Project in 10YPF Sustainable lifestyles and education:

Showing the sustainable lifestyle behaviour and technologies for energy efficient households in Zambia (2017-2018)

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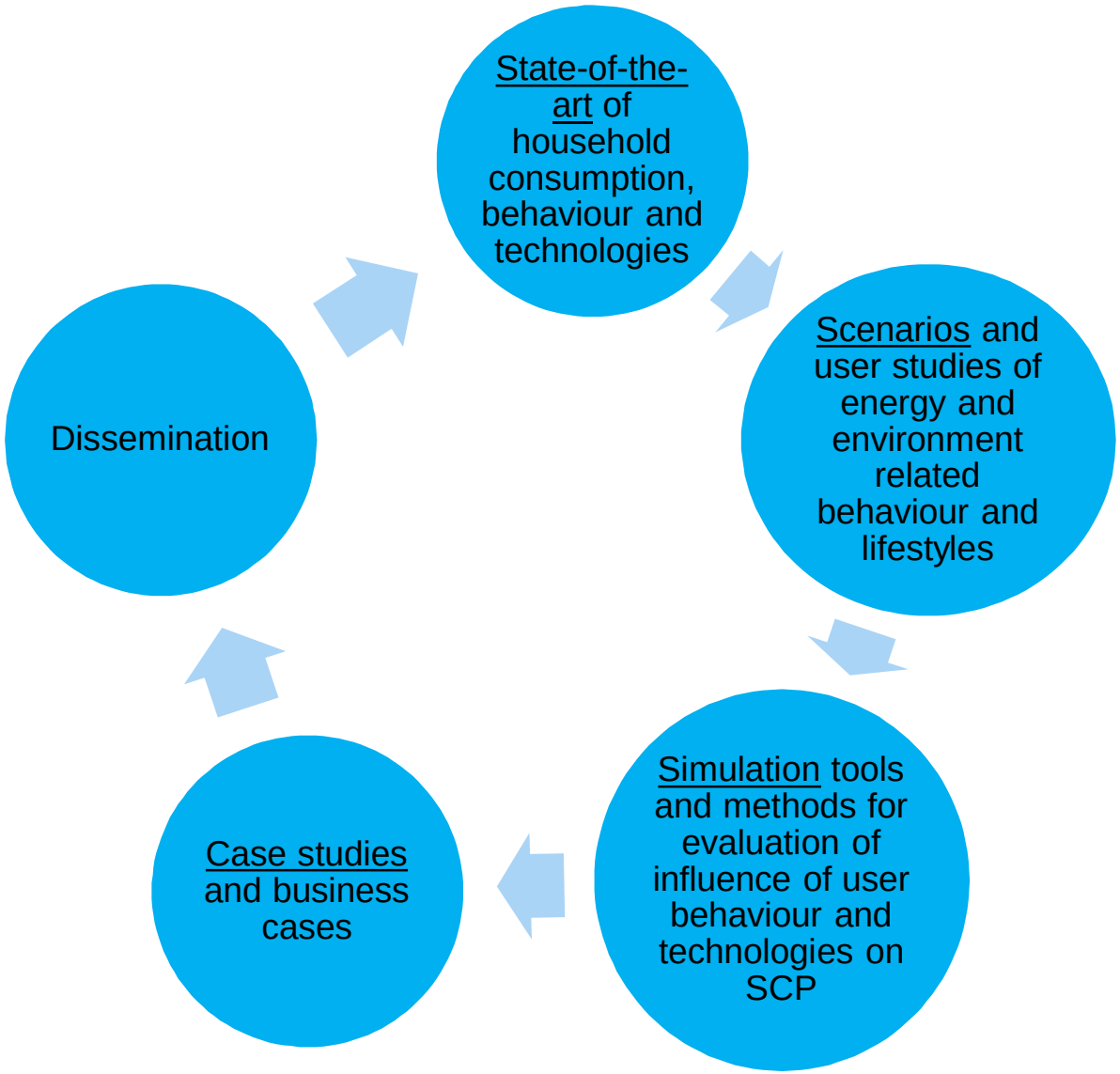
Showing the sustainable lifestyle behaviour and technologies for energy efficient households in Zambia

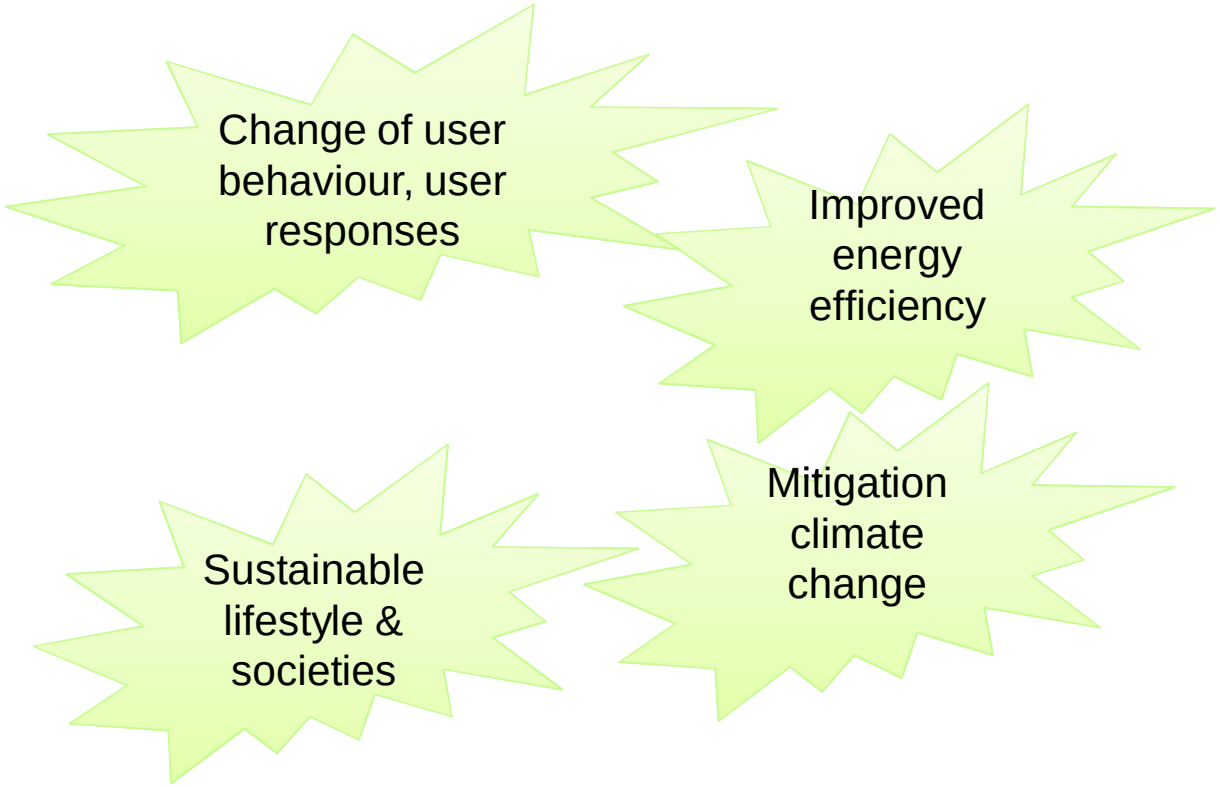
- The objective is to show influence of lifestyle, behaviour and technology on household energy performance and show possibilities of energy efficient technologies for large public
  - The scenarios of lifestyle are studied using participatory approaches and social innovations
  - The behaviour influencing on household energy use will be studied by case study simulations
  - The holistic performance combining lifestyle and technology scenarios will be shown by simulator/web-based /mobile tools
- The dissemination will be done in 3 levels
  - Development of the knowledge and expertise of university teachers and students (CBU) by implementing building system energy simulation tools and methods in university courses
  - Material & web based tool for basic education of public and youth
  - Increasing the knowledge of decision and policy makers about economic viability of energy saving technologies; practical case studies and business cases

WPs


State-of-the-art of household consumption, behaviour and technologies
Scenarios and user studies of energy and environment related behaviour and lifestyles
Simulation tools and methods for evaluation of influence of user behaviour and technologies on SCP
Case studies and business cases
Dissemination

Impact

§ Educational aspects
§ Climate & energy aspects
§ Quality of life aspects

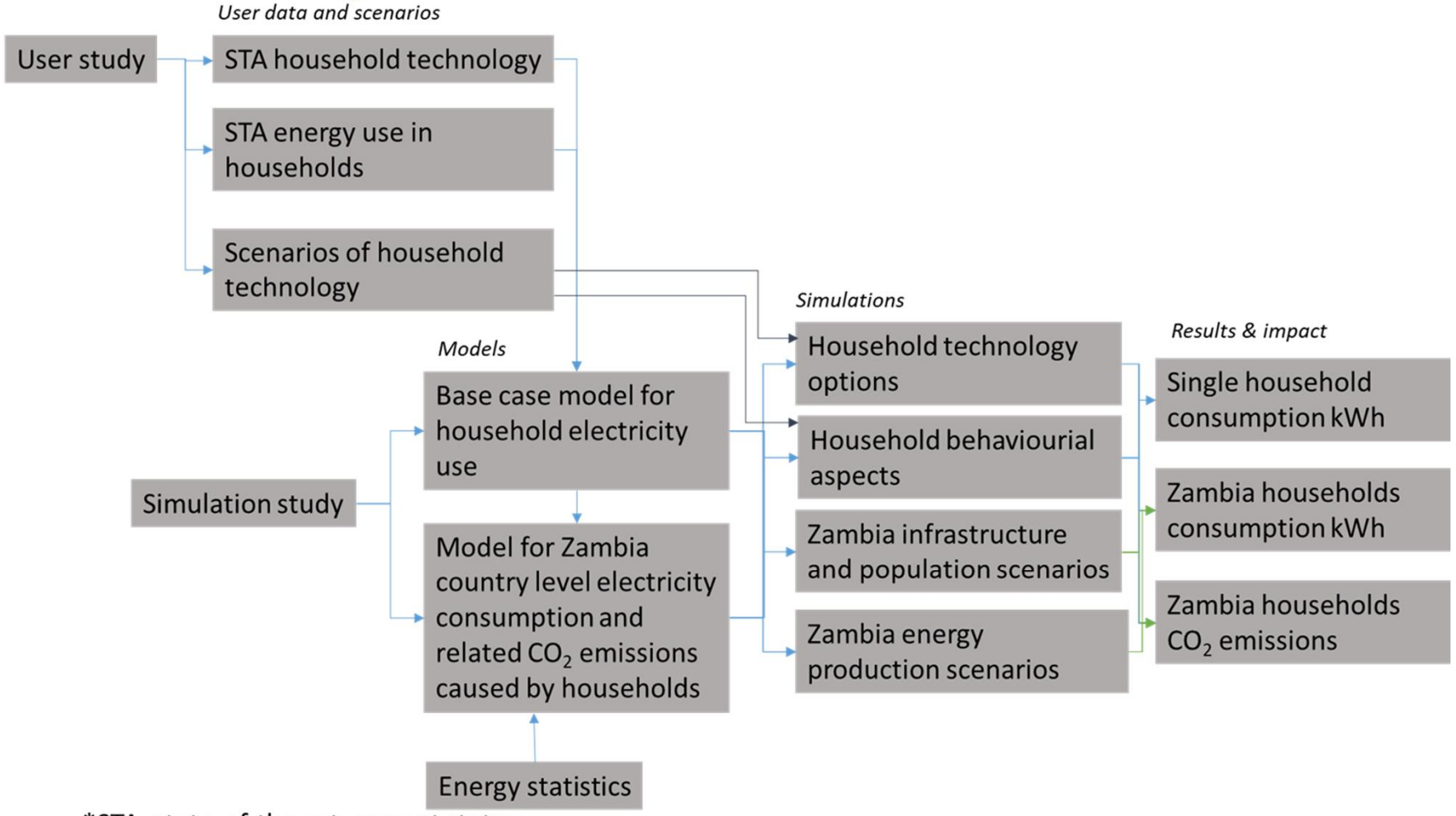


Partners

§ Financing

§ Research

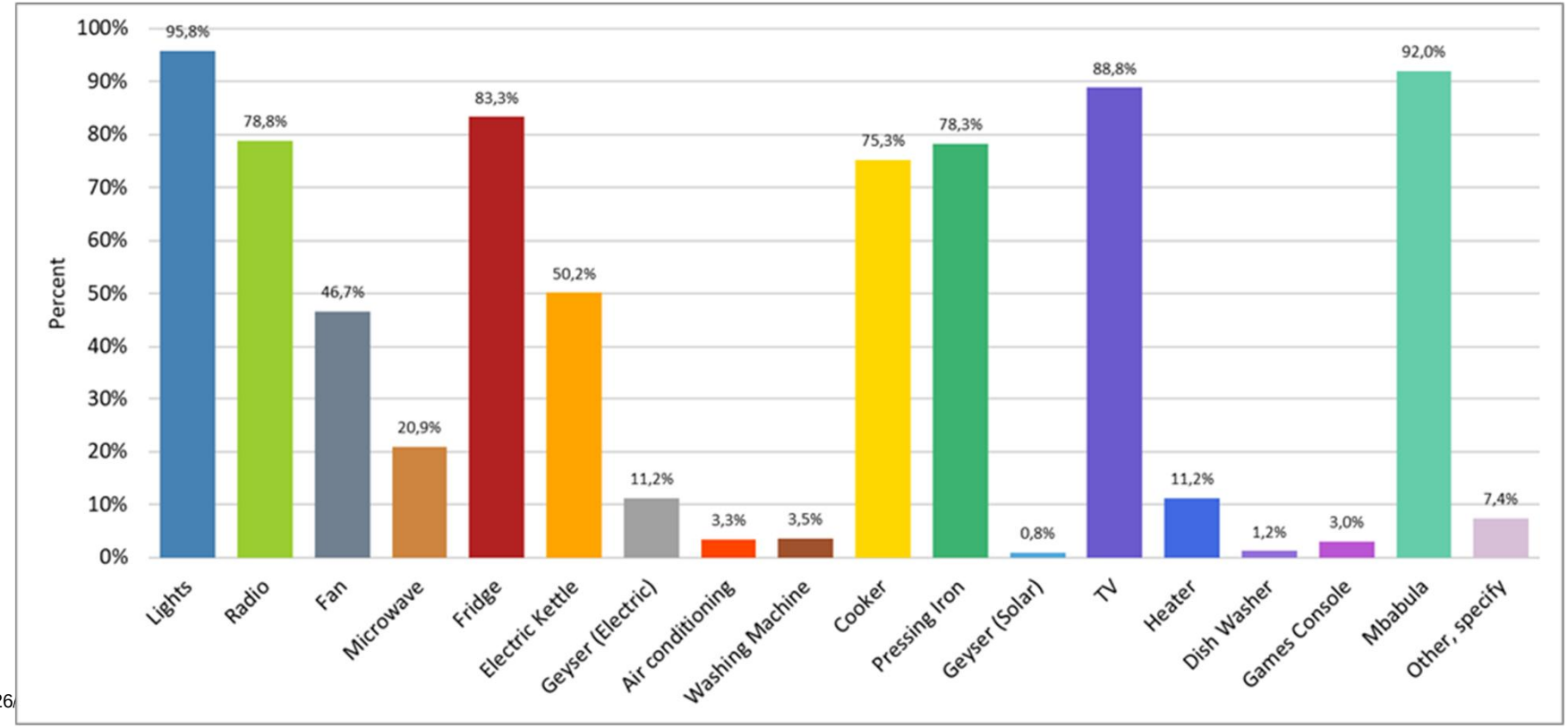
Case study results by combining user studies, scenarios and simulation study



*STA, state-of-the-art, current status

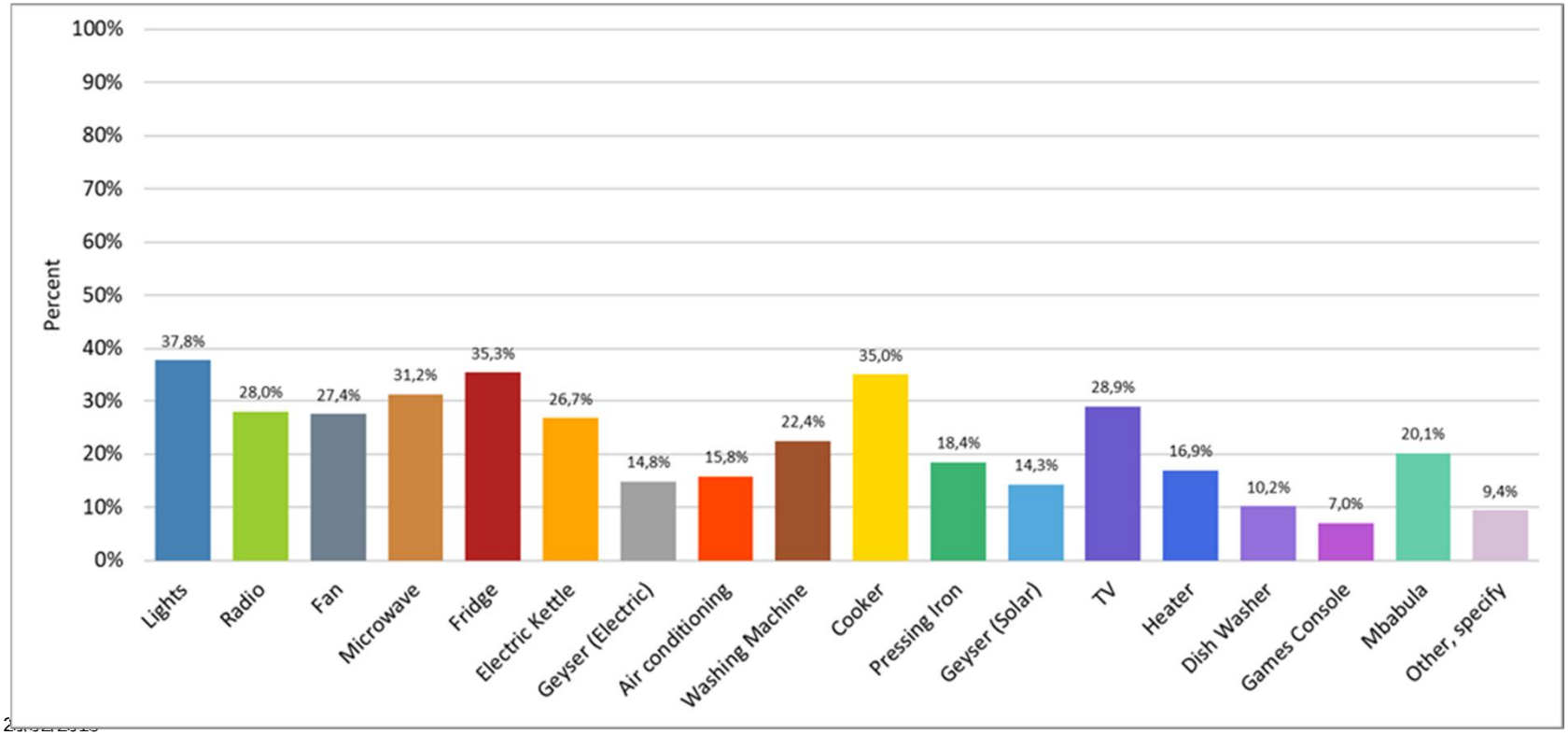
User study

§ Variety of appliances at households



User study

§ Planned investments in household appliances during next 5 years



Scenarios of the households

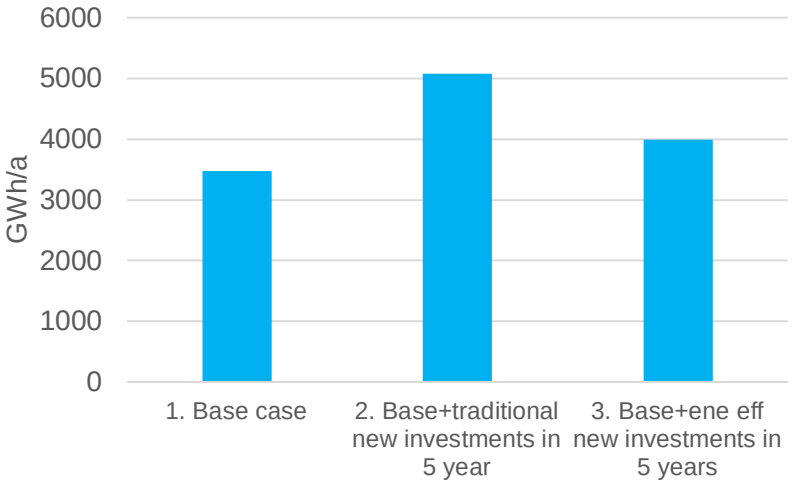
1. Base case at average household
2. Household technology scenarios: scenarios of new investments in appliances and replacement of existing ones
3. Behavioural scenarios: scenarios of investments in energy efficient appliances and scenarios of decrease of energy use by decrease in using time.
4. Zambian population growth and infrastructure scenarios. These scenarios don't have influence at household level but at Zambia level
5. Zambian energy production infrastructure scenarios. These scenarios have impact on CO_2 emissions.

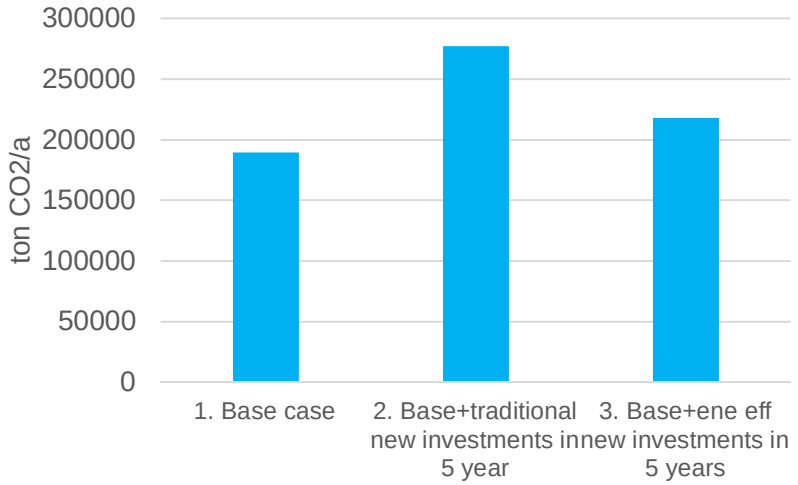
Þ 28 cases and for all the cases 6 different production infrastructure (=CO_2 factor) assumptions

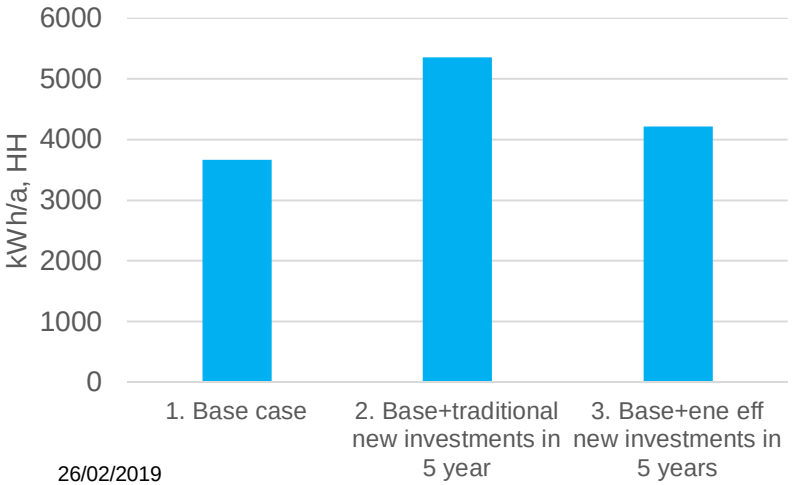
5 selected scenarios to show the impact of energy efficient household devices

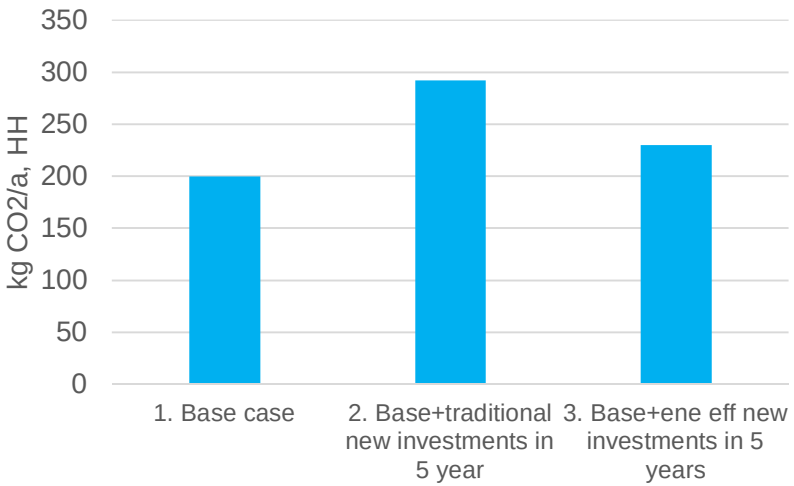
- New, near future investments with traditional tech vs energy efficient technology (cases #2 vs #3)
- Base case traditional lighting replaced by energy efficient lighting (#1 vs #6)
- The main household traditional tech appliances replaced by energy efficient ones (#1 vs #12)
- +3% yearly increase of amount of households in 5 years with traditional tech and energy efficient tech (#25e vs #26e)
- +7% yearly increase of amount of electrified households in 5 years with traditional tech and energy efficient tech (#27e vs #28e)

New, near future investments with traditional tech vs energy efficient technology (#2 vs #3)





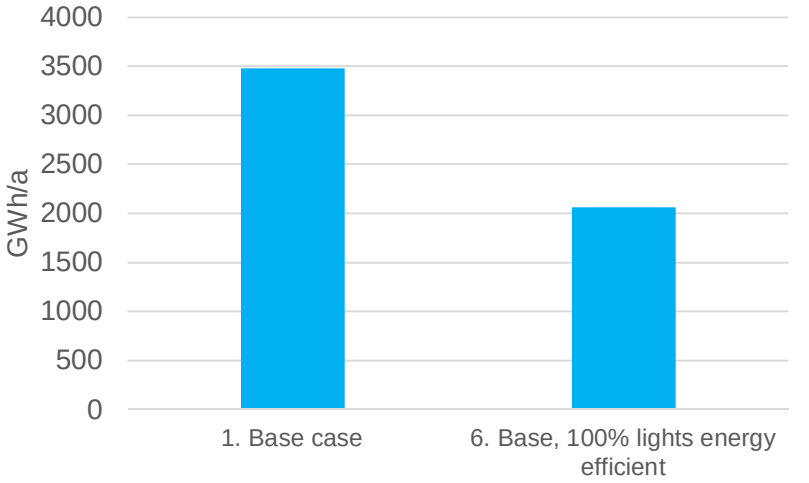


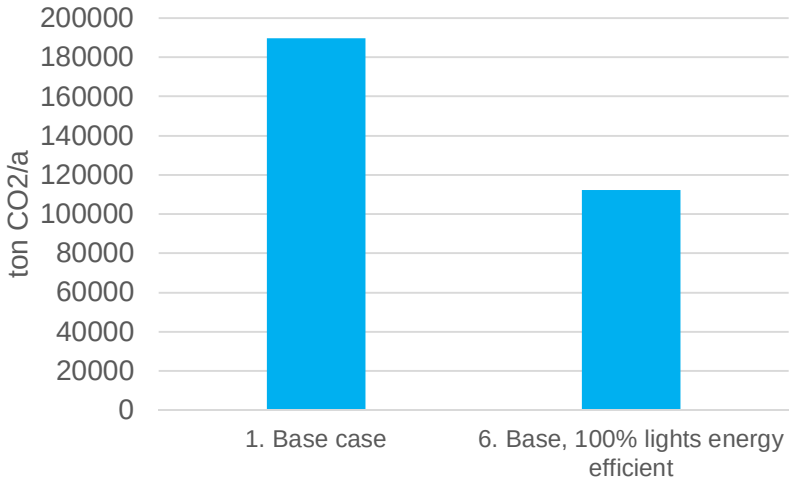


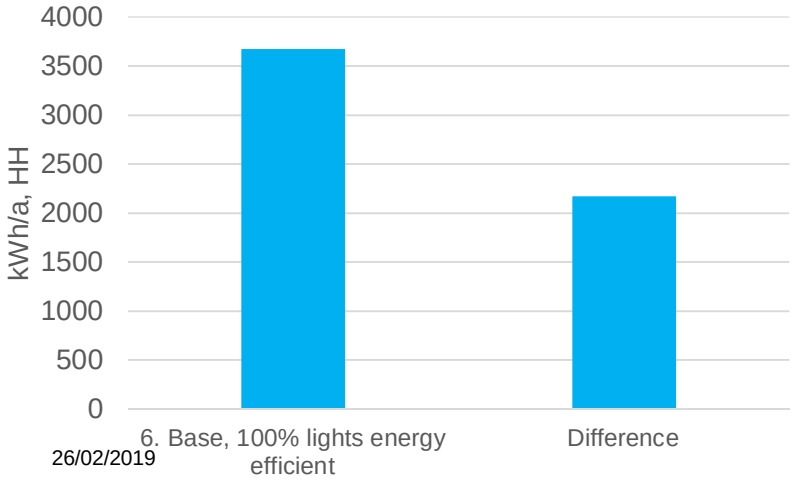
Difference	
-1084,5	GWh/a
-59103,3	ton CO2/a
-1144,3	kWh/a, HH
-62,4	kg CO2/a, HH

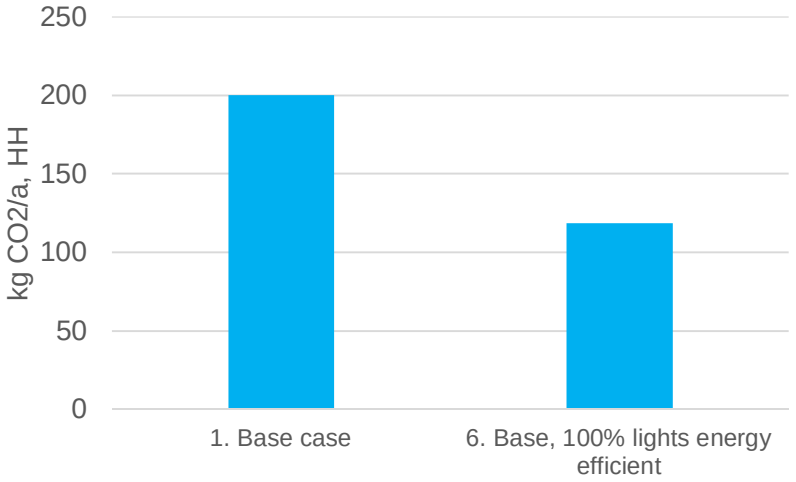
*HH=household

Base case traditional lighting replaced by energy efficient lighting (#1 vs #6)





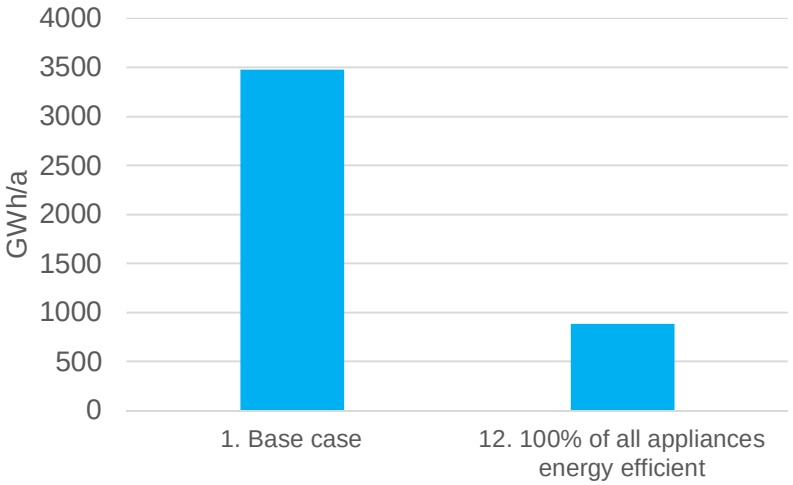


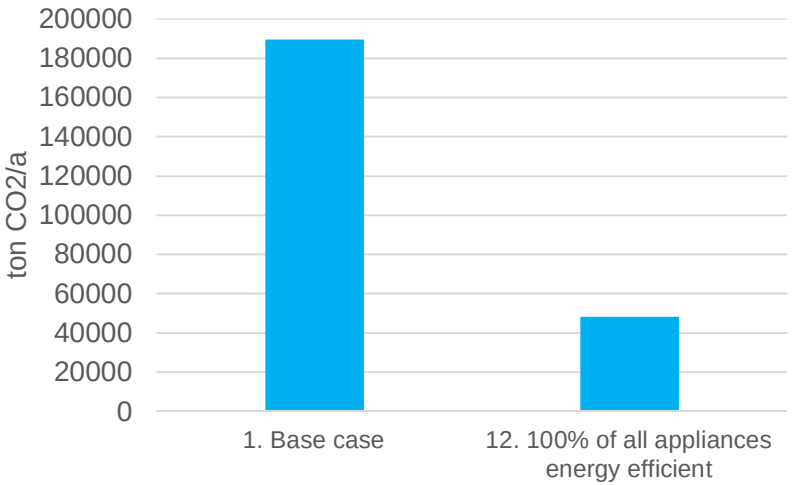


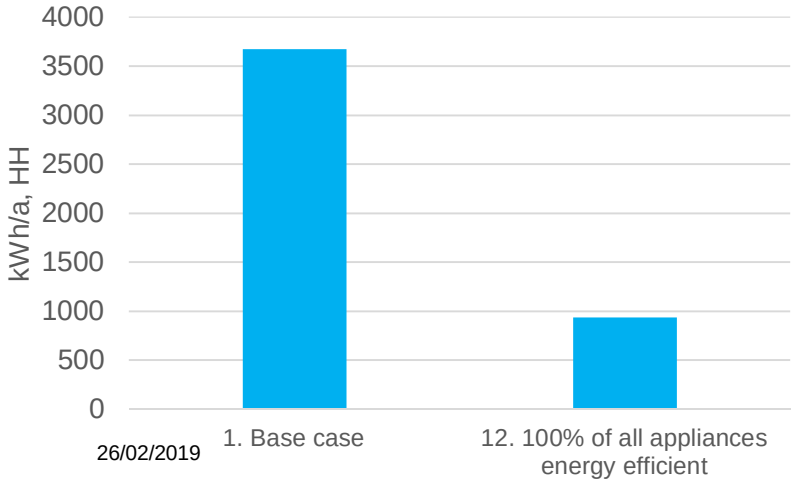
Difference	
-1419,1	GWh/a
-77339,8	ton CO2/a
-1497,4	kWh/a, HH
-81,6	kg CO2/a, HH

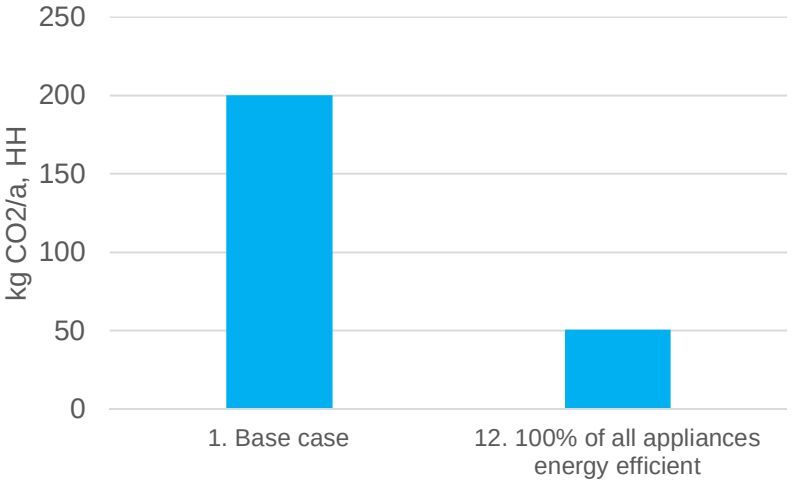
*HH=household

The main household traditional tech appliances replaced by energy efficient ones (#1 vs #12)





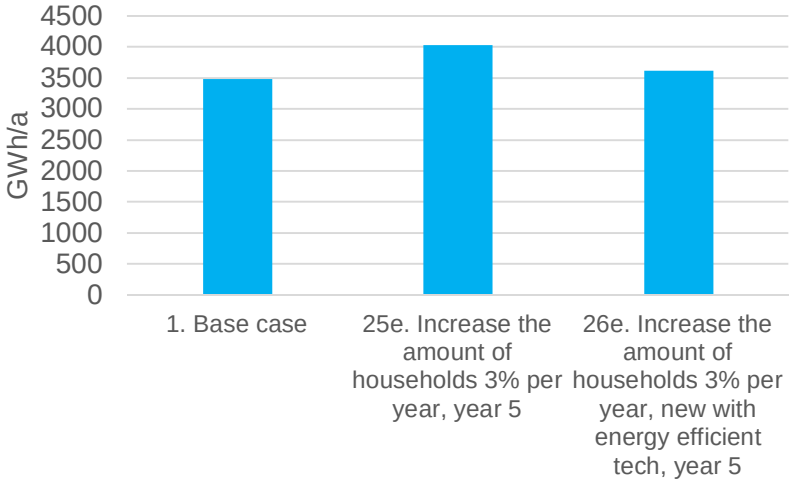


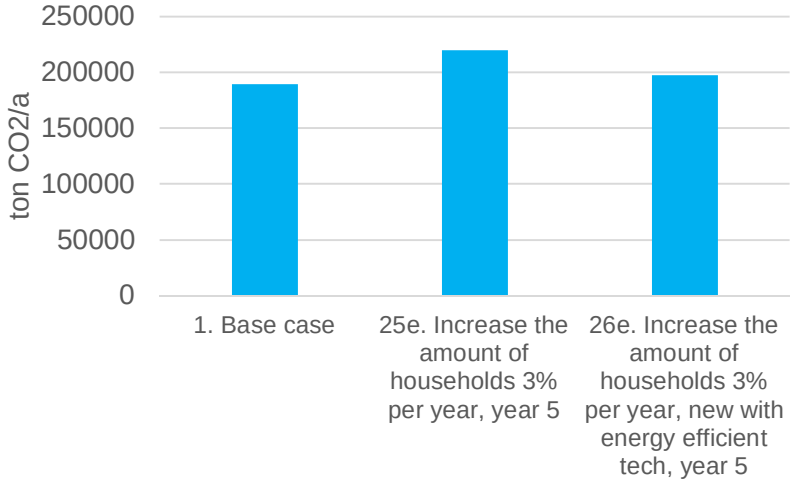


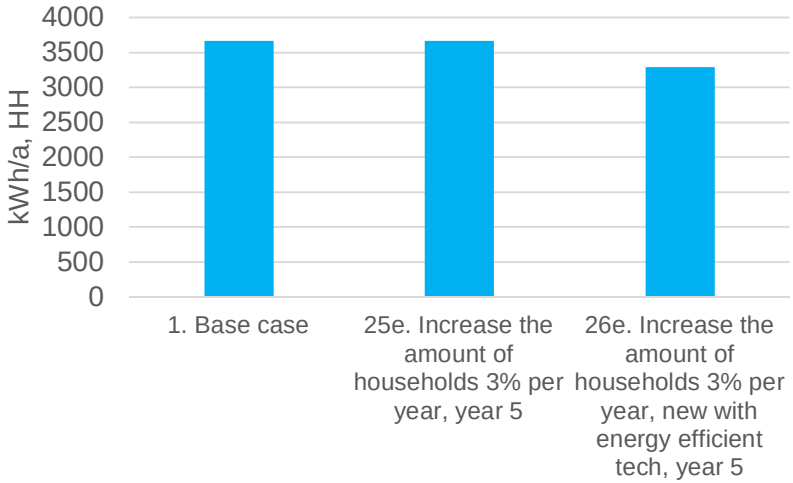
Difference	
-2593,2	GWh/a
-141329,3	ton CO2/a
-2736,3	kWh/a, HH
-149,1	kg CO2/a, HH

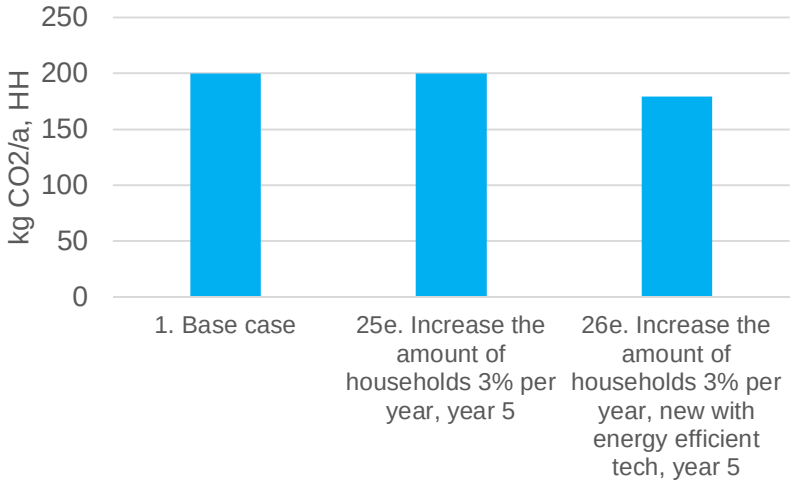
*HH=household

+3% yearly increase of amount of households in 5 years with traditional tech and energy efficient tech (#25e vs #26e)





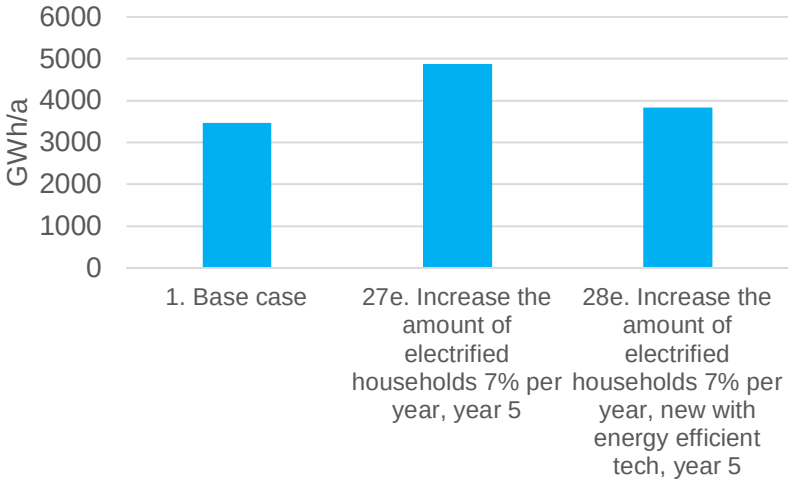


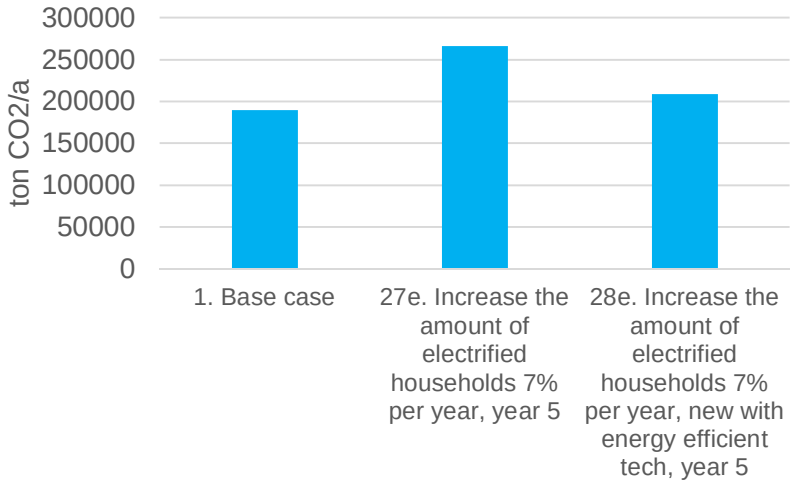


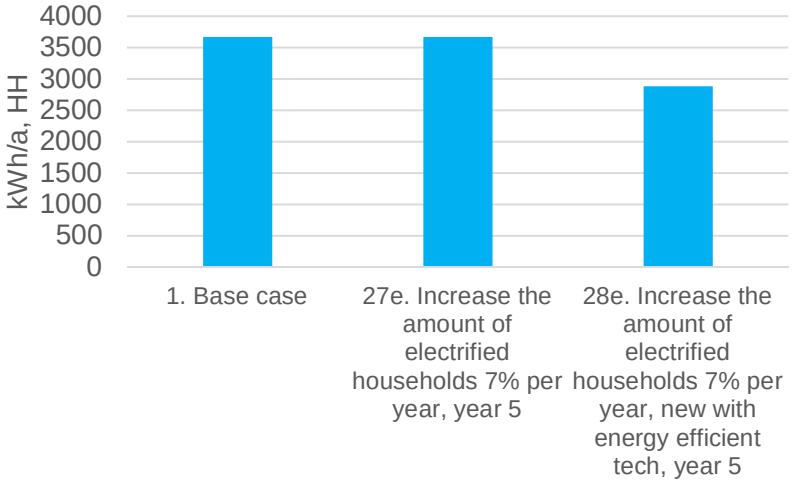
Difference	
-413,0	GWh/a
-22510,1	ton CO2/a
-375,9	kWh/a, HH
-20,5	kg CO2/a, HH

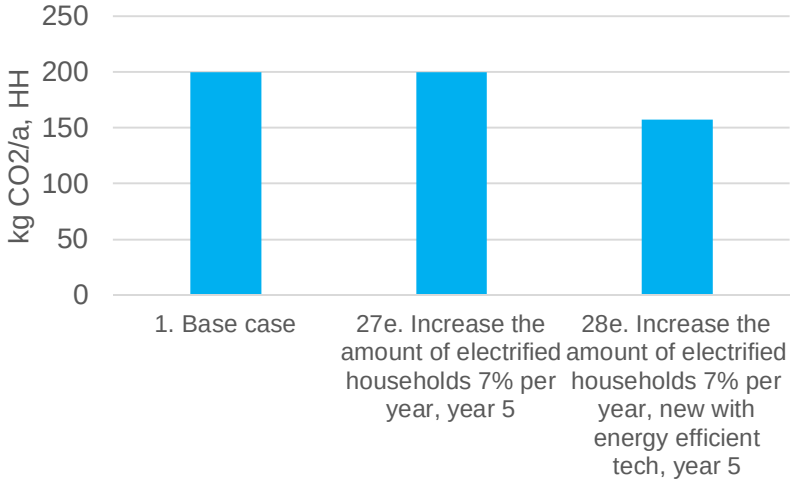
*HH=household

+7% yearly increase of amount of electrified households in 5 years with traditional tech and energy efficient tech (#27e vs #28e)









Difference	
-1043,9	GWh/a
-56892,4	ton CO2/a
-785,3	kWh/a, HH
-42,8	kg CO2/a, HH

*HH=household

Impact of selected 5 scenarios

Scale of 5 scenarios

- Zambia level
  - 400-2600 GWh/a
  - 22000-141000 ton CO_2
- Household level
  - 380-2700 kWh/a per household
  - 20-150 kg CO_2 per household

Impact of easy implementation <u>energy efficient lighting instead of traditional</u>

- Zambia level
  - 1400 GWh/a
  - 77000 ton CO_2
- Household level
  - 1500 kWh/a per household
  - 80 kg CO_2 per household

Difference	
-1419,1	GWh/a
-77339,8	ton CO2/a
-1497,4	kWh/a, HH
-81,6	kg CO2/a, HH

PROJECT SUMMARY

Showing the sustainable lifestyle behaviour and technologies for energy efficient households in Zambia

Customer: UNEP 10YFP Global action for sustainable consumption and production

CHALLENGE

Implementing the sustainable lifestyle behaviour and energy efficient technologies in Zambian households

SOLUTION

- Development of the knowledge and expertise of university teachers and students (CBU) by implementing building system energy simulation tools and methods in university courses
- Material for basic education of public and youth
- Increasing the knowledge policy makers about economic viability of energy saving technologies; practical case studies and business cases

BENEFIT

- Reduction in GHG by increasing user awareness
- Providing knowledge and scenarios of lifestyle changes to influence energy behaviour of households.
- Education and capacity building of CBU Kitwe, Zambia university teachers and students on building energy simulation expertise.