5.b.	The draft RA Law "On making an addition into the RA law "On urban development" submitted to the Ministry of Urban Development dated July 13, 2013	horizontal	2013-2015
I.6	Removing inadequate gas & electricity tariff structure to encourage EE	I.6	Revise tariff structure: Remove perverse tariff incentives that are accelerating winter electricity consumption and unnecessary gas consumption by public facilities and commercial establishments.	horizontal	not implemented

Cross-cutting Measures (Investment and Planning)

No	Title of the energy saving measure	End-use targeted	Duration	Achieved/Expected energy savings in target year (MWh)				Status in relation to 1st EEAP
				2014	2017	2018	2020	
I.3.a.	Financing for Energy Efficiency: GGF	EE and RE solutions for households space heat and lighting efficiency (windows, doors, heat supply, lighting, distribution systems) and SMEs	Start:2014 End:: 2020 (ongoing)	35,069	53,336	61,336	81,117	partially implemented
I.3.b.	Financing for EE: EE loans for households and SMEs, IFC	residential energy end-use, SME EE of production processes, space heat conservation	Start:2009 End: 2015	35,792	54,435	62,600	82,789	partially implemented
I.3.c.	Financing for EE: Energy efficiency loans for residential and business clients, EBRD ArmSEFF	EE loans for residential and business clients (corporate energy efficiency, sustainable energy financing facilities, cleaner energy production, municipal infrastructure EE)	Start:2006 End: 2015	341,655	519,614	597,556	790,268	partially implemented
I.3.d.	Financing for EE: Eastern European Energy Efficiency and Environment Partnership (E5P)	facilitation of EE finance in municipal infrastructure with grant co-financing	Start: 2015 End: ongoing	tracked as part of other measures due to leveraging effect				initializing
I.6.	Removing inadequate gas tariff s tructure to encourage energy sav ings	Developing a revised tariff structure which would not penalize SMEs and autonomous heating systems	Start:2016, ongoing		59,365	59,365	59,365	not implemented
I.7	Support to Armenian Municipalities in Sustainable Energy Action Planning	municipal infrastructures, building sector, households	Start 2015; End 2020	3,056	22,811	31,961	51,083	new measure
	Total (MWh)			415,572	709,560	812,818	1,064,621	
	Total (KTOE)			35.73	61.01	69.89	91.54	

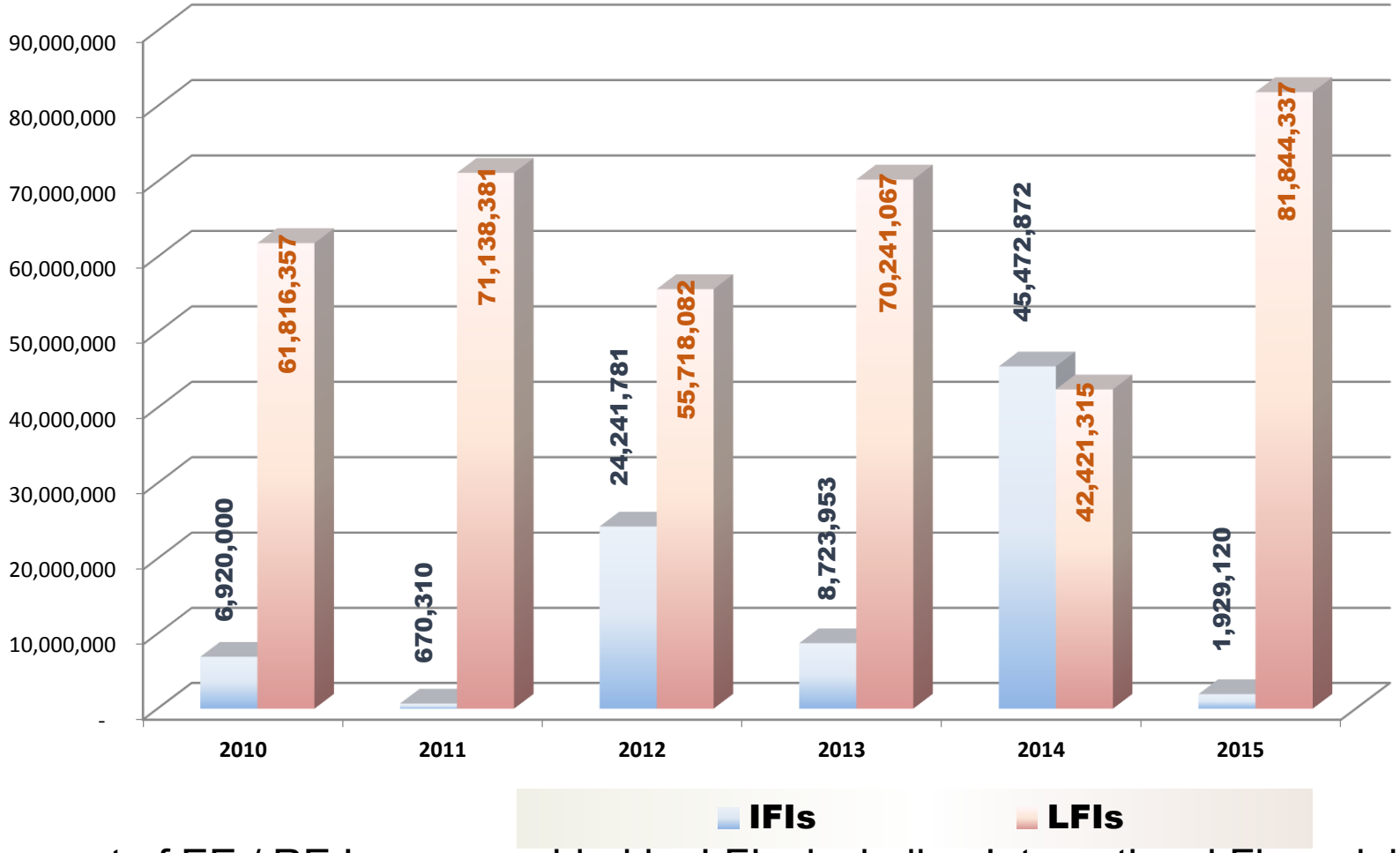
Cross-cutting / Financing EE Investments: EE&RE Lending Portfolio Analysis

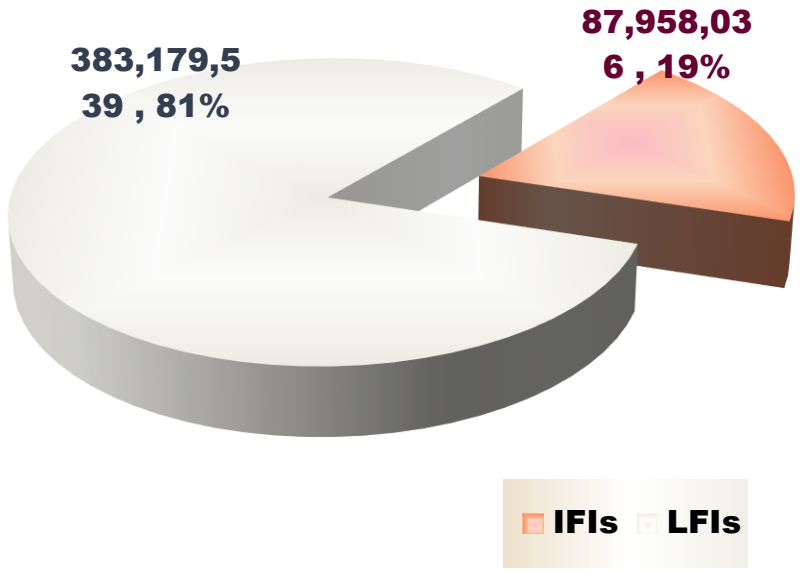




About 150 thousand TOE was saved in 2010-2015 through EE lending, and more than 18.30 mln TOE would be saved in 2016-2020, due to the cumulative effect of savings from past investments. GGF is going to be e main player in this activity with its estimated share in total savings expected to be about 97.2%. This may potentially be due to the fact, that majority of IFIs has failed to provide reasonable forecast of lending plans beyond 2015.

EE / RE LOANS PROVIDED BY LFIs and IFIs IN 2010 - 2015, USD



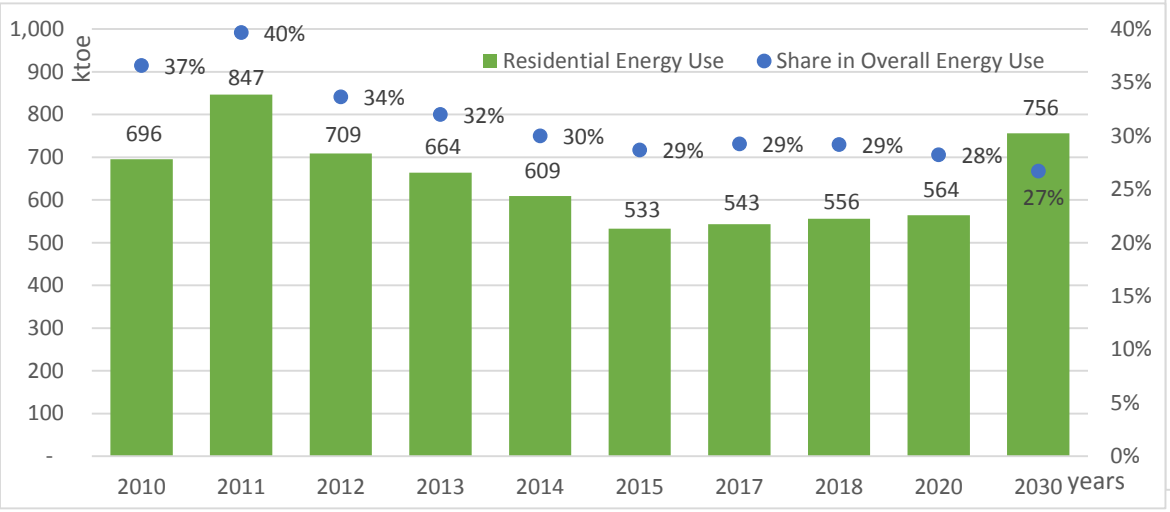


Amount of EE / RE Loans provided by LFIs, including International Financial Institutions' (IFI) funds, increased from $68.74 mln in 2010 to $83.78mln in 2015, i.e. 2.71% per year, which is about 1.72 times less than the annual GDP growth rate. **So, Armenia had about $340 mln unutilized EE investment potential in 2010-2015.**

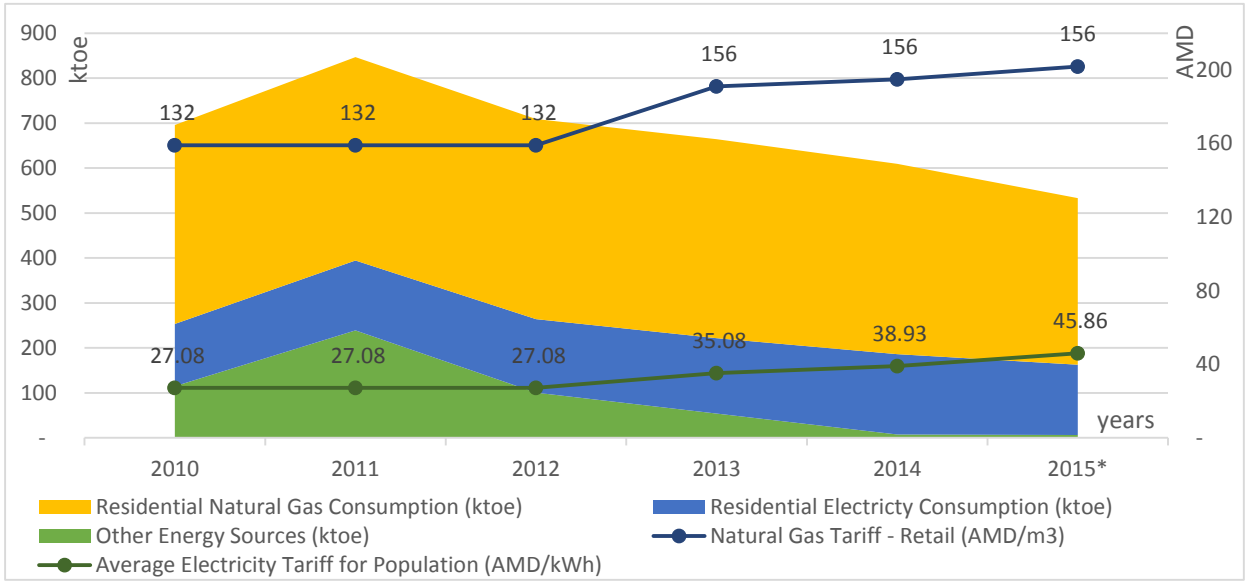
Covenant of Mayors: Sustainable Energy Action Planning
10 signatories already, 5 SEAPs ready,
Recommend: supporting CoM & SEAP development

Sector	Unit	Energy efficiency of measures in SEAPs				
		Tsaghkadzor	Vayk	Spitak	Hrazdan	Aparan
Municipal sector *	MWh/year	435,9	313,3	157,3	4303,8	500,4
	%	17,6	4,2	1,6	15,2	15,6
Residential	MWh/year	847,0	5065,0	7967,9	19682,5	2047,7
	%	34,2	68,1	82,9	69,4	63,8
Renewable energy	MWh/year	651,0	346,8	817,2	1909,7	513,9
	%	26,3	4,7	8,5	6,7	16,0
Transport	MWh/year	-	1483,1	-	1168,8	-
	%	-	19,9	-	4,1	-
Awareness raising	MWh/year	541,2	227,2	669,8	1286,0	147,2
	%	21,9	3,1	7,0	4,5	4,6
Total	MWh/year	2475,1	7435,4	9612,3	28350,8	3209,2

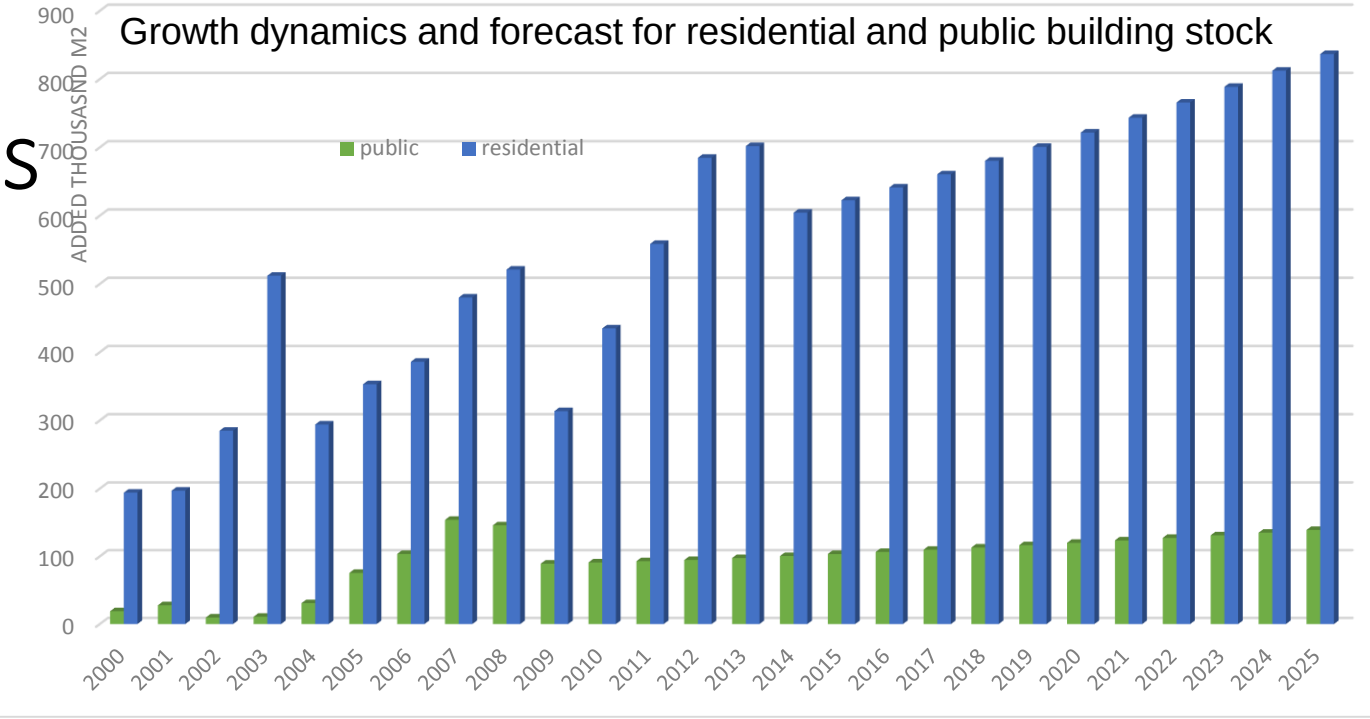
Buildings Sector/ Existing Residential Buildings

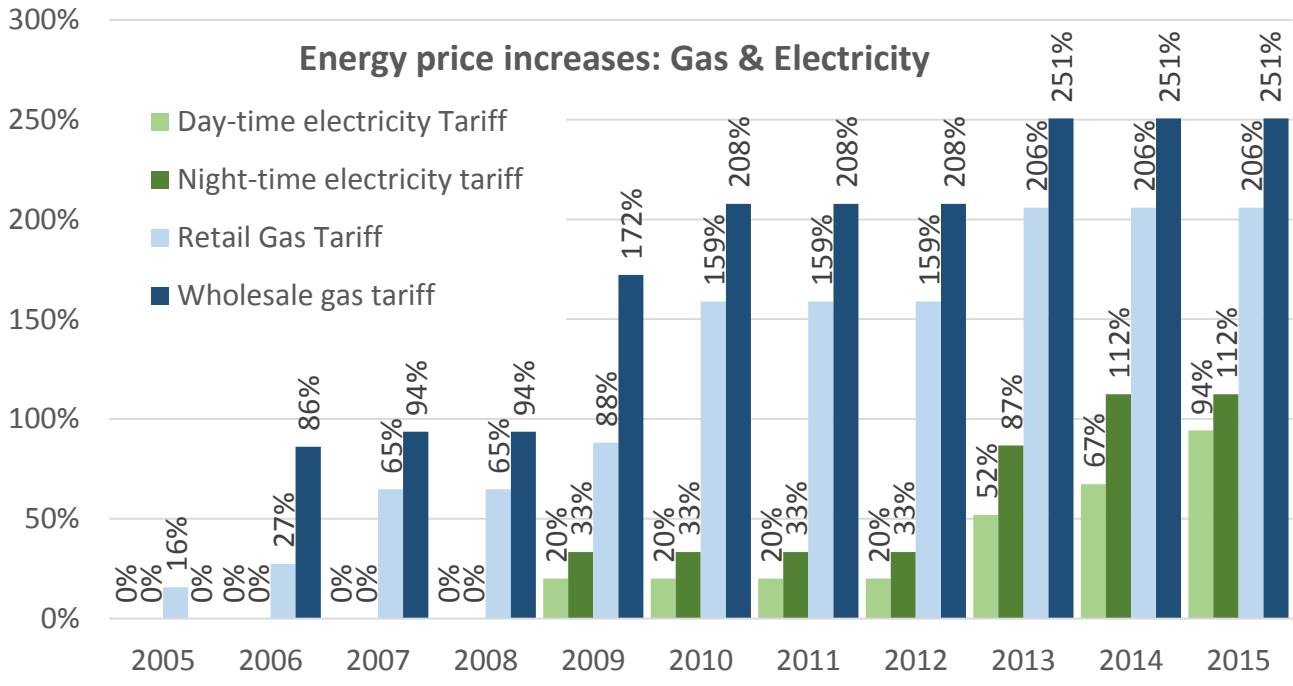


Energy Use in Residential Sector, 2010-2030.



Energy tariffs and Energy Consumption in Residential Sector, 2010-2015





EE Improvement Measures planned (1st NEEAP)

Building Sector: Horizontal Regulatory Measures	II.1. National Building Code considering energy performance of buildings
	II.2. Standards and calculation methodology to assess energy performance in buildings
	II.3. Institutional capacity-building for implementing and enforcing new standards
	II.4. QA/QC standards for certification of key building materials
	II.5. Methodology for assessment of energy performance for pilot buildings
	II.6. Training and education on building energy performance
	II.7. Pilot Project: Design competition & construction of several “best-practice” buildings

No.	1st NEEAP Measure	No	Title of the energy saving measure
II.1	National Building Code considering EPC	II.1	Development and adoption of the new building codes: • MSN “Thermal Protection of Buildings”; MSN “Thermal Networks”; MSN “Thermal Insulation of Equipment and Pipelines”
II.2	Standards and calculation methodology to assess energy performance in buildings	II.2.a	Development and adoption of the National standard AST 362-2013 “Energy efficiency. Building energy passport. Main provisions. Typical forms”
		II.2.b	Adoption of EPBD based technical regulation “On Building Energy Performance”
		II.2.c	Harmonization of 6 EN and ISO standards in relation of energy efficiency
		II.2.d	Development of the technical regulation on the building safety, including provisions on building EE
		II.2.e	Amendments to the Law on Energy Saving and Renewable Energy
II.3	Institutional capacity-building for implementing and enforcing new standards	II.3.a	The draft RA Law “On making an addition into the RA law “On urban development” submitted to the Ministry of Urban Development dated July 13, 2013
		II.3.b	The decision of RA Government “On implementation of energy saving and energy efficiency improvement measures in facilities being constructed (reconstructed, renovated) under the state funding".
		II.3.c	Changes to the Gov.Decision on Energy Audits
		II.3.d	- The energy efficiency and energy saving related tasks and functions were added in the MUD charter in 2013 by the Government decision N225-N (13 March 2013). According to the 2014 Action Plan, the MUD is currently elaborating a draft government decision “On application of measures directed towards increasing of energy saving and energy efficiency in objects constructed (reconstructed, renovated) by the state means”. Workplan for 2015 includes new Housing Code development.
II.4	QA/QC standards for certification of building materials	II.4	2 laboratories were established for testing thermal-physical parameters of construction materials in Armenia. Over 14 materials were tested and certified.
II.5	Methodology for assessment of energy performance for pilot buildings	II.5.a	“Advisory Handbook on Technical Solutions for Thermal Insulation of Envelopes of Residential, Public and Industrial Buildings in Construction and Reconstruction in the Republic of Armenia”
		II.5.b	Development of “Database of construction insulation materials and pre-fabricates”
		II.5.c	Changes to the Gov.Decision on Energy Audits
II.6	Training and education on building energy performance	II.6.a	Black Sea Basin 2007-2013 Energy Efficiency Program strengthening the administrative capacity of local authorities and exchange good practice knowledge in energy efficiency in buildings, Black Sea Join Operational Program. Trainings including: - Study Tour on Energy Efficiency, Renewable Energy and Other Eco Solutions in Buildings in Armenia; - A Public Seminar on Energy Efficiency in AUA; etc.
		II.6.b.	UNDP/GEF Improving EE in Buildings Program held multiple trainings and seminars aimed at building experts' capacity
II.7	Pilot Project: Design competition and construction of several “best-practice” buildings	II.7.a. II.7.b	Pilots on energy efficiency in residential buildings, UNDP/GEF BEEI project Pilots on energy efficiency in public buildings through energy saving agreement scheme, R2E2/GEF/WB INOGATE/ESIB & HFHA REELIH
II.8	incentive scheme to promote EE residential (re)construction		Not implemented

Residential Buildings: Program-matic & New measures

II.7. Financing for EE & Pilot projects (UNDP/GEF BEEI project).

II.9.a. Financing for EE: Household energy efficiency loans and EE mortgage loans (NMC/AFD)

II.9.b. Financing for EE: Residential energy efficiency bank-based commercial loan through HFHA Condo, REELIH and SUDEP Projects

II.9.c. Financing for EE: KfW Urban & Rural Housing EE credit line

II.10. Mitigating Tariff Increase with Low-income Energy Efficiency Program

II.11. EE Retrofits in existing residential buildings: National Program and Action Plan for MAB Renovation & EE [potentially: UNDP/GEF/EIB De-risking EE investments in Residential Housing of Armenia]

II.12. Appliance Energy Labeling Awareness Campaign

Energy Efficiency Improvement Measures in Residential Buildings

No	Title of the energy saving measure	End-use targeted	Duration	Achieved / estimated energy savings in target year (MWh)				Status in relation to 1st EEAP
				2014	2017	2018	2020	
II.7	Legal Support, Financing and Information: Improvement of Energy Efficiency in Buildings; development of secondary legislation for EE in buildings, as well as funding for the first pilot thermal modernization of a residential multi-apartment building in Avan district of Yerevan and social housing in Goris and Akhouryan towns (UNDP/GEF BEEI project).	Residential multi-apartment buildings, social housing, significant reconstruction of existing buildings, secondary legislation for EE in buildings	Start: 2013; End: 2017	1,200	1,200	1,200	1,200	partially implemented
II.9.a.	Financing for Energy Efficiency: Household energy efficiency loans and EE mortgage loans (NMC/AFD)	Household EE loans and EE mortgage loans ; residential buildings and private homes' space heating, hot water preparation	Start:2014 End: 2020	136	141	164	211	partially implemented
II.9.b	Financing for Energy Efficiency: Residential energy efficiency bank-based commercial loan through HFHA Condo, REELIH and SUDEP Projects	residential energy end-use in space heating and hot-water preparation	Start: 2013; End: 2018	30	4,914	5,067	5,067	partially implemented
II.9.c.	Financing for Energy Efficiency: KfW Housing EE credit line	Residential energy end use, heating, hot water preparation, lighting	Start:2016 End: 2020	new measure	TBD	TBD	TBD	Inception March 2016
II.10	**Mitigating Tariff Increase with Low-income Energy Efficiency Program**	**Residential energy end use, lighting efficiency**	**Start:2015 End: 2016**	**new measure**	**116,159**	**116,159**	**116,159**	**new measure**
II.11	**EE Retrofits in existing residential buildings: National Program and Action Plan for MAB Renovation & EE**	**Existing residential buildings, space heating**	**Start:2016 End: 2020**	**new measure**	**65,000.00**	**65,000.00**	**65,000.00**	**new measure**
II.12	**Appliance Energy Labeling Awareness Campaign**	**Residential energy end use, lighting efficiency**	**Start:2015 End: 2020**	**new measure**	**176,704**	**209,369**	**409,635**	**new measure**
Sum of savings:			MWh	1,366	364,118	396,959	597,272	
Sum of savings:			KTOE	0.12	31.31	34.13	51.36	

Public Buildings & Services: Programmatic & New measures

III.1. Public Building EE: Implementation of energy saving activities in municipal and social public facilities (R2E2/GEF/WB)

III.1.a Public Building EE: Implementation of energy saving activities in municipal and social public facilities (R2E2/GEF/WB)

III.2. NAMA project to Support EE in Public Buildings and Social Housing

III.3. Financing for EE & Public Procurement for EE: UNDP Green Urban Lighting Project GHG Emission reduction by increasing EE in municipal lighting in the cities of Armenia

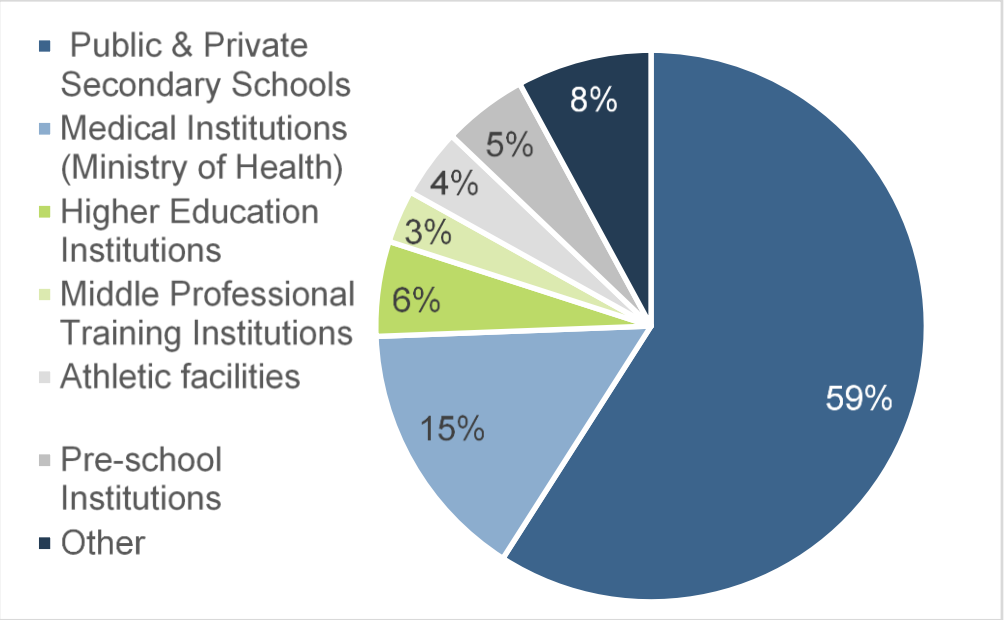
III.4. Financing for Energy Efficiency & Public Procurement for EE: EE-integrated reinforcement of Schools by KfW

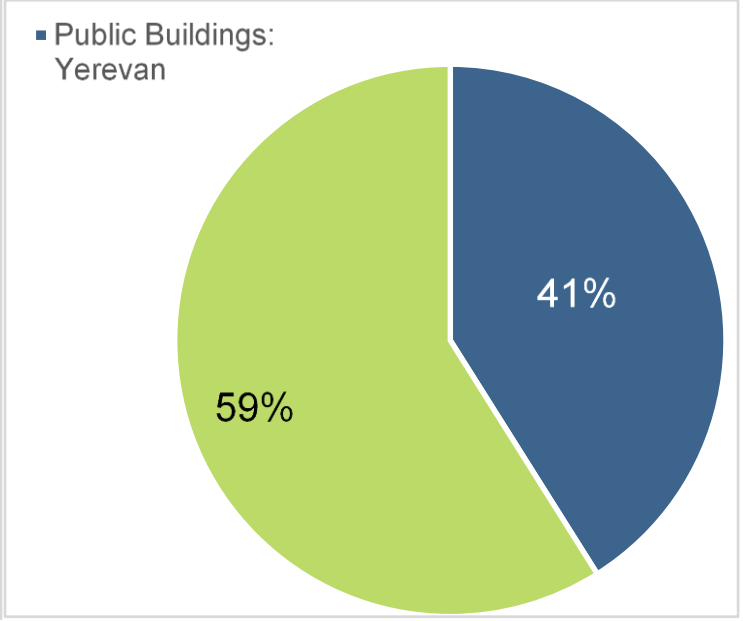
III.5. EBRD Loan-funded Yerevan streetlighting

III.6. USAID Clean Energy and Water Program for EE & RE solutions in community energy and water use

III.7 Yerevan - Jur Rehabilitation and Modernization

Public Buildings and Services





Energy Saving Potential in Public Buildings

Total Area of public buildings in Armenia (m2)	13,787,397
Total energy consumption in Public Buildings (MWh/year)*	1,764,787
Annual Energy Saving Potential (MWh/year)*	896,181
* - based on R2E2 experience with 56 projects.	
Average energy consumption prior to EE in public buildings	128 kWh.m/yr
Average energy consumption after EE	63 kWh.m/yr
Average energy saving rate	51%
Investment need (AMD) at average of AMD 8400/m2 for typical ESMs	115,814,134,238
Investment need (USD) - exchange rate 473	$244,850,178
Total Financing currently available (GEF and KfW)	$ 27,270,296

EEIMs in Public Buildings & Services – Part 1

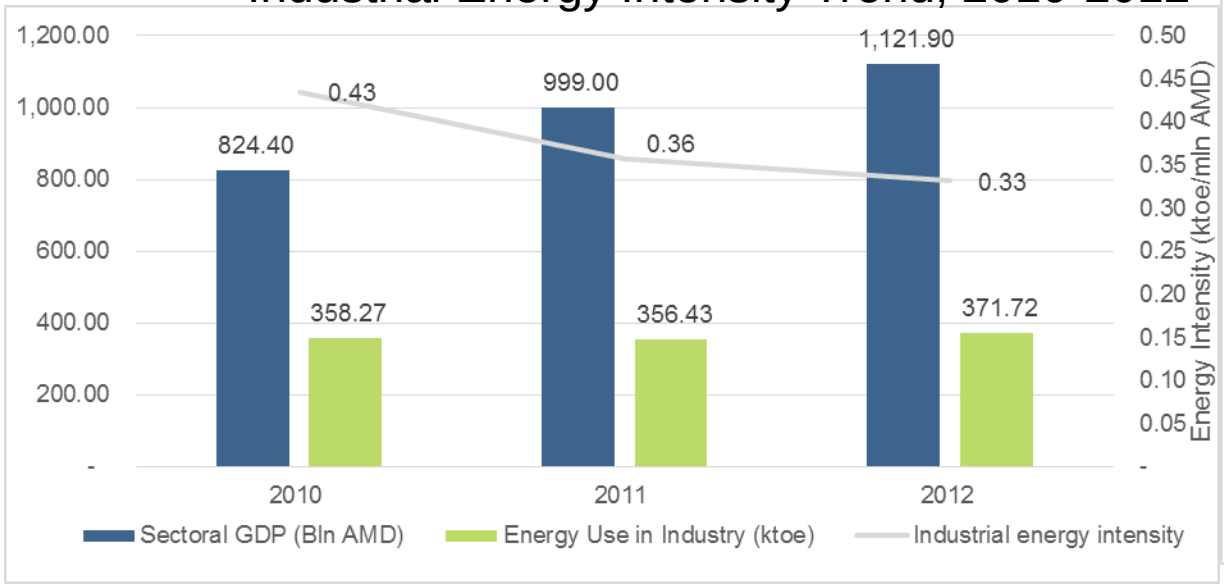
No	Title of the energy saving measure	End-use targeted	Duration	Achieved / expected energy savings per year (MWh)				Status in relation to 1st EEAP
				2014	2017	2018	2020	
III.1.	Public Building EE: Implementation of energy saving activities in municipal and social public facilities (R2E2/GEF/WB)	Implement energy saving activities in public facilities to reduce the level of energy consumption by social and other public facilities under energy saving agreement (ESA) scheme with ESCO participation.	Start: 2012 End: 2017	48,941	84,570	101,484	146,137	partially completed
III.2.a	Public Building EE: Grant-cofinanced Implementation of energy saving activities in municipal and social public facilities (E5P/R2E2/GEF/WB)	Expand the current R2E2 lending facility to implement energy saving activities in public facilities to reduce the level of energy consumption by social and other public facilities, which have suboptimal comfort levels in status quo.	Start: 2016; End: 2020	new measure	6,742	10,113	16,855	new measure
III.2.	NAMA project to Support Energy efficiency in Public Buildings and Social Housing	New construction and capital renovation of public buildings and social housing, significant reconstruction of existing buildings, secondary legislation for EE in buildings	Start: 2016 End: 2020 (ongoing)	new measure	11,442	14,653	21,037	carbon financing sought
III.3.	Financing for EE & Public Procurement for EE: UNDP Green Urban Lighting Project GHG Emission reduction by increasing energy efficiency of municipal lighting in the cities of Armenia	Municipal lighting electricity use in the cities of Armenia	Start:2013 End: 2017	new measure	103	103	103	partially completed

EEIMs in Public Buildings & Services – part 2

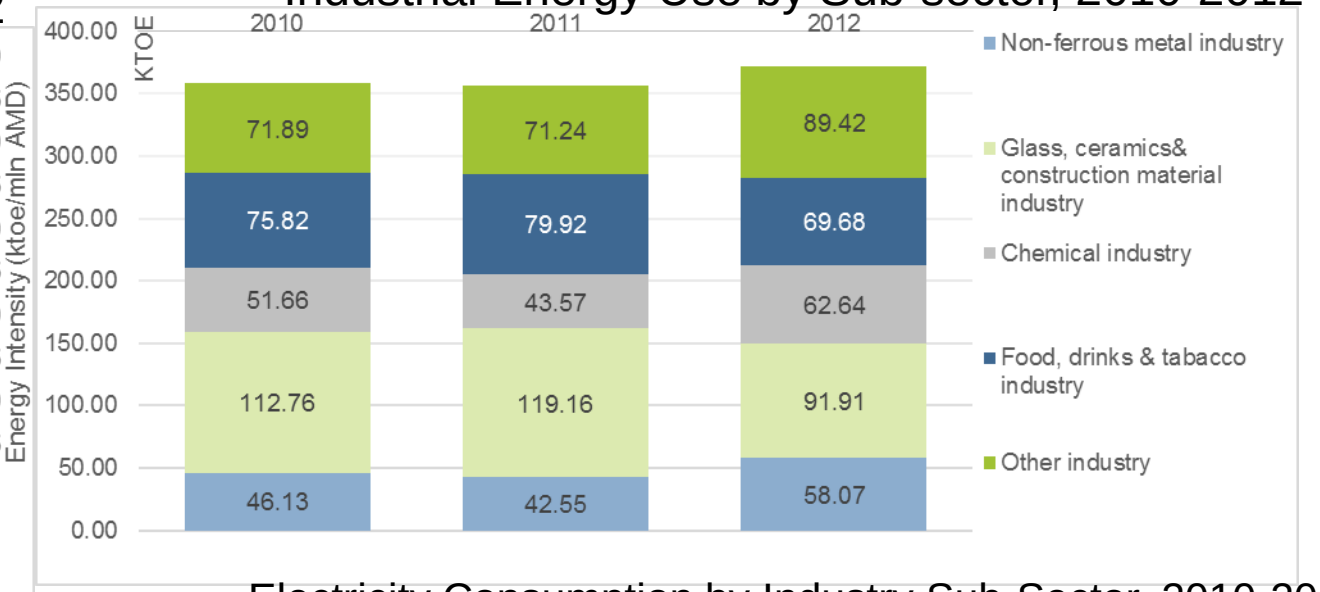
No	Title of the energy saving measure	End-use targeted	Duration	Achieved / expected energy savings per year (MWh)				Status in relation to 1st EEAP
				2014	2017	2018	2020	
III.4.	EE-integrated reinforcement of Schools by KfW	Public & service buildings (schools)	Start:2016; End: 2020	new measure	39,897	39,897	39,897	pending
III.5.	EBRD Loan-funded Yerevan streetlighting	Reduced electricity use on 28 streets of Yerevan, Armenia	Start: 2015; End 2017	new measure	2,554	2,554	1,277	pending launch
III.6.	USAID Clean Energy and Water Program for EE & RE solutions in community energy and water use	rural communities, agricultural water users, community organizations, municipalities	Start: 2012	19	19	19	19	completed
III.7	Yerevan - Jur Rehabilitation and Modernization	Municipal water & wastewater	Start 2013* End - 2017	71,160	75,400	75,400	75,400	partially completed
Sum of savings:			MWh	120,120	220,727	244,223	300,724	
Sum of savings:			KTOE	10.33	18.98	21.00	25.86	

Industry, SMEs and Power (Generation, Transmission, Distribution))

Industrial Energy Intensity Trend, 2010-2012

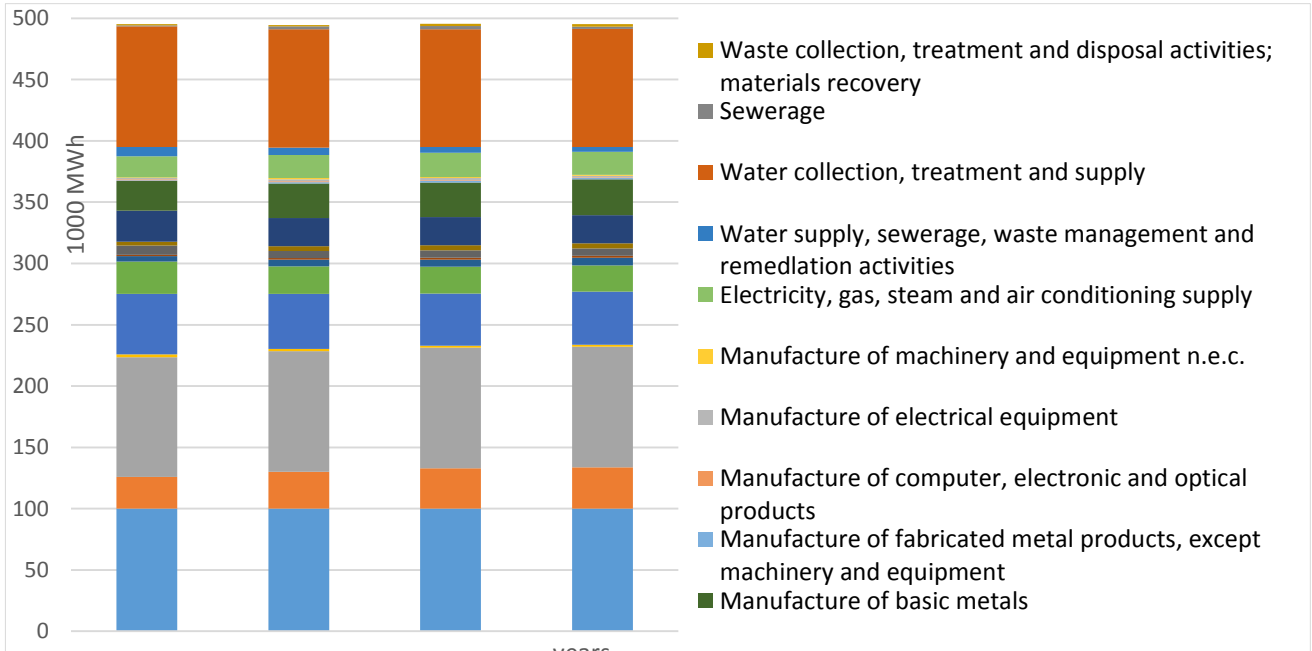


Industrial Energy Use by Sub-sector, 2010-2012



Structure of Natural Gas Consumption by Sectors (2011-2013)	2011	2012	2013	2014	Share in TFEC
Quantity of Imported Gas	2069.1	2455.5	2361.05	2450.9	(%)
Gas distributed through Networks, including to	1534.92	1608.9	1821.92	2008.8	82%
Population	550.75	542	538.93	515.4	26%
Power Sector	184.91	231.9	252.29	594.1	29.6%
Industry	252.04	259.9	275.261	252.1	12.5%
Vehicle Fueling Stations (CNG)	362.36	418	454.96	481.7	24%
Public Sector	51.45	48.4	49.89	49.1	2%
Other Consumers	133.42	108.7	250	116.3	6%
Average calorific value of natural gas (kCal/m3)				8214	

Electricity Consumption by Industry Sub-Sector, 2010-2012



EEIMs in Industry, SME & Power Sector

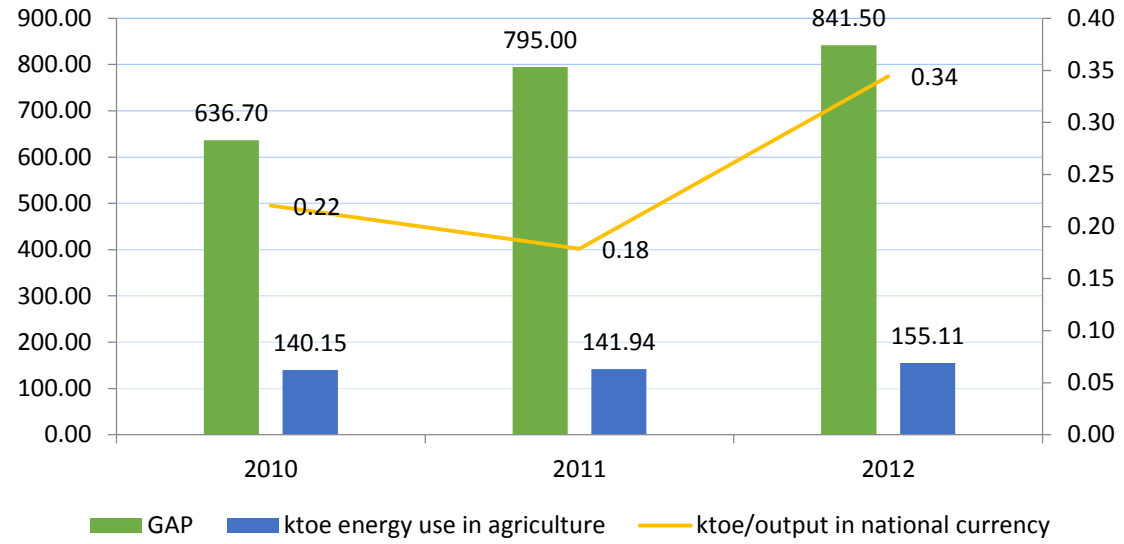
- Considering EE aspects during approval and construction of new industrial facilities
- Increasing the efficiency of the central heating plants and suppliers: Avan DH - cogeneration
- EE Financing Facility for Industry & SME
- Natural gas savings through improvement of transmission pipelines and substations, and optimization of existing boiler houses in TPPs
- Reduction of energy losses in distribution networks: WB Electricity Supply reliability
- Reduction of energy losses in distribution networks: EBRD Power Supply Reliability
- Electricity savings through improvements of existing network, compensation of reactive power, transformer improvement
- Reduction of Electricity Losses in Low-voltage networks, ArmElNet
- Wider Application of Renewable Energy: SWHs
- Geothermal Heat Pumps for Central Heating
- Utilization of animal waste for biogas energy production
- Development of distributed solar PV generation through implementation of Net metering provision

EEIMs in Industry, Power & SMEs

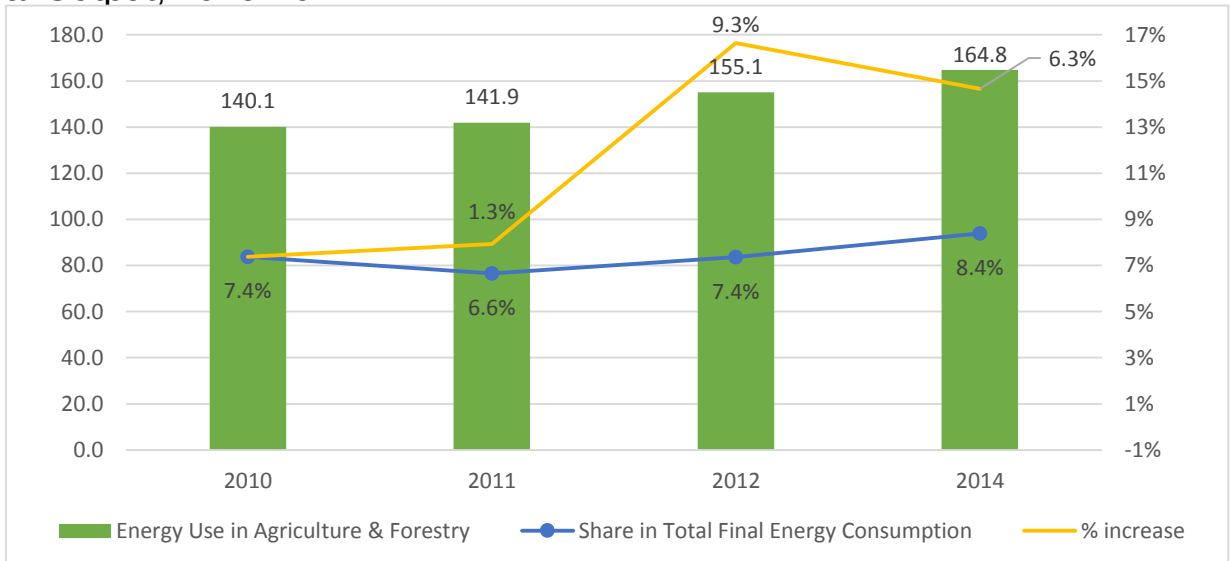
No	Title of the energy saving measure	end-use targeted	Duration	Achieved / Expected energy savings (MWh) in respective target year				Status in relation to 1st NEEAP
				2014	2017	2018	2020	
IV.1	Considering EE aspects during approval and construction of new industrial facilities	Industry & SME: ISO 50001 users, RECP, BAT, benchmarking, ecodesign	Start: 2015 End: 2020 (ongoing)	-	271,969	397,132	718,979	not impemented
IV.2	Increasing the efficiency of the central heating plants and suppliers: Avan DH - cogeneration	Developed model of an efficient energy cogeneration and supply	Start: 2005 End: ongoing	6,673	9,213	10,060	11,753	partially implemented
IV.3	Implementation of EE Financing Facility for Industrial Enterprises	reported in cross-cutting section						
IV.4.a	Natural gas savings through improvement of transmission pipelines and substations, and optimization of existing boiler houses in TPPs	Natural gas savings through improvement of transmission pipelines and substations	Start: 2016 End: 2020	-	12,362	18,543	30,905	Not implemented
IV.4.b	Natural gas savings through improvement of transmission pipelines and substations, and optimization of existing boiler houses in TPPs	TPP 250 MW proposed by the WB to cover peaks and reserve margin, after the decommissioning of blocks 1-4 of Hrazdan TPP	Start: 2018 End: 2020				2,369,980	not implemented
IV.5.a	Reduction of energy losses in distribution networks: WB Electricity Supply reliability	energy generation, distribution	Start: 2015 End: 2060		-	-	-	not implemented
IV.5.b	Reduction of energy losses in distribution networks: EBRD Power Supply Reliability	reduced energy losses in distribution networks	Start: 2016 End: 2020		-	3,311	3,311	not implemented
IV.5c.	Electricity savings through improvements of existing electricity network, compensation of reactive power and improvement of transformers	Improved energy efficiency and energy savings of power sector	Start: 2012 End: 2017			18,000	18,000	not implemented
IV.5.d.	Reduction of Electricity Losses in Low-voltage networks, ArmElNet	reduced energy losses in distribution networks	Start: 2016 End: 2020		62,072	62,072	62,072	not implemented
IV.6.a	Wider Application of Renewable Energy: SWHs	The measure is designed on the basis of realized best practices and experiences.	Start: 2016 End: 2020 (and beyond)	8,623	17,256	18,401	25,356	new measure
IV.6.b	Geothermal Heat Pumps for Central Heating	space heating, EE, renewables, PPP	Start: 2016 End: 2020 (and beyond)		705	705	705	new measure
IV.6.c	Promotion of Biogas Utilization from Animal Waste	space heating, EE, renewables, PPP	Start: 2016 End: 2020 (and beyond)		57,922	86,883	144,806	new measure
IV7	development of distributed RE generation through implementation of Net metering provision	Distributed generation, solar energy, autonomous electricity production, net metering	Start: 2016 End: ongoing	701	1,781	2,141	2,861	new measure
Total Industry & Power (MWh)				15,997	433,280	617,249	3,391,288	
Total Industry & Power (ktoe)				1.38	37	53	292	

Agriculture

Energy Intensity of Gross Agricultural Output, 2010-2012

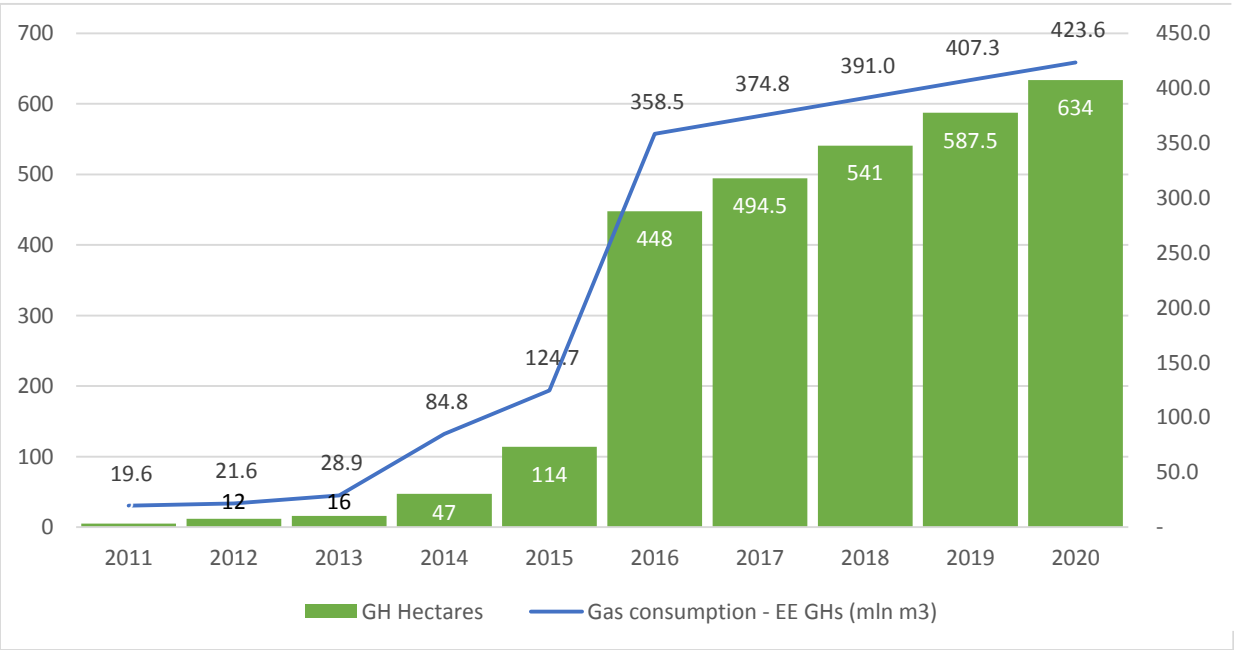


Dynamics of energy consumption in agricultural sector



93% of existing agricultural machinery produced in Soviet Union (1976-91)

Dynamics of energy consumption in commercial greenhouses



	Existing Unit	Working Order	Load Level
Tractors	15,025	11,862	78.9%
Trucks	15,063	11,383	75.6%
Combine-Harvester	1,356	1,007	74.3%
Tractor Trailer	6,130	5,337	87.1%
Tractor Mowing Machines	2,031	1,714	84.4%
Forage Harvester	405	295	72.8%
Grain Cleaning Machines	425	362	85.2%
Row Sowing Machines	1,863	1,597	85.7%
Tractor Plows	3,903	3,447	88.3%
Cultivators	2,279	1,926	84.5%
Square Baler	1,664	1,397	84.0%

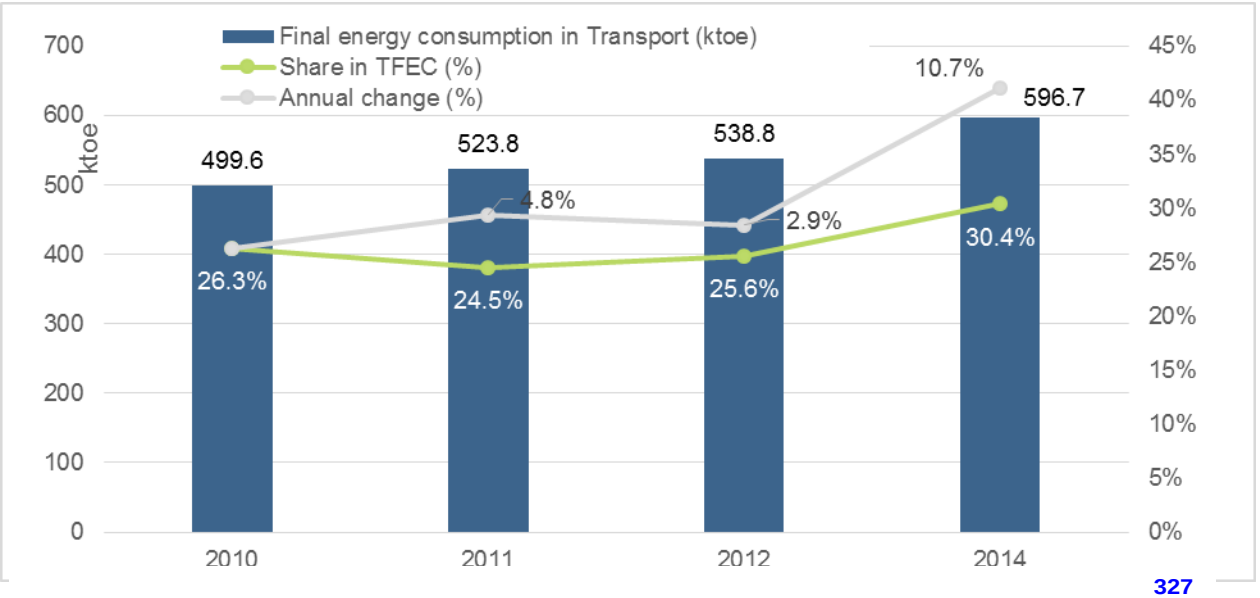
EEIMs in Agriculture

VI.1	Rural development program: high efficiency agricultural machinery import
VI.2	Importing high efficiency tractors, Japanese ODA
VI.4	Irrigation rehabilitation emergency project, WB
VI.6	Municipal water project, WB
VI.7	USAID Clean Energy & Water Program
VI.10	Irrigation System Modernization and Institutional Capacity Building, WB
VI.12	Science technology innovation partnership (STIP)
VI.13	Energy efficient greenhouse
VI.15	Grading agricultural products based on quality
VI.16	Renewing the agricultural machinery park
VI.18	Install gravity irrigation

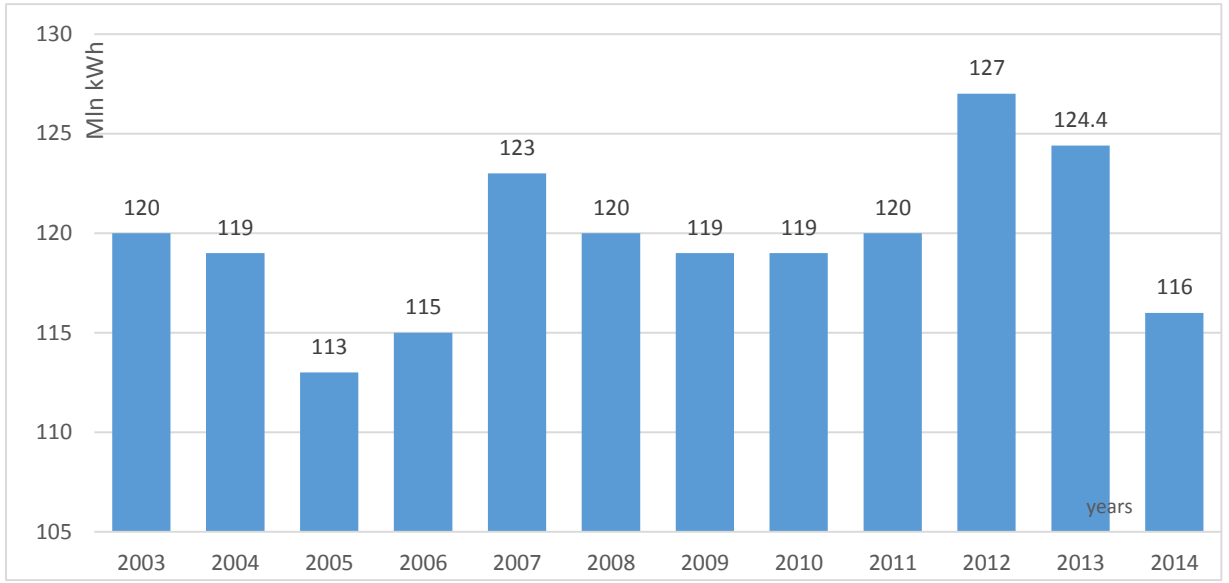
EEIMs in Agriculture Sector

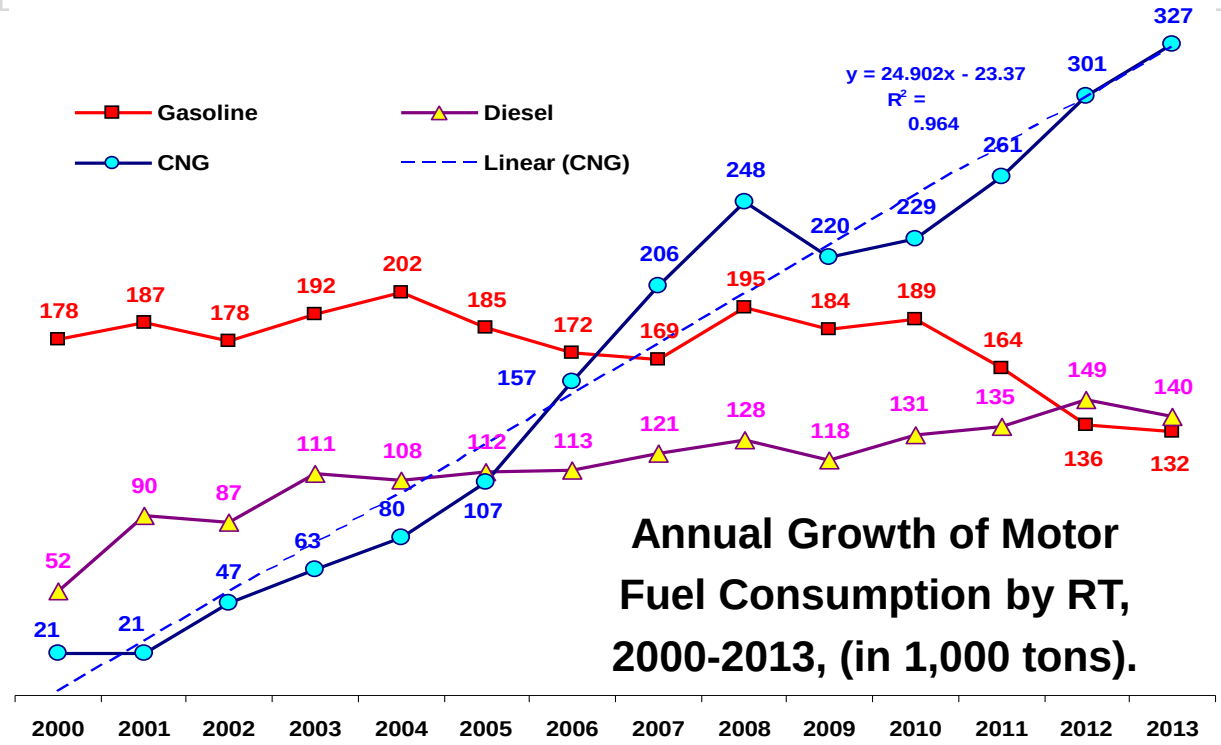
No	Title	Target end-use	Time-frame	Achieved energy savings in target year (MWH)			
				2014	2017	2018	2020
VI.1	Rural development program: high efficiency agricultural machinery import	Farmers	2013-ongoing	9	9	9	9
VI.2	Importing high efficiency tractors, Japanese ODA	Farmers	2010-2012	1,267	1,267	1,267	1,267
VI.4	Irrigation rehabilitation emergency project, WB	Rural irrigation users;	2009-2013	78	73	73	73
VI.7	USAID Clean Energy & Water Program	Rural communities	2012-2015	150	150	150	150
VI.10	Irrigation System Modernization and Institutional Capacity Building, WB	Rural irrigation users; farmers	Future plans		19,000	19,000	19,000
VI.12	Science technology innovation partnership (STIP)	Fish farms	2015-2030				
VI.13	Energy efficient greenhouses	Private greenhouse sector	Start: 2011 End: 2020		425	480	591
VI.15	Grading agricultural products based on quality	Processors, farmers	Start: ASAP		8620	25900	51700
VI.16	Renewing the agricultural machinery park	Farmers	Start: ASAP End: 2020		134	201	269
VI.18	Install gravity irrigation	Farmers	Start: ASAP	172000	17200	34500	51700
	Total MWH			1,508	19,223	19,223	19,223
	Total ktoe			0.13	1.65	1.65	1.65

Transport/Mobility

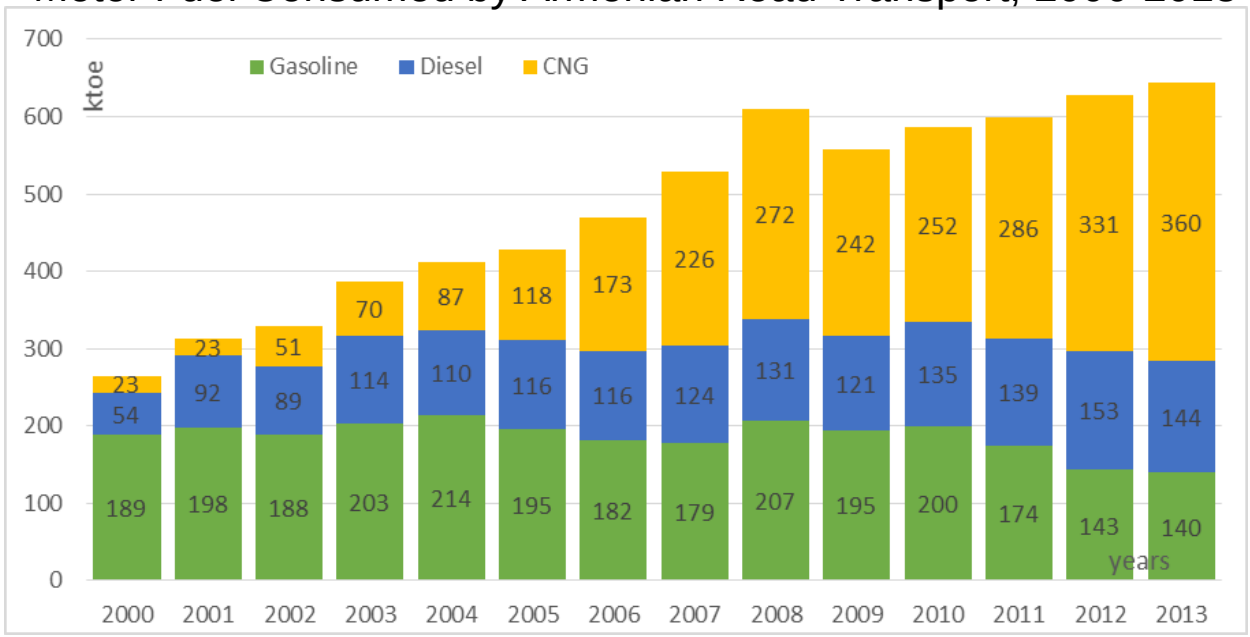


Electricity Consumption (Million kWh)



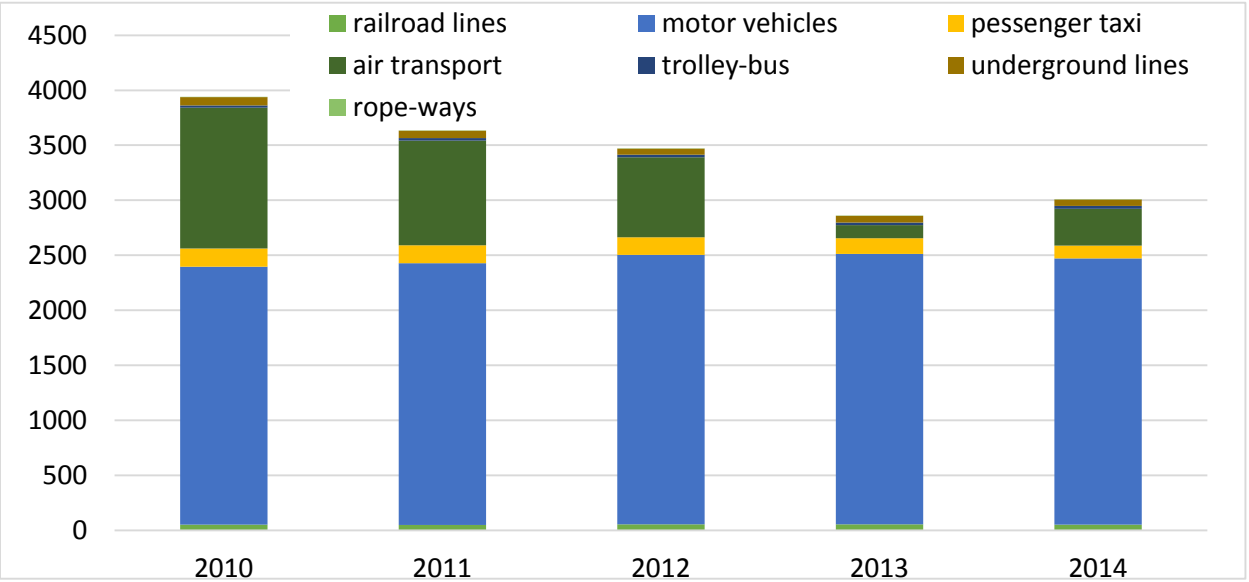


Motor Fuel Consumed by Armenian Road Transport, 2000-2013



Transport/Mobility

Passenger Turnover (Million Passenger Kilometers Travelled)

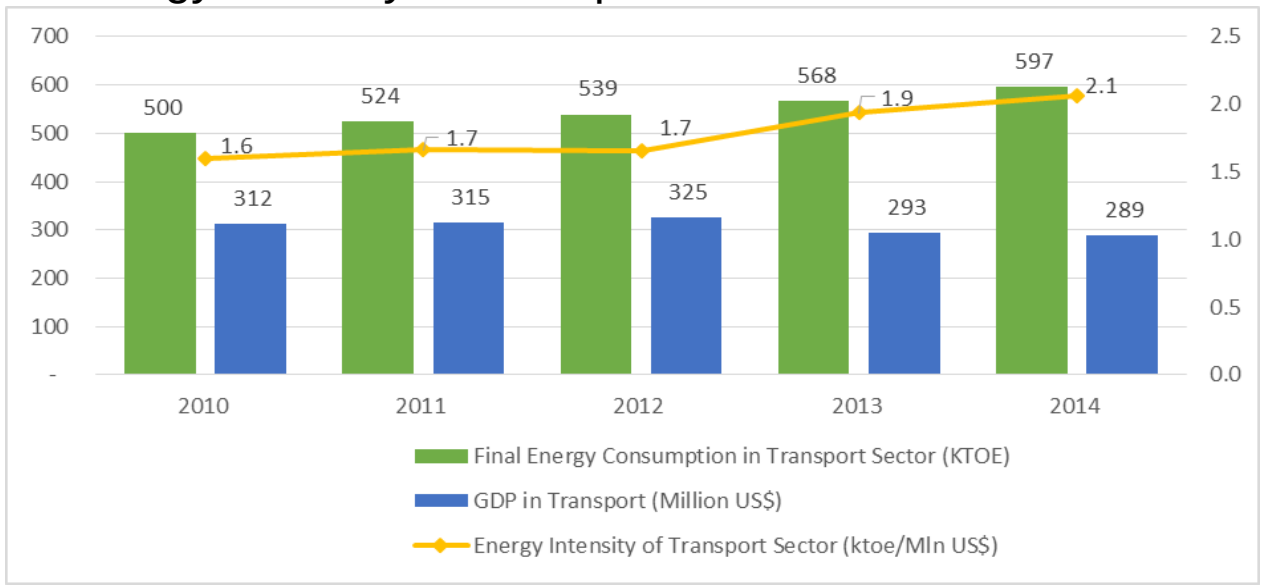


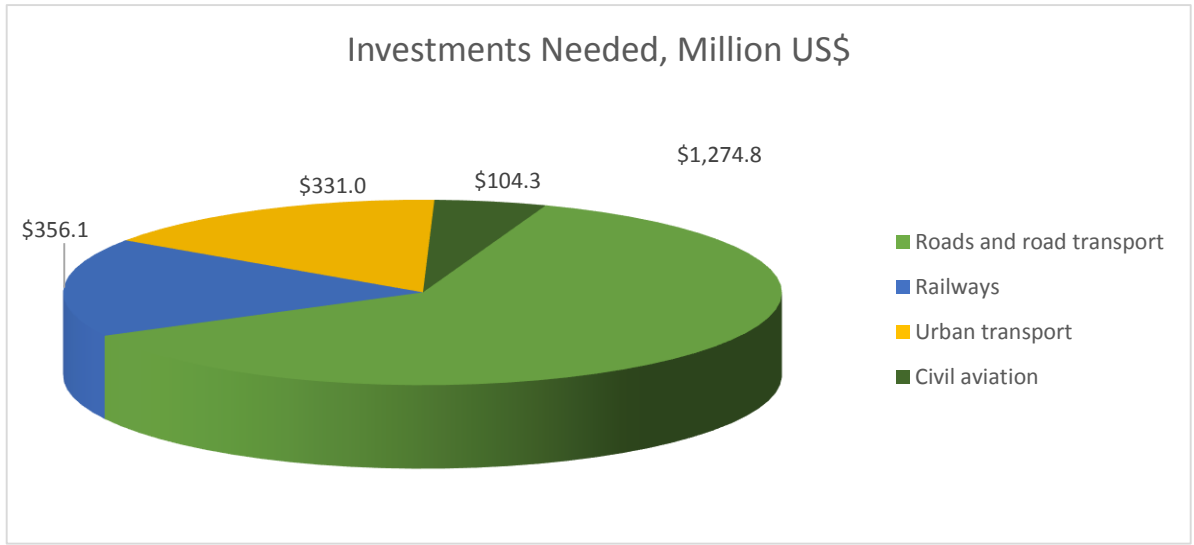
Road Transport Fleet (Number) in Running in 2010, by Main Category and Motor Fuel Burned.

RT Fleet Category	Gasoline	Diesel	CNG	Total RT by Category
Passenger Cars	165,171	1,409	80,999	247,579
Buses and Minibuses	3,962	1,902	5,521	11,385
Trucks	13,434	12,550	14,848	40,832
Total RT by motor fuel	182,567	15,861	101,368	299,796

Motor Fuel Consumed by Armenian Road Transport , 2000-2013

Energy Intensity of Transport Sector





EEIMs in Mobility/ Transport

V1	Development of legislative background on fuel efficiency and emission norms
V2	Dissemination of information on technologies and ES
V3	Continuous exchange of mini buses by larger passenger buses
V4	Expansion and modernization of the electrified public transport
V5	Expansion and modernization of rail transport network (passenger and freight)
V6	Continuous switching of road vehicles from gasoline to CNG
V7	Development of an integrated electro-transport network and public services to cover unsatisfied demand in public transportation services in the greater Yerevan area
V8.	Electric vehicles deployment strategy

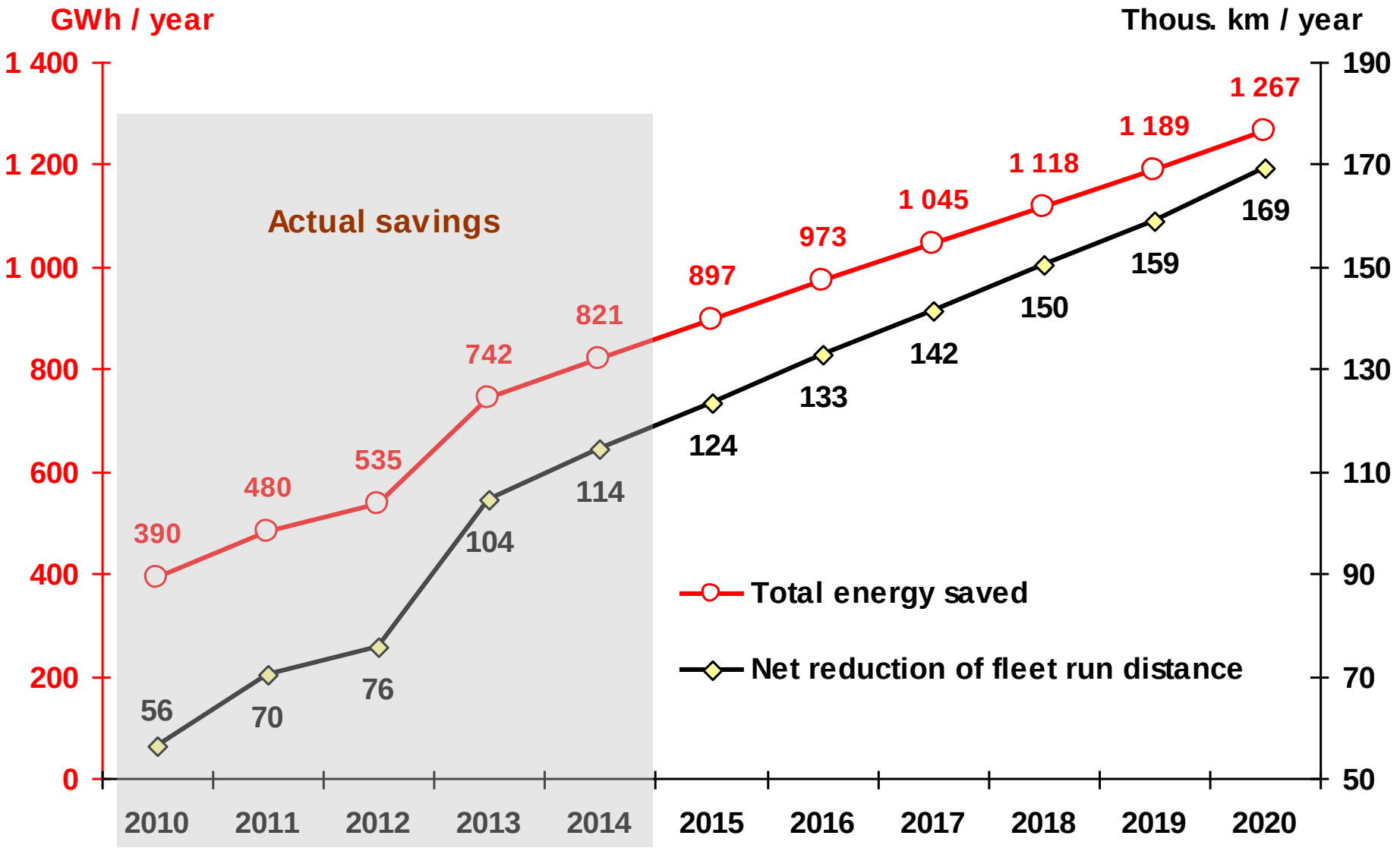
Overview of Individual Measures in the Transport Sector -1

No	V. Transport sector	end-use targeted	Duration	Achieved/expected energy savings in target year (MWh)				Status in relation to 1st NEEAP
				2014	2017	2018	2020	
V.1	Development of legislative background regarding fuel efficiency and emission norms of vehicles	regulatory measure, feasibility studies	Start: 2008 End: ongoing					partially implemented
V.2	Dissemination of information on technologies and approaches for EE in transport	information						not implemented
V.3	Continuous exchange of mini buses by larger passenger buses	road transport	Start:2012 End: ongoing	821,022	1,045,391	1,118,245	1,267,202	partially implemented
V.4	Expansion and modernization of the electrified public transport system in the City of Yerevan	electric transport (metro)	Start:2015 End: 2020		5,294	5,294	5,294	partially implemented
		(trolley)	Start:2016 End: 2020	n/a	n/a	n/a	n/a	pre-feasibility
V.5	Expansion and modernization of rail transport network (passenger and freight)	rail road transport	Start: 2010 End: Ongoing	582	862	972	1,206	partially implemented

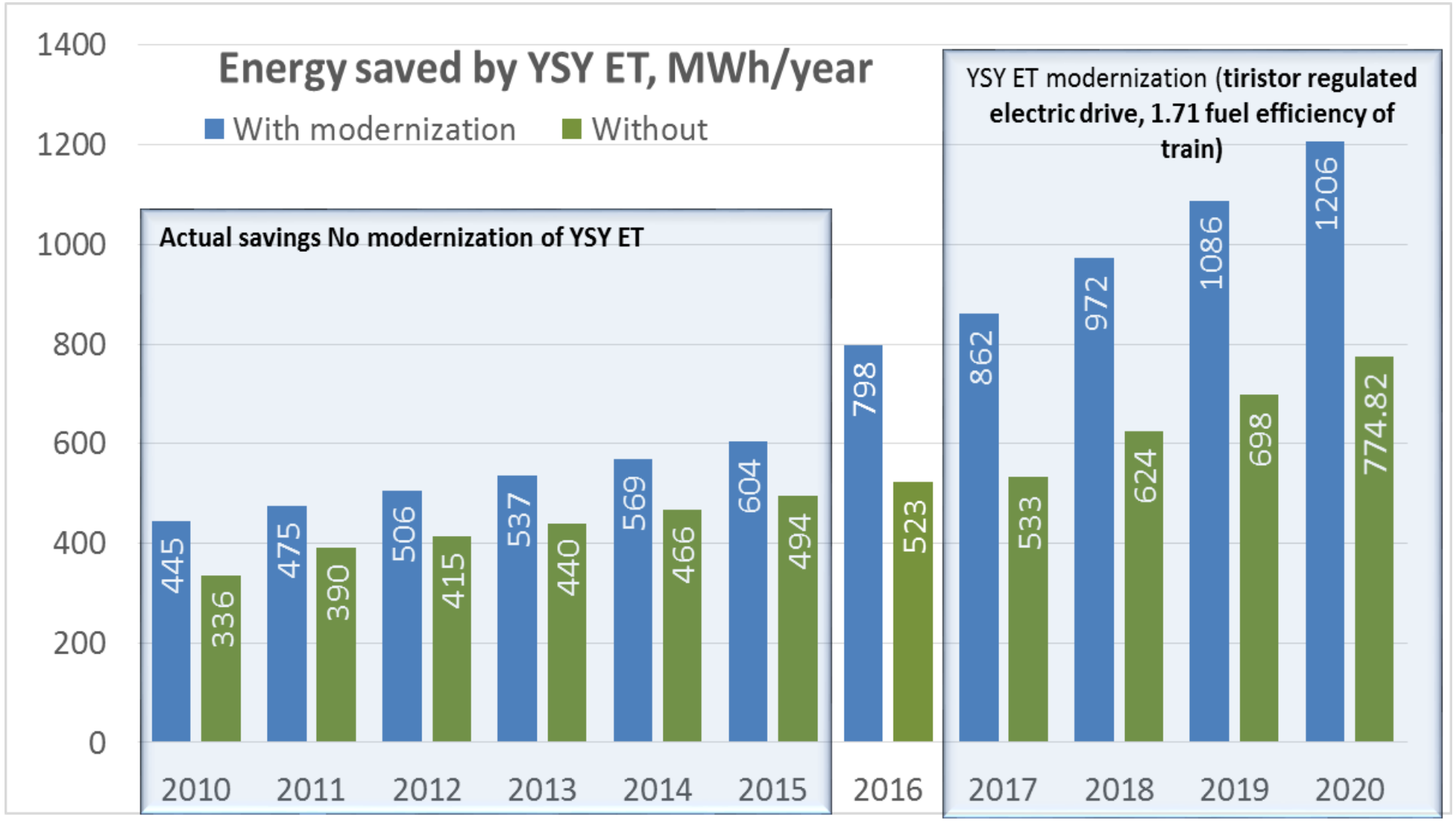
Overview of Individual Measures in the Transport Sector-2

No	V. Transport sector	end-use targeted	Duration	Achieved/expected energy savings in target year (MWh)				Status in relation to 1st NEEAP
				2014	2017	2018	2020	
V.6	Continuous switching of road vehicles from gasoline to compressed natural gas (CNG)	road transport	Start: 2008; End: ongoing	Financial & CO_2 savings only				partially implemented
V.7	Development of Integrated Electro-Transport Network and services to cover unsatisfied demand in public transportation services in Yerevan agglomeration	information, planning	Start: 2016; End: ongoing	n/a	n/a	n/a	n/a	new measure
V.8	Electric vehicles (BEV, PHEV) deployment in Armenia	road transport	Start: 2016 End: continuous	n/a	238	238	342	new measure
	Total energy savings in transport / mobility	MWh		821,604	1,051,785	1,124,749	1,274,044	
		ktoe		70.65	90.44	96.71	109.55	

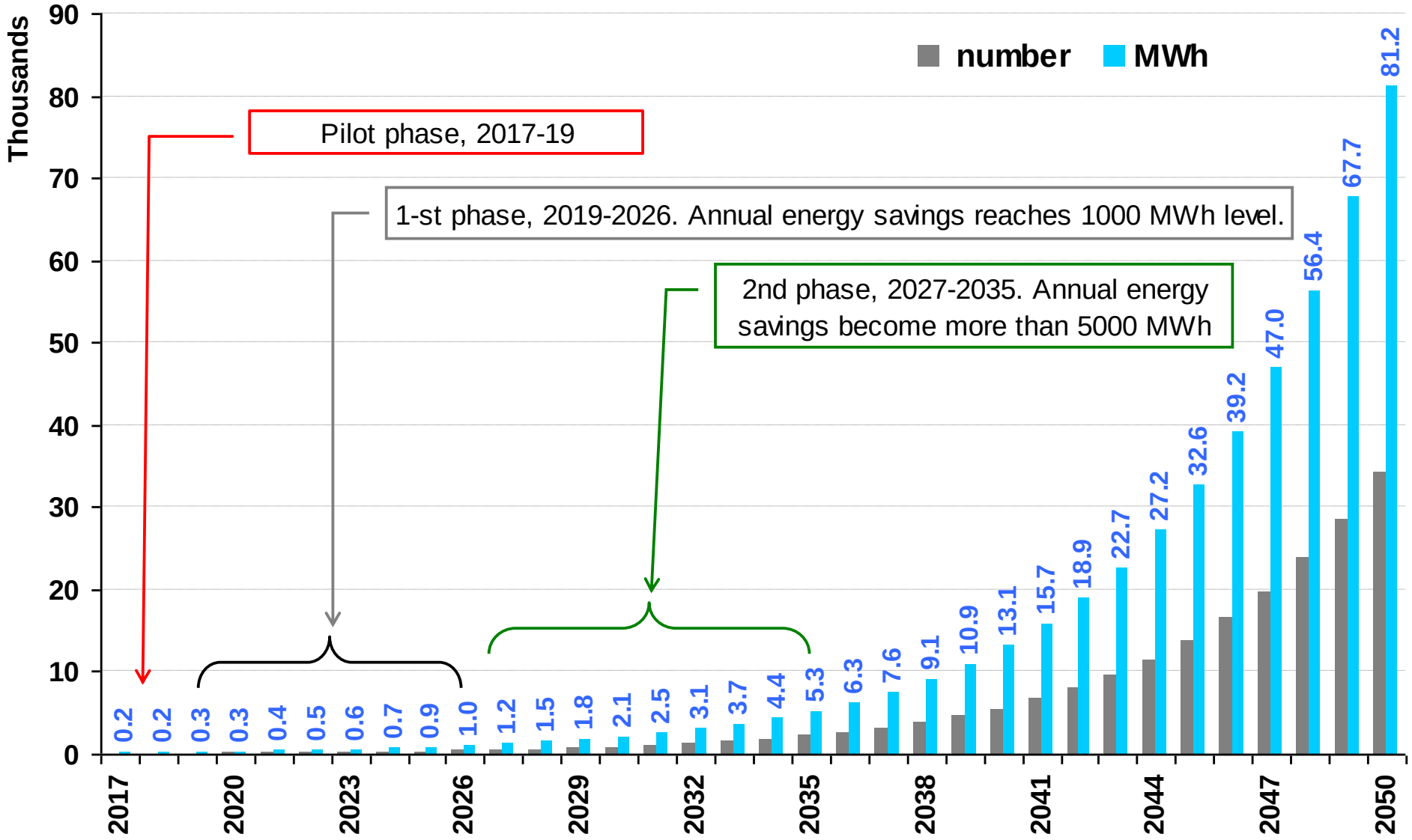
V3. Direct energy savings due to Public Transport fleet & route optimization



V5. Rail expansion & modernization (seasonal Yerevan-Shorja-Yerevan electric train)



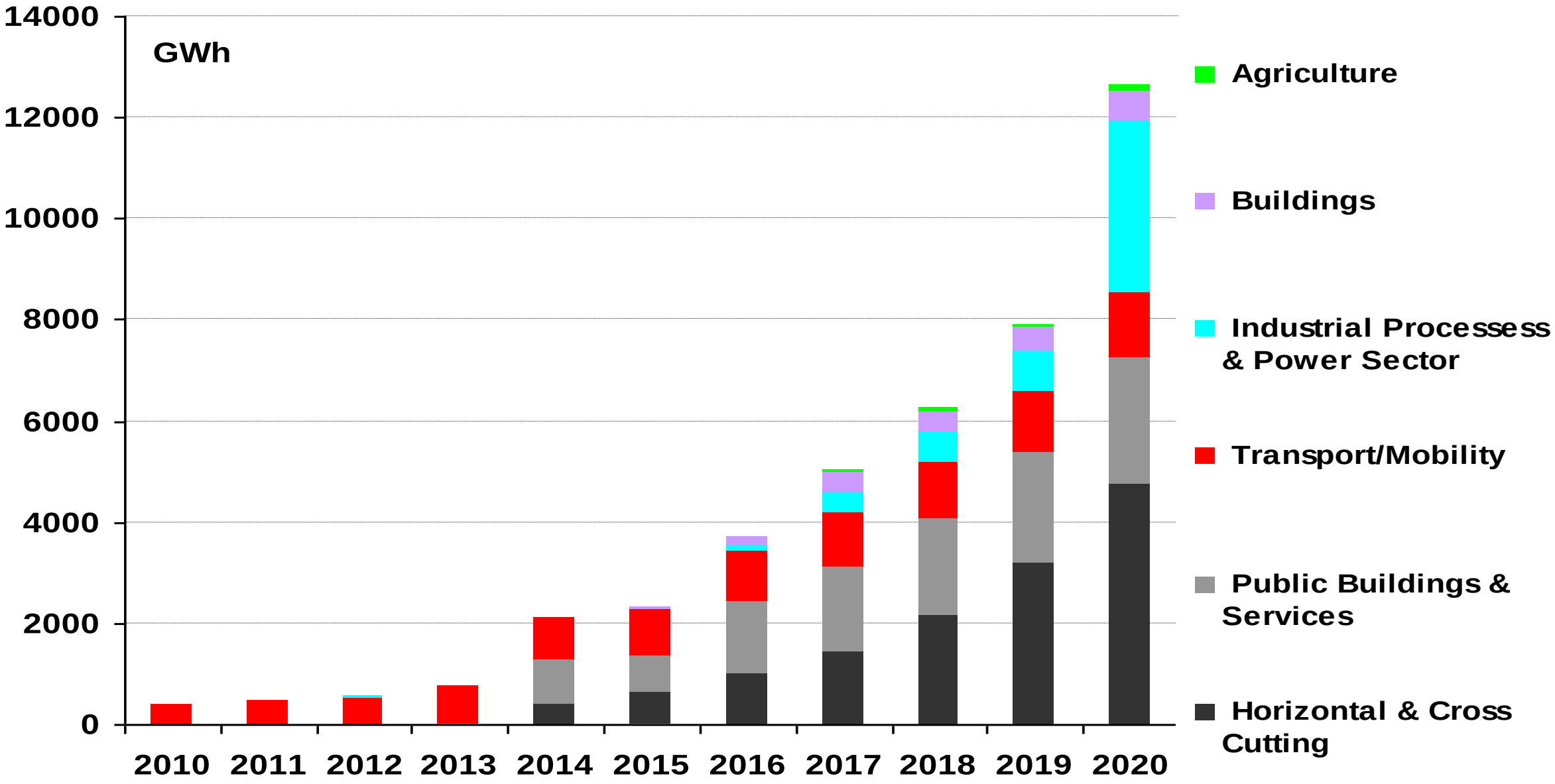
V8. Electric vehicles deployment strategy



Sectoral breakdown of annual and cumulative energy savings for 2010-2020 (GWh)

No	Title of the energy saving measure	Achieved or expected energy savings in target year (GWh)										Aggregate Savings (GWh)
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
I.	Horizontal & Cross Cutting					413	619	988	1,452	2,148	3,192	4,758	13,568
II.	Buildings					1	3	146	364	397	479	597	1,987
III.	Public Buildings and Services					862	757	1,446	1,667	1,904	2,183	2,504	11,323
IV.	Industrial Processes and Power Sector	1	1	7	10	16	19	151	433	617	801	3,391	5,448
V.	Transport/Mobility	390	480	536	742	822	897	979	1,052	1,125	1,195	1,274	9,492
VI	Agriculture					2	1	1	47	82	61	125	318
VII,	Grand Total	GWh				2,115	2,297	3,711	5,014	6,272	7,911	12,650	39,969
		KTOE				182	197	319	431	539	680	1,088	3,437

Achieved (expected) annual energy savings 2010-2020

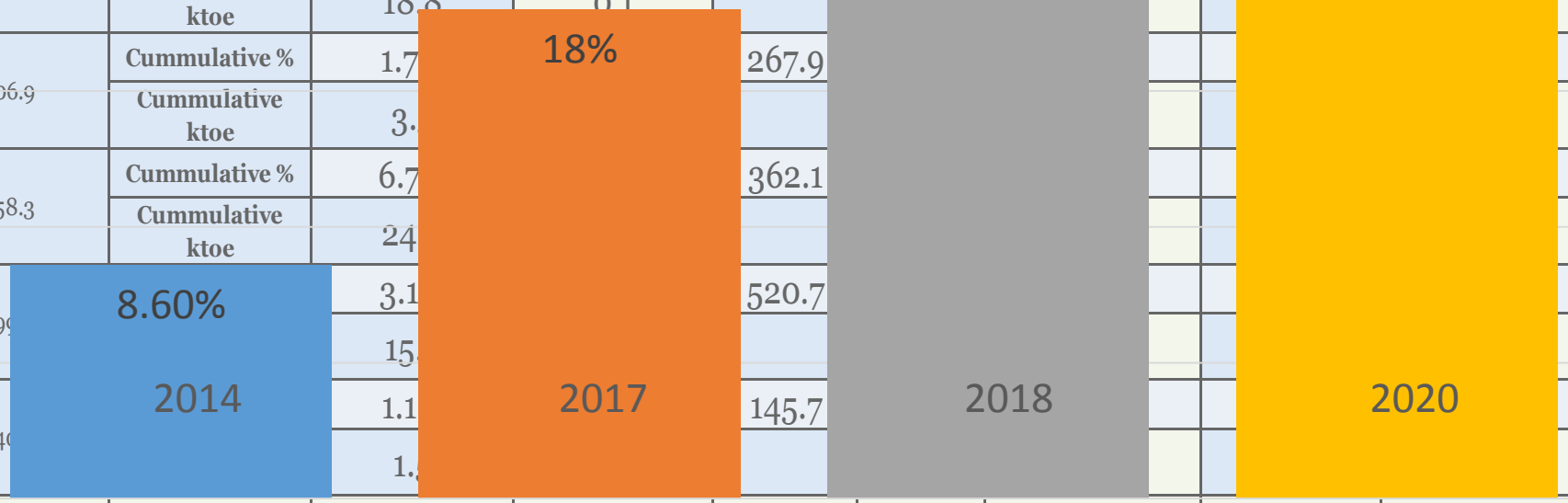


Progress against NEEAP 1 targets and New (Revised) Targets

Sector/Measure		Baseline Final Energy Consumption	Estimated annual savings SECTOR TARGET based on 2010 baseline (% and ktoe)		Sector target in 2014 (ktoe)	Baseline Final Energy Consump-tion	Estimated annual savings per measure based on 2010-2012 average baseline (% and ktoe)				Aggregated savings target by 2020	
		2010 (in ktoe)	annual/ cumulated savings	Cummulative 1st NEEAP TARGET set for 2014 (in ktoe)	ACHIEVED	Avg for 2010-2012 (in ktoe)	Cummulative for 2017 (1st NEEAP)	Cummulative for 2017 (2nd NEEAP revised)	Cummulative for 2018 (1st NEEAP)	Cummulative for 2018 (2nd NEEAP revised)	in ktoe (1st NEEAP)	Cummulative for 2020 (2nd NEEAP revised)
I.	Horizontal /Cross-cutting	no target	NO TARGET									
			Cummulative ktoe		35.7			61.0		69.9		91.5
II.	Buildings (Residential)	695.7	Cummulative %	2.7%	0.0%	750.5	9.9%	4%	13.5%	4.5%	23.0%	7%
			Cummulative ktoe	18.8	0.1		74.3	31.3	101.3	34.1	172.6	51.4
III.	Public & Private S ervice Sector	206.9	Cummulative %	1.7%	26.6%	267.9	6.1%	53.5%	8.4%	61.1%	14.6%	80%
			Cummulative ktoe	3.5	55.1		16.3	143.3	22.5	163.7	39.1	215.3
IV.	Industry & Power	358.3	Cummulative %	6.7%	0.4%	362.1	19.8%	10.3%	26.2%	14.7%	23.3%	80.5%
			Cummulative ktoe	24.0	1.4		71.7	37.3	94.9	53.1	84.4	291.6
V.	Transport /Mobiliy	499.6	Cummulative %	3.1%	14.1%	520.7	9.0%	17.7%	11.4%	19.0%	20.3%	22%
			Cummulative ktoe	15.5	70.6		46.9	90.4	59.4	96.7	105.7	109.5
VI.	Agriculture	140.1	Cummulative %	1.1%	0.1%	145.7	2.3%	2.77%	2.7%	4.8%	14.0%	7.4%
			Cummulative ktoe	1.5	0.13		3.4	4.0	3.9	7.0	20.4	10.7
VII.	Total	1900.6	Cummulative %	**3.3%**	**8.6%**	**2047.0**	**10.4%**	**18%**	**13.8%**	**20.7%**	**22.3%**	**37.6%**
			Cummulative ktoe	**63.3**	**163.1**		**212.6**	367.4	**282.0**	424.6	422.2	770.1
		22.10 GWh	Cummulative GWh	**0.7**	**1.9**	**23.8**	**2.5**	**4.3**	**3.3**	**4.9**	**4.9**	**9.0**

Armenia's Progress against NEEAP 1 targets and New Targets

Sector/Measure		Baseline Final Energy Consumption	Estimated annual savings SECTOR TARGET based on 2010 baseline (% and ktoe)		Sector target in 2014 (ktoe)	Baseline Final Energy Consump-tion	Estimated annual savings per n average baseline				Aggregated savings target by 2020	
		2010 (in ktoe)	annual/ cumulated savings	Cummulative 1st NEEAP TARGET set for 2014 (in ktoe)	ACHIEVED	Avg for 2010-2012 (in ktoe)	Cummulai ive for 2017 (1st NEEAP)	Cummulative for 2017 (2nd NEEAP revised)	C f	or)	in ktoe (1st NEEAP)	Cummulative for 2020 (2nd NEEAP revised)
I.	Horizontal /Cross-cutting	no target	NO TARGET									
			Cummulative ktoe		35.7			61.0				91.5
II.	Buildings (Residential)	695.7	Cummulative %	2.7%	0.0%	750.5					23.0%	7%
			Cummulative ktoe	18.8	0.1						172.6	51.4
III.	Public & Private S ervice Sector	206.9	Cummulative %	1.7		267.9					14.6%	80%
			Cummulative ktoe	3.							39.1	215.3
IV.	Industry & Power	358.3	Cummulative %	6.7		362.1					23.3%	80.5%
			Cummulative ktoe	24							84.4	291.6
V.	Transport /Mobiliy	49		3.1		520.7					20.3%	22%
				15							105.7	109.5
VI.	Agriculture	14		1.1		145.7					14.0%	7.4%
				1.							20.4	10.7
VII.	Total	1900.6	Cummulative %	3.3%	8.6%		10.4%	18%	13.8%	20.7%	22.3%	37.6%
			Cummulative ktoe	63.3	163.1	197.5	212.6	367.4	282.0	424.6	422.2	770.1
		22.10 GWh	Cummulative GWh	0.7	1.9	23.8	2.5	4.3	3.3	4.9	4.9	9.0

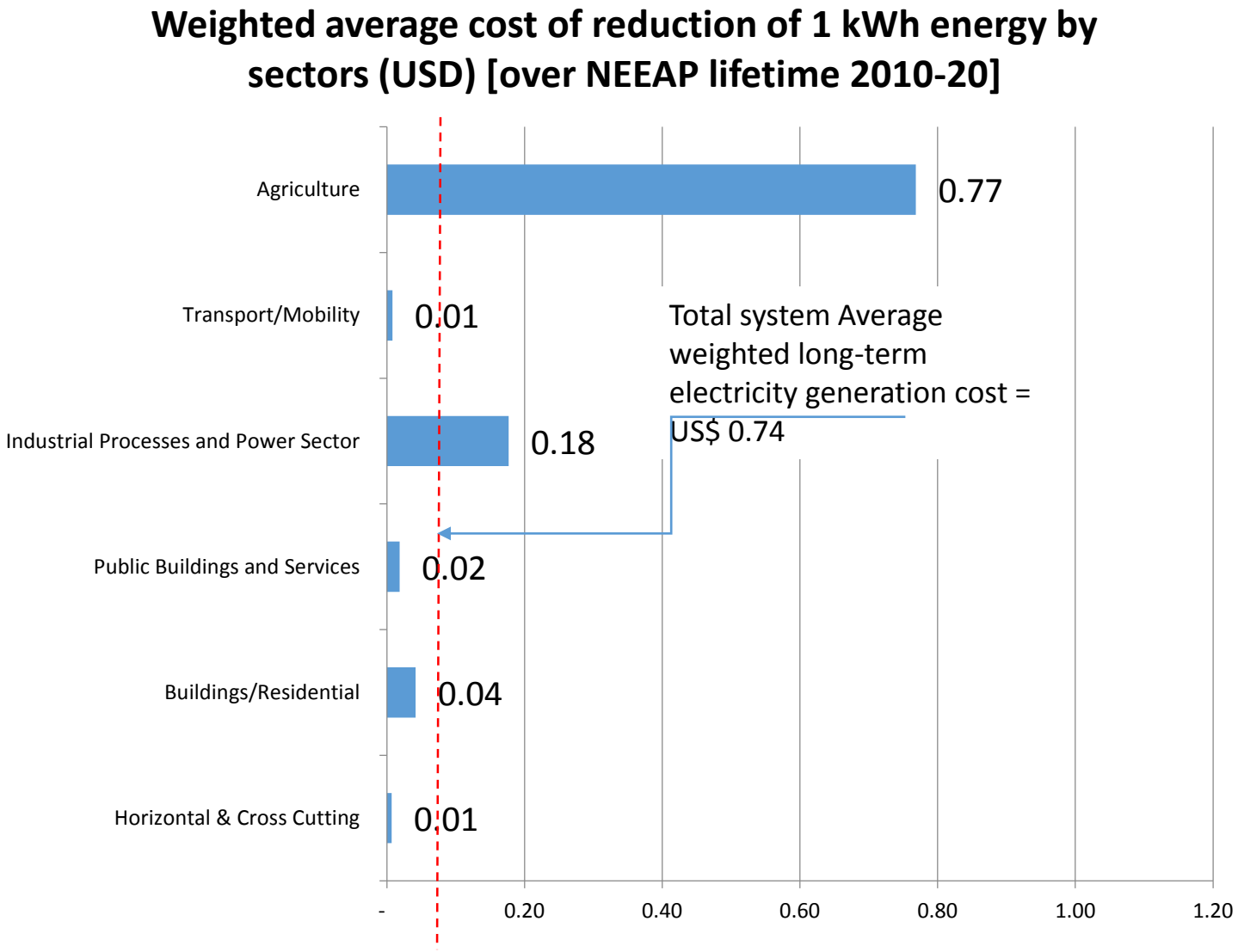


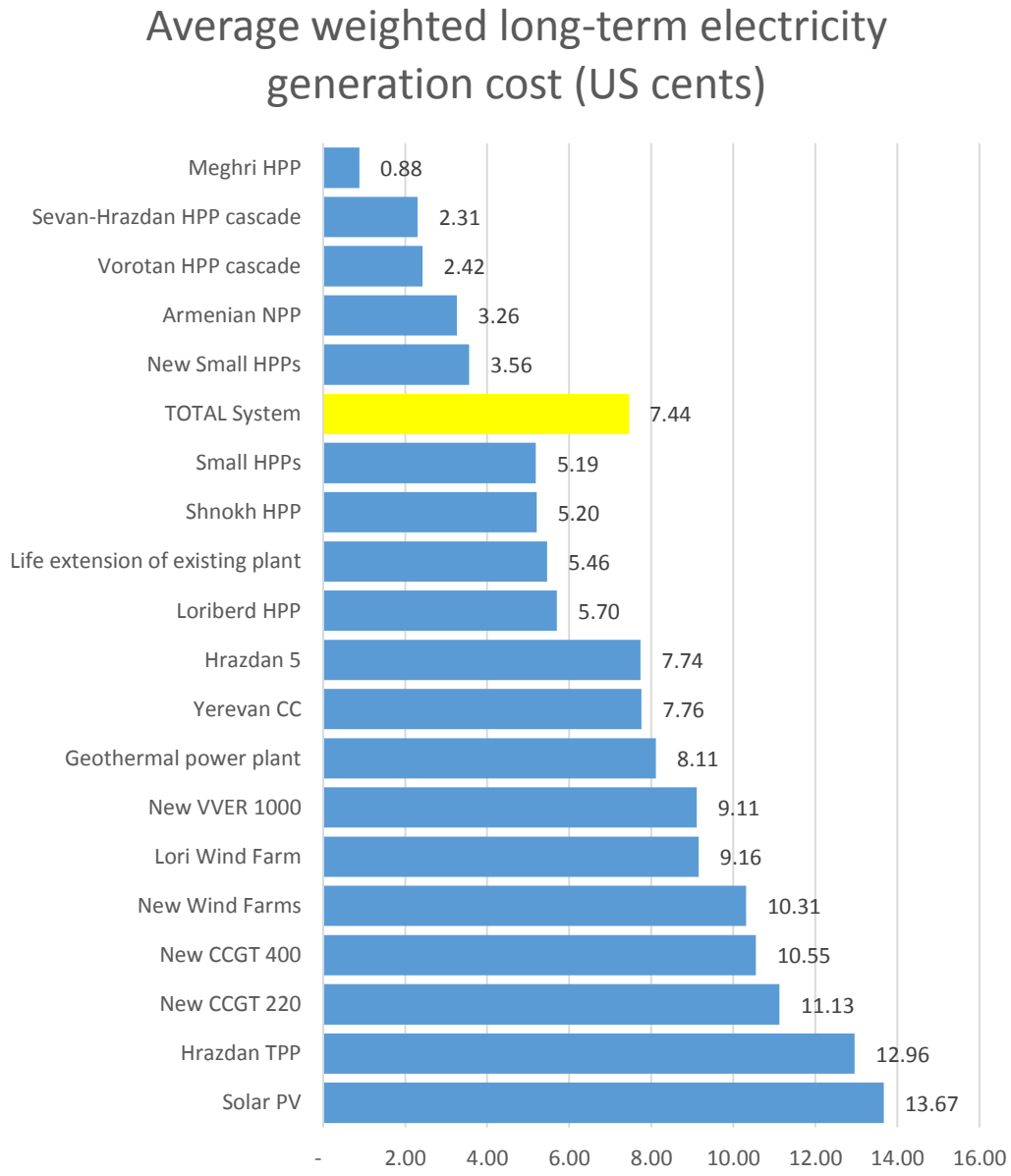
National Energy Saving Targets

Tons of CO_2 emission avoided by target year based on Sectoral Measures

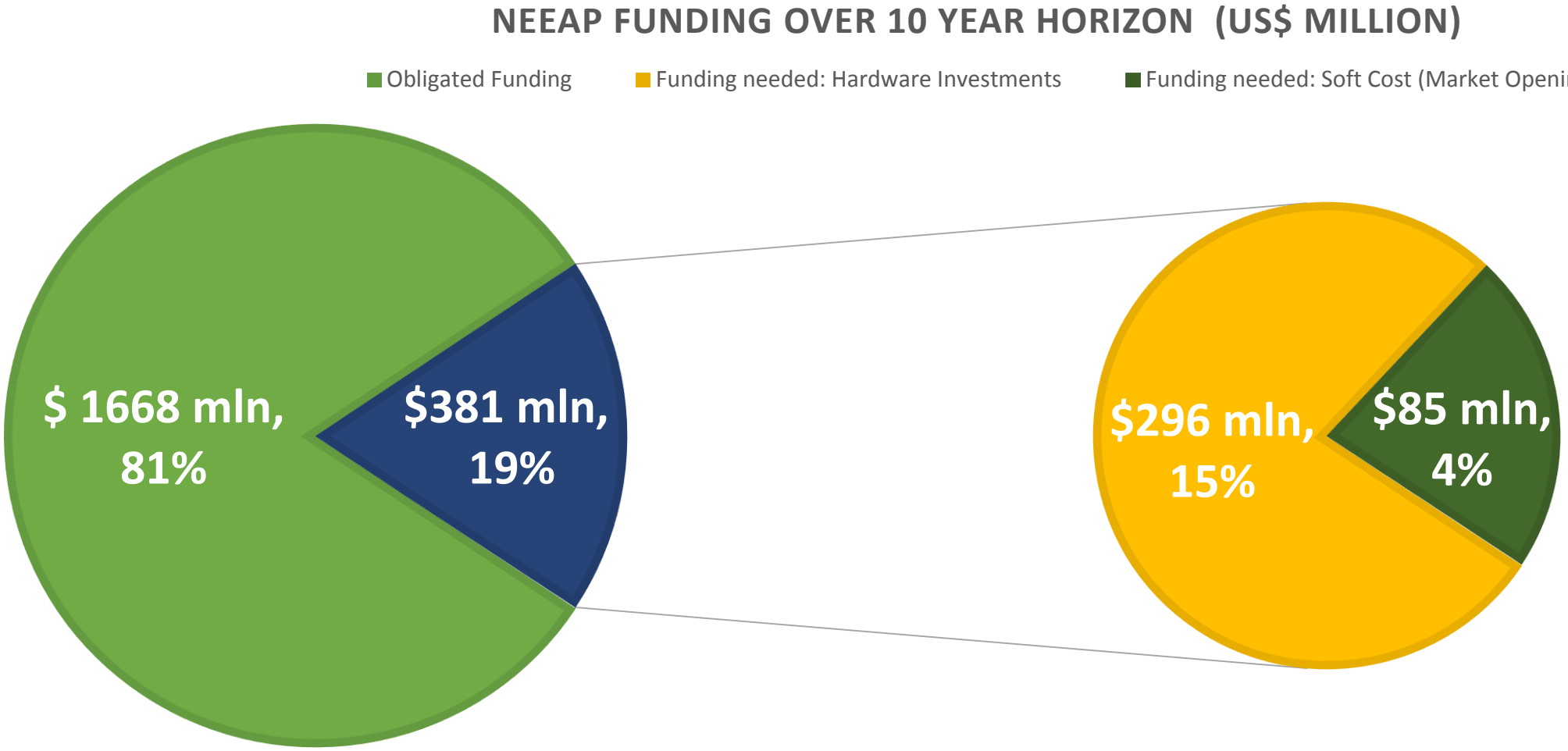
Sectors	Tons of CO_2 emission avoided by target year			
	2014	2017	2018	2020
Horizontal and CC	183,157	209,515	222,694	271,732
Buildings (Residential)	1,366	28,860	28,860	28,860
Public Buildings and Services	186	25,493	27,293	31,250
Industry	311	791	951	1,270
Transport	31	40	43	49
Agriculture	-	7,637	15,318	22,955
Total GHG Avoided (tons CO2)	185,650	282,464	309,349	356,116

Weighted average cost of 1 kWh energy GENERATED & SAVED

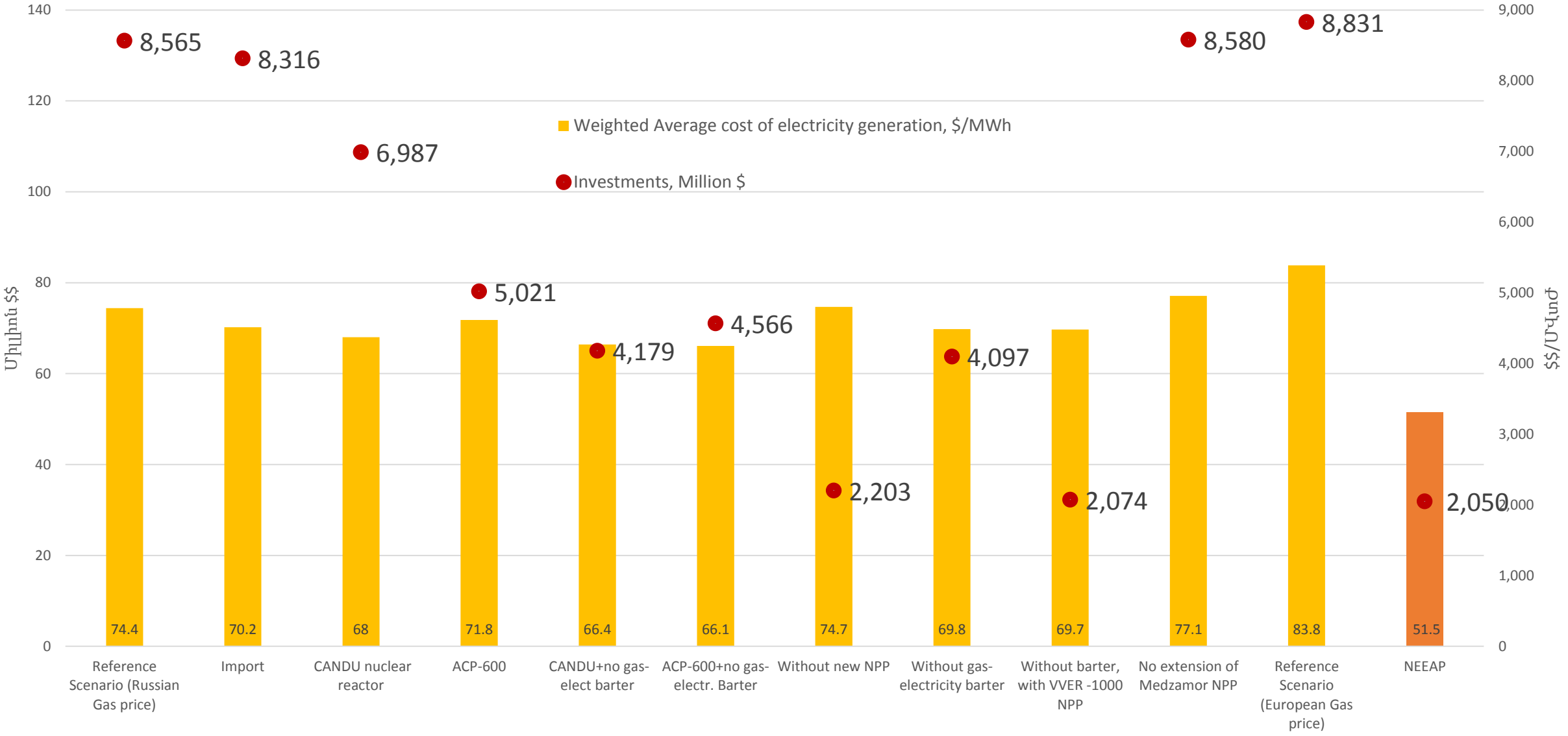




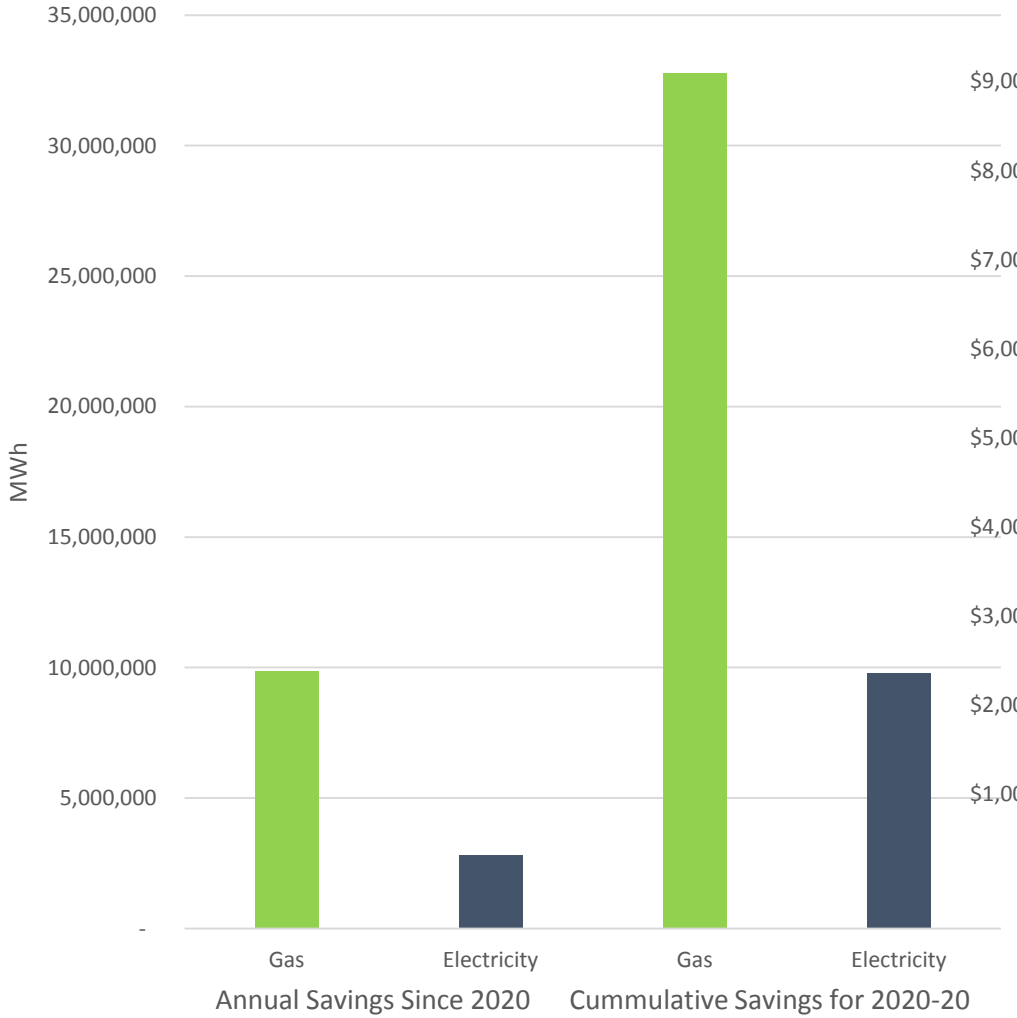
Cost of the NEEAP:
Investments over 2010-20 time horizon $2,05 million

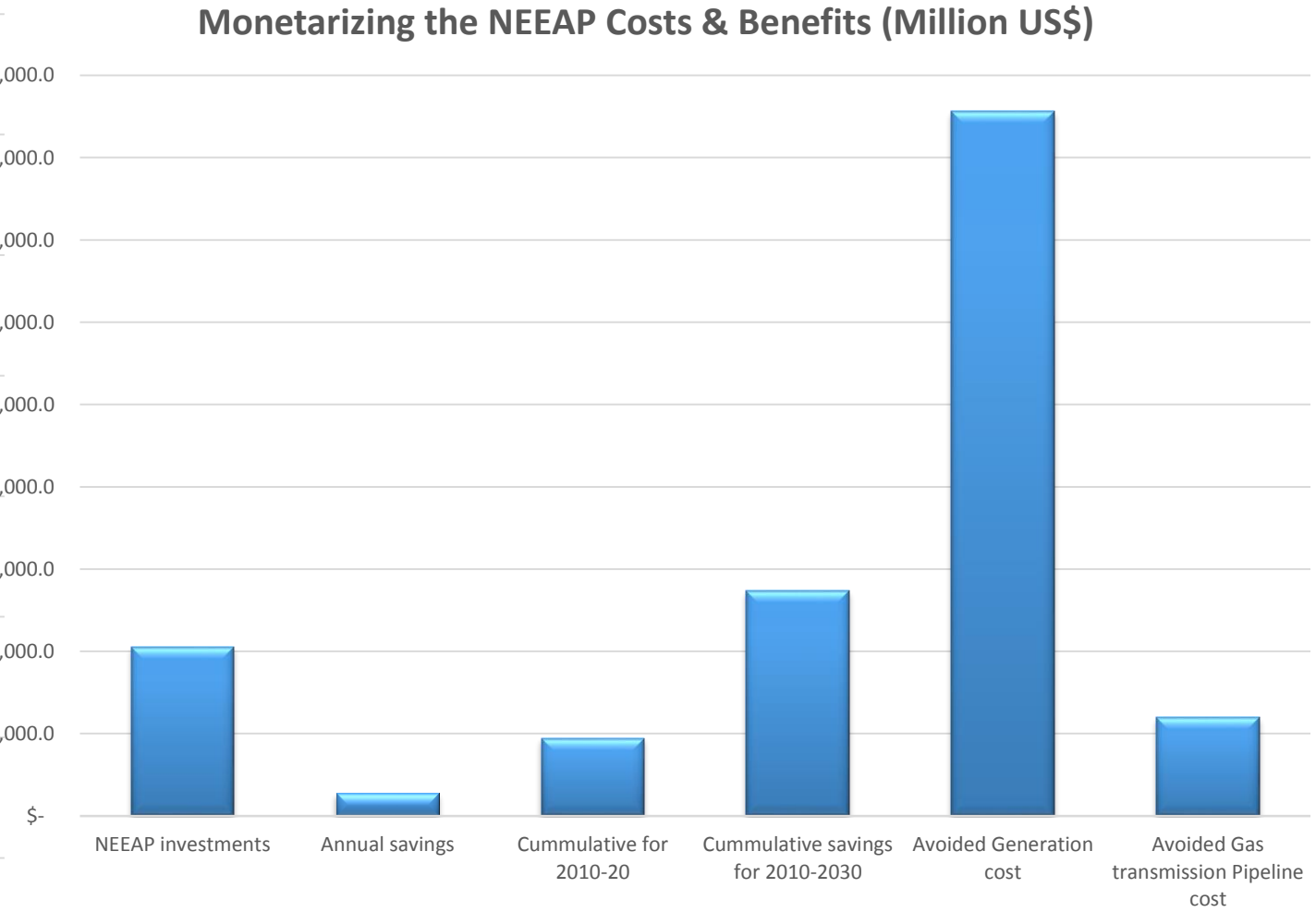


Comparative Analysis of 2nd NEEAP implementation scenario with the existing scenarios of energy sector development of the Republic of Armenia



The Economic Gains from the NEEAP Implementation





Tasks associated with 2nd NEEAP Oversight

- Develop and maintain appropriate and transparent data bases on energy efficiency and renewable energy sources (monitoring and reporting services).
- Monitoring, verification of savings and preparing reports on realized energy audits in building sector.
- Organize and monitor training courses for energy auditors.
- Cooperate with non-governmental sector in developing the awareness of the need of EE and RES.
- Encourage innovative approaches for investment including third party financing or co-financing.
- Undertake measures for raising the awareness of consumers on end-use heat efficiency and increasing the efficiency of MABs, insulation, efficiency of pumps, flow regulation and other distribution efficiencies can occur.

Thank you

Astghine Pasoyan

Team Leader,

Econoler & Alliance to Save Energy Consortium

astghine@gmail.com

apasoyan@ase.org

www.ase.org