Appliances Guide
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bigEE

The overall worldwide saving potential of TVs

With results detailed for 10 world regions

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1 The overall worldwide energy and cost saving potential

TVs

About **1.9 billion** TVs are in use worldwide (Scenario reference year 2010). With an average annual electricity consumption of **199 kWh** each, altogether they account for about **7 %** of the total electricity consumption from the residential sector and cause worldwide annual greenhouse gas emissions of **249 million tons** of CO_2-eq. If every time a TV is purchased, the most energy efficient model is chosen, **475 TWh** of electricity and **313 million tons** of CO_2-eq per year can be saved by 2020. Even further savings are achievable by 2030.

1.1 Worldwide distribution of TVs

The distribution of TVs and the related electricity consumption is still uneven between different world regions. However, in all regions appliance ownership is expected to grow in the future.

The distribution of TVs is very uneven between different world regions. In North America, Western Europe and Pacific OECD most households own on average already more than two TVs, whereas in other world regions the level of ownership is still below saturation (see Figure 1). However, this is expected to change in the future.

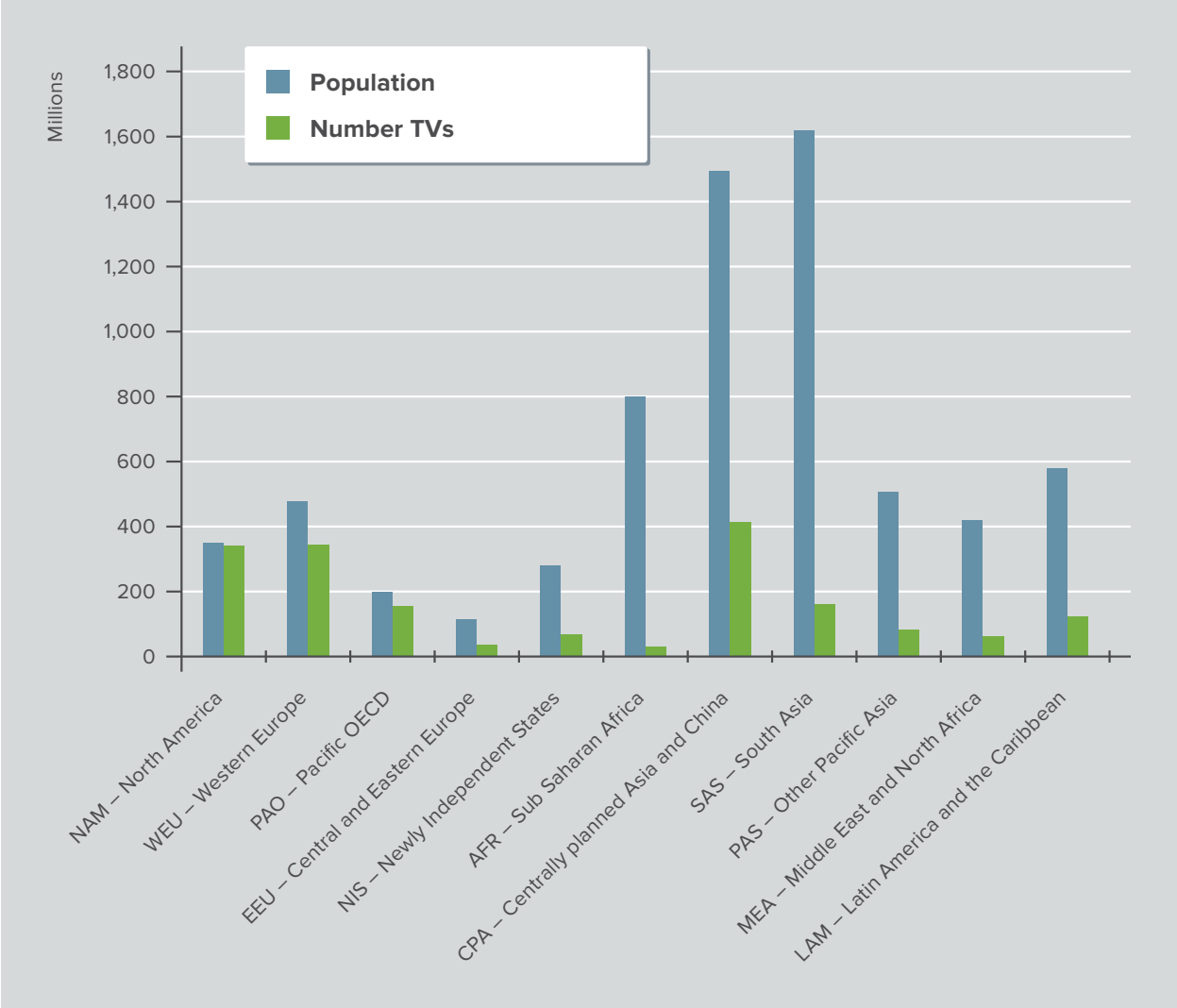

Figure 1: World population and number of TVs in the different world regions according to IPCC systematic

Source: Own calculation based on IEA 2010 and other reports

1.2 Electricity consumption of TVs

The results of the bigEE appliances model calculation show that TVs in private households consume varying amounts of electricity in different parts of the world, both in absolute and relative terms with regard to the overall household consumption. The uneven distribution of TVs worldwide (see Figure 1), different types of TVs (different technologies like CRT[1] and FPD[2] TVs) and their various efficiency levels, as well as different viewing habits and practices (e.g. hours of viewing per day or multiple TVs in On-mode at the same time) lead to substantial differences in electricity consumption in different world regions (see Figure 2).

[1] Cathode Ray Tube
[2] Flat Panel Display

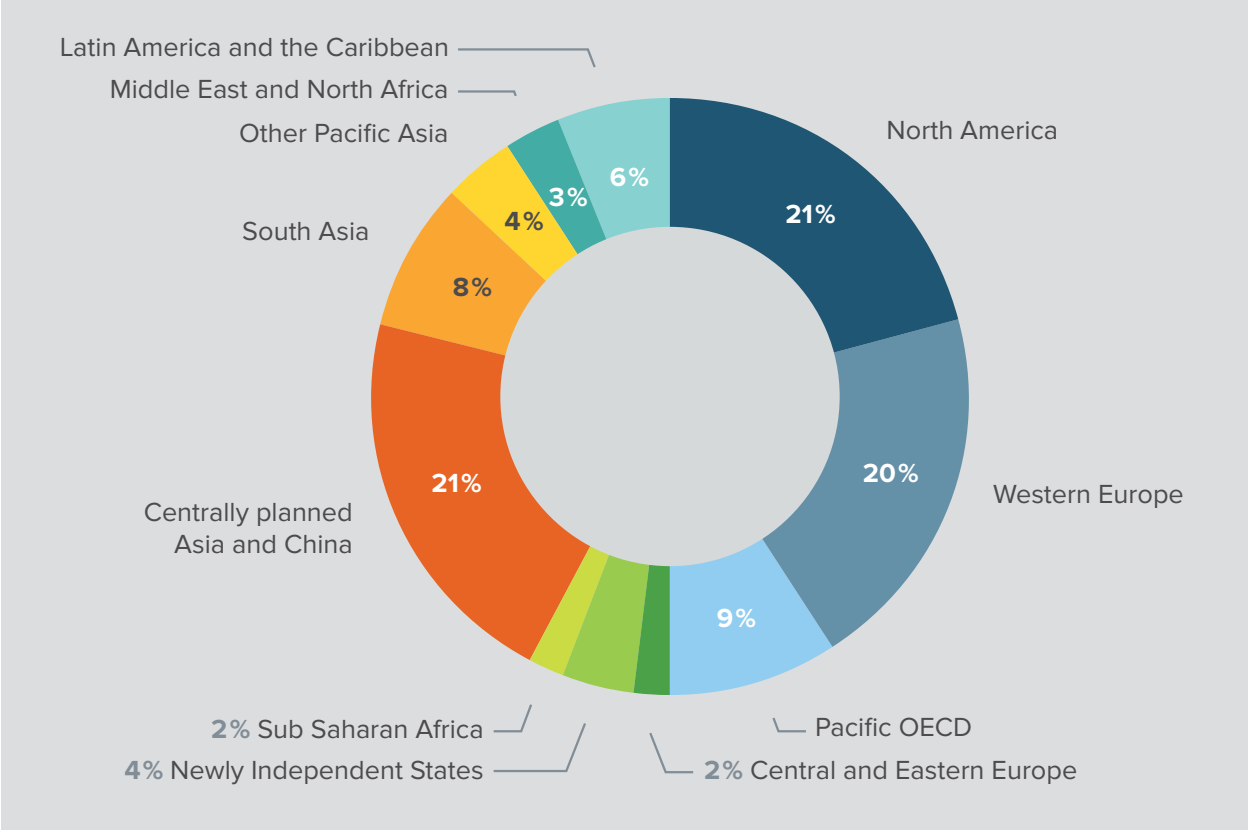

Figure 2: Worldwide distribution of electricity consumption for TVs

Source: Own calculation based on IEA 2010 and various other reports

Based on data from various available reports, own calculations and extrapolations as well as expert opinions, the electricity consumption of TVs in households has been calculated and extrapolated to global scale on a country-by-country basis.

1.3 The worldwide energy and cost saving potential

About **1.9 billion** TVs are in use worldwide. The average annual consumption of each of these TVs amounts to about **199 kWh** (Scenario reference year 2010). In total, this causes an annual electricity consumption of **369 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient "Best Available Technology" (BAT) model is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the worldwide annual energy consumption and the increasing stock of TVs can be achieved. While the stock is expected to grow by 42 % until 2020, in the efficiency scenario the energy consumption can be reduced by 50 %. Although the stock is expected to grow by another 22 % until 2030, in the efficiency scenario the energy consumption would further decrease by 36 % (see Figure 3). Thereby, higher living standards, represented by increasing appliance ownership rates, more viewing hours per household and year as well as a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario, the energy consumption would increase by 73 % by 2020.

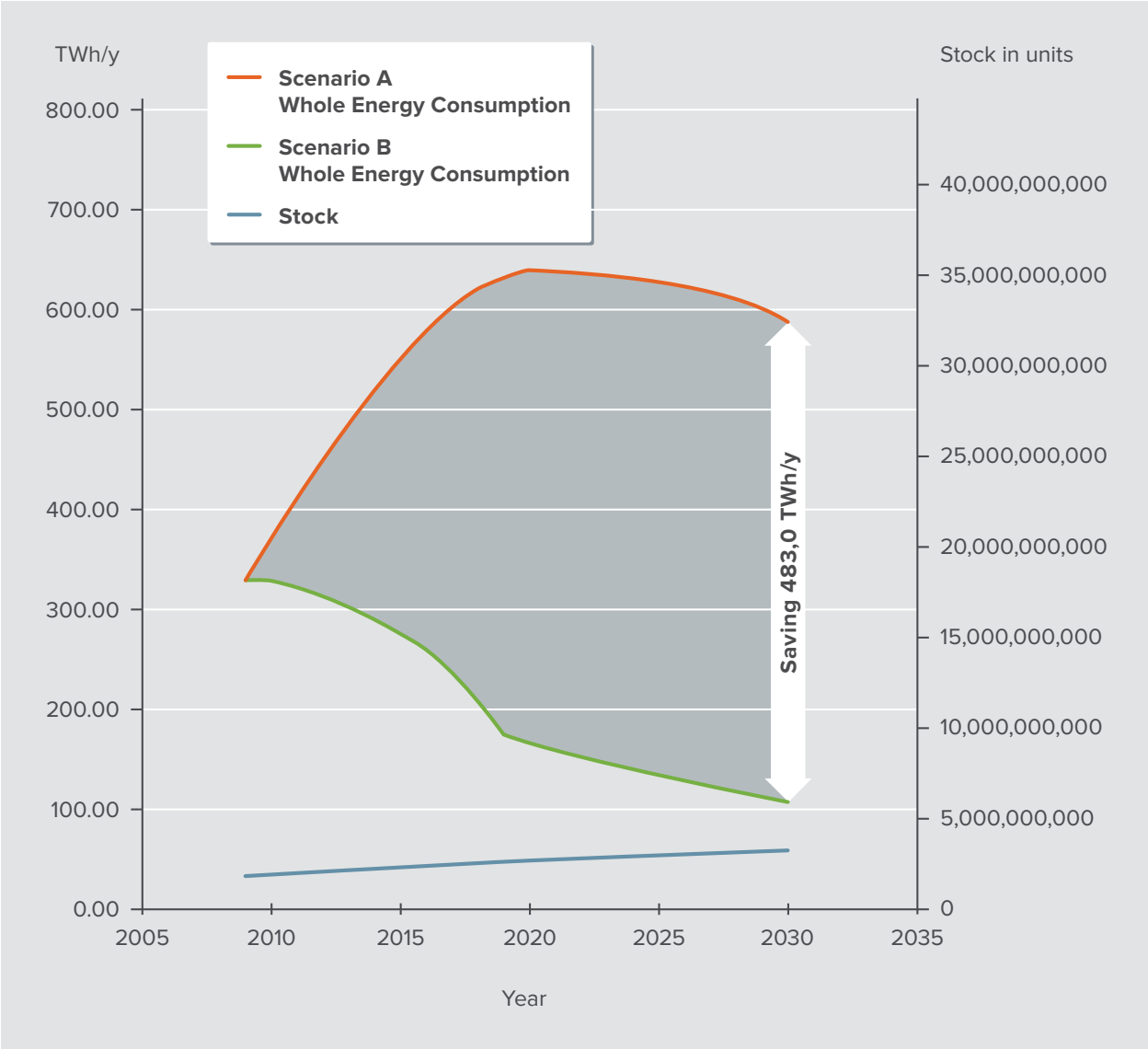

Figure 3: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation; WEC 2009 and IEA 2010 for current electricity consumption and population data

Table 1: Population and electricity consumption data of TVs for the whole world for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	6,859,396,560
	Total electricity net consumption per year [TWh/year]	17,434
	Total domestic electricity consumption per year [TWh/year]	4,686
	Total energy consumption of TVs per year [TWh/year]	368.96
	Stock number TVs	1,855,059,899
	Average annual energy consumption of TVs in the stock [kWh/year]	198.89
	Total annual CO_2eq emissions related with TVs [Mt/year]	249,28
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	474.41
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-204.67
	CO_2eq emission reduction potential 2020 vs. baseline development [Mio.t/year]	312.98
	Stock number of TVs in 2020	2,623,666,254
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	47.41
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	55,173,901,777.92
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	46,364,623,342.79
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	264,985,896,228.49
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	123,318,017,231.44
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	482.97
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-264.20
	CO_2eq emission reduction potential 20130 vs. baseline development [Mio.t/year]	315.24
	Stock number of TVs in 2030	3,197,817,918
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	67,071,142,860.77
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	56,362,304,925.02
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	725,590,051,652.49
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	380,281,751,859.01

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	9,985.34
	Total GHG emission reductions scenario B compared to scenario A [Mt]	6,547.28
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	122,245,044,638.69
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	102,726,928,267.81
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	938,191,265,002.60
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	508,556,388,583.71

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2 The energy and cost saving potential by world region

2.1 NAM – North America

2.1.1 Included countries

Aruba, Bermuda, Canada, Cayman Islands, Falkland Islands, Guam, Puerto Rico, Saint Pierre and Miquelon, United States, Virgin Islands, U.S., Virgin Islands, British.

2.1.2 Key messages and data

About **343 million** TVs are in use in **North America**. With an average annual electricity consumption of **213 kWh** each, altogether they account for about **4.5 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **49.5 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **51.3 TWh** of electricity and **33.8 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **343 million** TVs are in use in **North America**. The average annual consumption of one of these TVs amounts to about **213 kWh** of electricity. In total, this causes an annual electricity consumption of **73.2 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, in North America an absolute decoupling of the annual energy consumption and the still increasing stock of TVs can be achieved. While the stock is expected to grow by 41 % until 2020, in the efficiency scenario (scenario B) the energy consumption can be reduced by 73 %. Although the stock is expected to grow by another 15 % until 2030, in the efficiency scenario the energy consumption would further decrease by 20 % (see Figure 4).

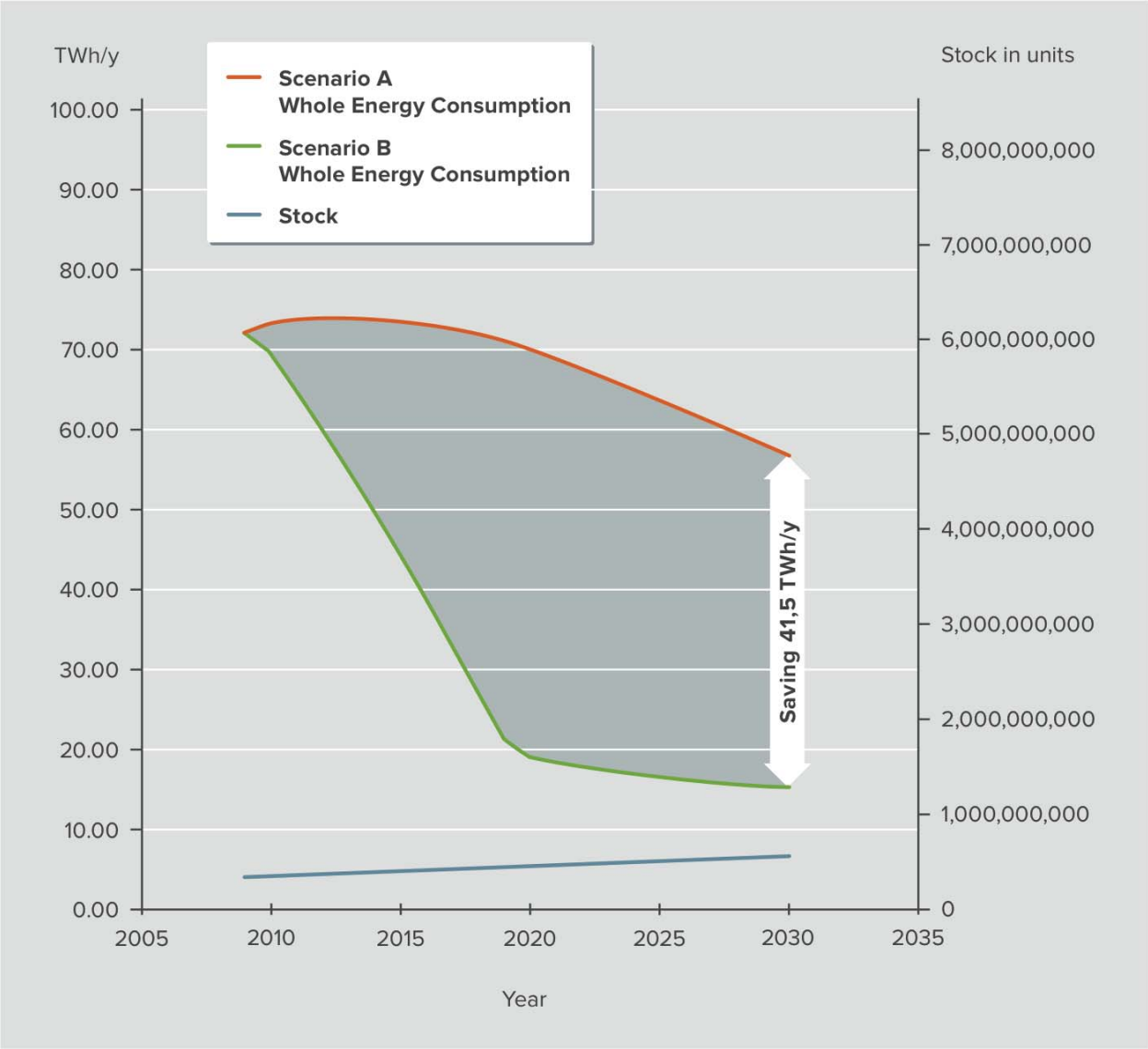

Figure 4: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 5 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 2). For hints and links to good practice policy examples also visit www.bigee.net.

Table 2: Population and electricity consumption data of TVs for North America for 2010 and potential changes by 2020 and 2030

Base year 2010	Population	352,728,816
	Total electricity net consumption per year [TWh/year]	4,454
	Total domestic electricity consumption per year [TWh/year]	1,602
	Total energy consumption of TVs per year [TWh/year]	73,24
	Stock number TVs	343,401,806
	Average annual energy consumption of TVs in the stock [kWh/year]	213.29
	Total annual CO_2eq emissions related with TVs [Mt/year]	49.49
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	51.28
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-54.23
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	33.83
	Stock number of TVs in 2020	485,839,936
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	30.40
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	13,262,313,551.14
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	11,144,801,303.48
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	19,451,382,563.51
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	5,455,255,114.06
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	41.50
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-57.98
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	33.83
	Stock number of TVs in 2030	559,822,517
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24-92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	14,286,554,737-27
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	12,005,508,182.58
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	51,743,107,398.99
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	20,090,713,243.30

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	964.98
	Total GHG emission reductions scenario B compared to scenario A [Mt]	633.67
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	27,548,868,288.41
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	23,150,309,486.05
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	68,811,267,288.06
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	29,742,246,478.87

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.2 WEU and EEU - Western, Central and Eastern Europe

2.2.1 Included countries

Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Cyprus (incl. North Cyprus), Denmark, Faroe Islands, Finland, France, Germany, Gibraltar, Greece, Greenland, Hungary, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Macedonia, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia (incl. Kosovo), Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

2.2.2 Key messages and data

About **389 million** TVs are in use in Western, Central and Eastern Europe. With an average annual electricity consumption of **192 kWh** each, altogether they account for about **7.9 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **50 million tons** of CO_2-eq (Scenario reference year 2010).

If every time a TV is purchased, the most energy-efficient model is chosen, **46.3 TWh** of electricity and **30.5 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

389 million TVs are in use in Western, Central and Eastern Europe. The average annual consumption of one of these TVs amounts to about **192 kWh** of electricity. In total, this causes an annual electricity consumption of **74.4 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, in Western, Central and Eastern Europe an absolute decoupling of the annual energy consumption and the still increasing stock of TVs can be achieved. While the stock is expected to grow by 26 % until 2020, in the efficiency scenario the energy consumption can be reduced by 72 %. Although the stock is expected to grow by another 9 % until 2030, in the efficiency scenario the energy consumption would further decrease by 23 % (see Figure 5). Thereby, an increasing appliance ownership rate and a change towards even more efficient FPD TVs have been anticipated.

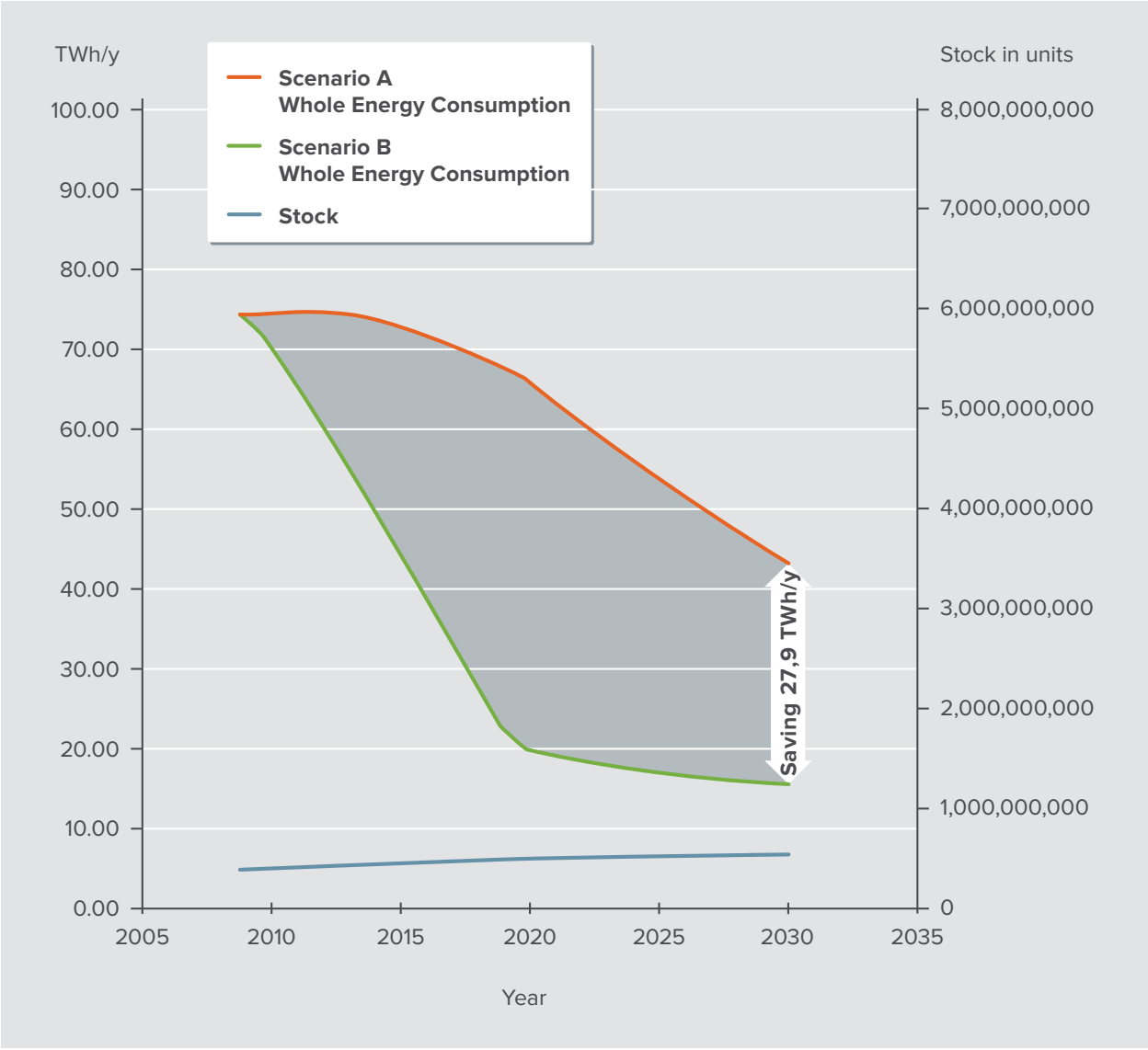

Figure 5: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 5 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 3). For hints and links to good practice policy examples also visit www.bigee.net.

Table 3: Population and electricity consumption data of TVs for Western, Central and Eastern Europe for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	600,872,150
	Total electricity net consumption per year [TWh/year]	3,396
	Total domestic electricity consumption per year [TWh/year]	942.6
	Total energy consumption of TVs per year [TWh/year]	74.44
	Stock number TVs	388,743,938
	Average annual energy consumption of TVs in the stock [kWh/year]	191.49
	Total annual CO_2eq emissions related with TVs [Mt/year]	50.30
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	46.26
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-54.56
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	30.52
	Stock number of TVs in 2020	484,588,522
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	30.40
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	13,203,414,116.26
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	11,095,305,980.05
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	16,809,943,795.41
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	4,060,178,694.53
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	27.86
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-59.05
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	30.52
	Stock number of TVs in 2030	532,803,879
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	13,657,560,103.88
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	11,476,941,263.76
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	38,416,940,001.11
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	12,515,038,323.66

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	772.29
	Total GHG emission reductions scenario B compared to scenario A [Mt]	508.44
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	26,860,974,220.14
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	22,572,247,243.81
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	48,890,478,866.99
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	18,127,157,402.64

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.3 PAO – Pacific OECD (+ South Korea)

2.3.1 Included countries

Australia, Cook Islands, Japan, New Zealand, Niue and additionally South Korea (originally IPCC PAS region, but assigned for the purposes of this text to PAO countries due to similar socioeconomic as well as technological parameters).

2.3.2 Key messages and data

About **159 million** TVs are in use in **Pacific OECD countries**. With an average annual electricity consumption of **191 kWh** each, altogether they account for **7.2 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **20.4 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **17.4 TWh** of electricity and **11.5 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

159 million TVs are in use in **Pacific OECD countries**. The average annual consumption of one of these TVs amounts to about **191 kWh** of electricity. In total, this causes an annual electricity consumption of **30.2 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, in Pacific OECD countries an absolute decoupling of the annual energy consumption and the increasing stock of TVs can be achieved. While the stock is expected to grow by 23 % until 2020, in the efficiency scenario the energy consumption can be reduced by 62 %. Although the stock is expected to grow by another 13 % until 2030, in the efficiency scenario the energy consumption would further decrease by 42 % (see Figure 6). Thereby, an increasing appliance ownership rate and a change towards more efficient FPD TVs have been anticipated.

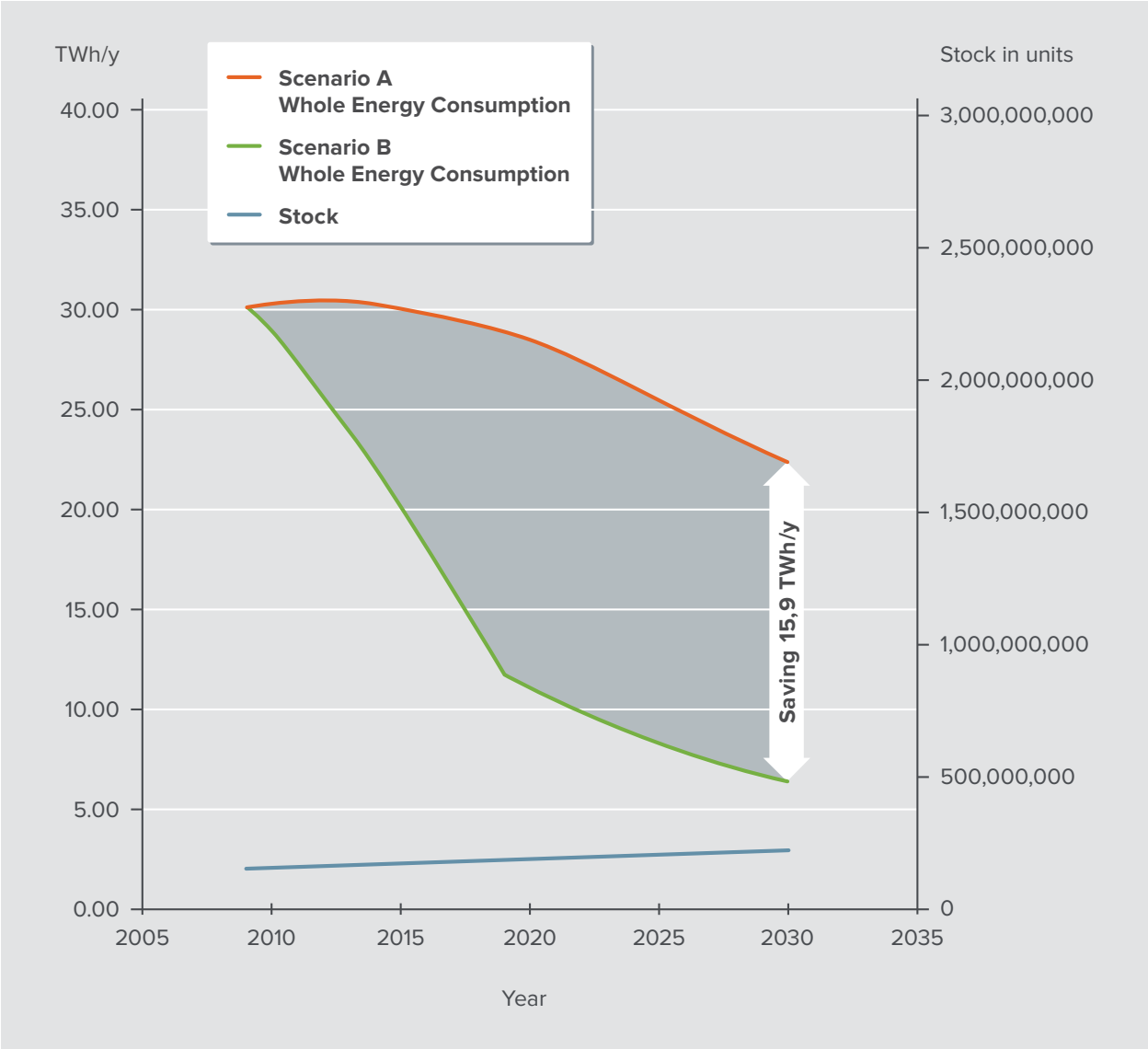

Figure 6: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 5 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 4). For hints and links to good practice policy examples also visit www.bigee.net.

Table 4: Population and electricity consumption data of TVs for Pacific OECD countries for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	201,061,224
	Total electricity net consumption per year [TWh/year]	1,684
	Total domestic electricity consumption per year [TWh/year]	428.2
	Total energy consumption of TVs per year [TWh/year]	30.22
	Stock number TVs	158,581,981
	Average annual energy consumption of TVs in the stock [kWh/year]	190.57
	Total annual CO_2eq emissions related with TVs [Mt/year]	20.42
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	17.38
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-19.25
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	11.47
	Stock number of TVs in 2020	195,482,534
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	48.83
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	4,890,394,930.20
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	4,109,575,571.60
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	6,243,587,310.69
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	1,500,823,990.25
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	15.90
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-23.85
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	11.47
	Stock number of TVs in 2030	218,229,303
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	5,595,802,024.63
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	4,702,354,642.54
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	17,589,946,952.43
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	6,414,071,699.29

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	347.74
	Total GHG emission reductions scenario B compared to scenario A [Mt]	228.17
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	10,486,196,954.83
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	8,811,930,214.14
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	24,134,243,796.93
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	10,104,588,190.87

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.4 NIS – Newly Independent States

2.4.1 Included countries

Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

2.4.2 Key messages and data

About **74 million** TVs are in use in **Newly Independent States**. With an average annual electricity consumption of **198 kWh** each, altogether they account for **6.7 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **9.8 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **19.5 TWh** of electricity and **12.9 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **74 million** TVs are in use in **Newly Independent States**. The average annual consumption of one of these TVs amounts to about **198 kWh**. In total, this causes an annual electricity consumption of **14.6 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, in Newly Independent States an absolute decoupling of the annual energy consumption and the increasing stock of TVs can be achieved. While the stock is expected to grow by 37 % until 2020, in the efficiency scenario the energy consumption can be reduced by 38 %. Although the stock is expected to grow by another 6 % until 2030, in the efficiency scenario the energy consumption would further decrease by 52 %. Thereby, higher living standards represented by increasing appliance ownership rates and a change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by 88 % by 2020 (see Figure 7).

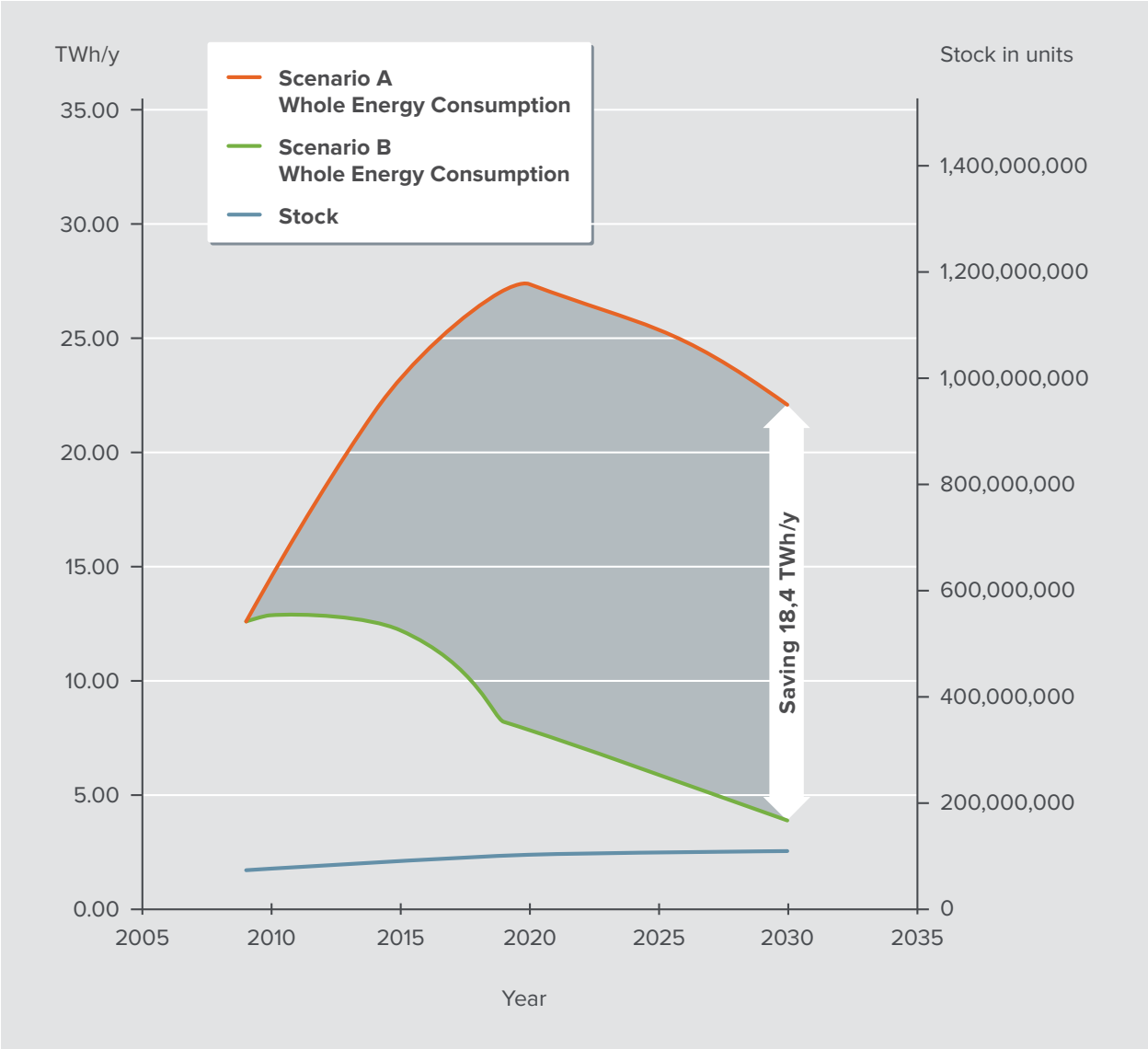

Figure 7: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users. For hints and links to good practice policy examples also visit www.bigee.net.

Table 5: Population and electricity consumption data of TVs for Newly Independent States for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	283,540,000
	Total electricity net consumption per year [TWh/year]	1,238
	Total domestic electricity consumption per year [TWh/year]	187
	Total energy consumption of TVs per year [TWh/year]	14.61
	Stock number TVs	73,922,553
	Average annual energy consumption of TVs in the stock [kWh/year]	197.59
	Total annual CO_2eq emissions related with TVs [Mt/year]	9.87
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	19.53
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-6.70
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	12.89
	Stock number of TVs in 2020	101,196,997
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	59.00
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	1,619,759,353.72
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	1,361,142,314.05
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	11,643,217,867.28
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	5,727,859,440.98
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	18.39
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-10.79
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	12.89
	Stock number of TVs in 2030	106,884,822
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	1,899,343,388.15
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	1,596,086,880.80
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	30,666,577,640.11
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	16,688,261,475.27

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	397.04
	Total GHG emission reductions scenario B compared to scenario A [Mt]	260.42
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	3,519,102,741.87
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	2,957,229,194.85
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	39,021,623,069.64
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	21,772,885,883.24

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.5 AFR – Sub-Saharan Africa

2.5.1 Included countries

Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Brazzaville), Congo (Kinshasa), Cote d´Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauretania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia (incl. Somaliland), South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

2.5.2 Key messages and data

About **34 million** TVs are in use in **Sub-Saharan Africa**. With an average annual electricity consumption of **189 kWh** each, altogether they account for about **6 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **4.3 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **13.5 TWh** of electricity and **8.9 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **34 million** TVs are in use in **Sub-Saharan Africa**. The average annual consumption of one of these TVs amounts to about **189 kWh**. In total, this causes an annual electricity consumption of **6.4 TWh** (Scenario reference year 2010). As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account. By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in Sub-Saharan Africa can be achieved. While the stock is expected to grow by **45 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **27 %**. Although the stock is expected to grow by another **75 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **20 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **171 %** by 2020 and additionally by **20 %** by 2030.

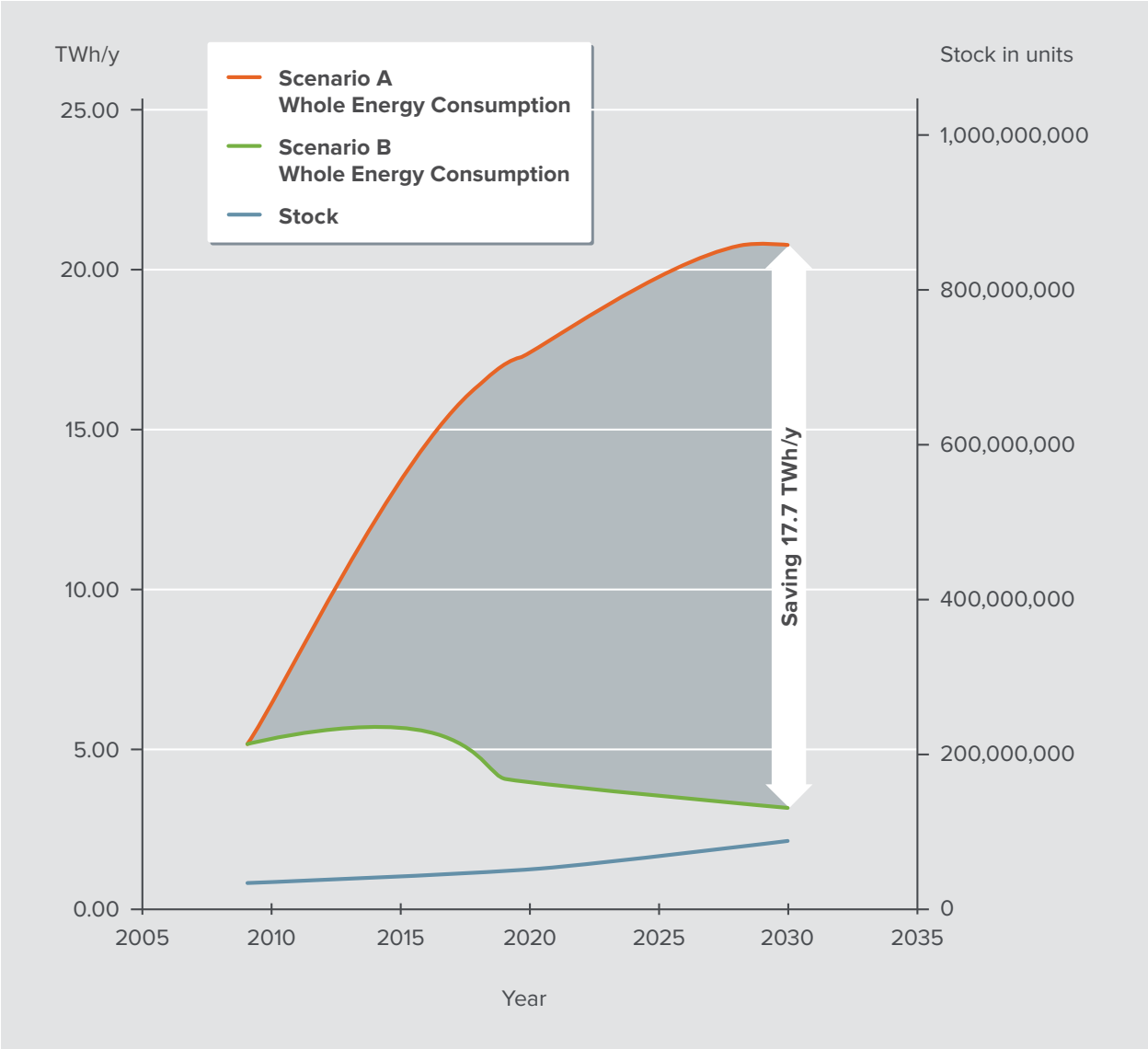

Figure 8: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (See Table 6). For hints and links to good practice policy examples also visit www.bigee.net.

Table 6: Population and electricity consumption data of TVs for Sub-Saharan Africa for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	800,157,500
	Total electricity net consumption per year [TWh/year]	330.6
	Total domestic electricity consumption per year [TWh/year]	84.5
	Total energy consumption of TVs per year [TWh/year]	6.42
	Stock number TVs	34,025,828
	Average annual energy consumption of TVs in the stock [kWh/year]	188.59
	Total annual CO_2eq emissions related with TVs [Mt/year]	4.34
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	13.52
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-2.56
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	8.92
	Stock number of TVs in 2020	49,254,879
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	54.99
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	864,127,614.11
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	726,157,658.92
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	8,348,712,414.38
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	4,225,563,754.14
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	17.67
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-3.31
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	8.92
	Stock number of TVs in 2030	85,978,908
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	1,527,828,760.02
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	1,283,889,714.30
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	24,840,651,236.91
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	13,691,687,980.41

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	322.97
	Total GHG emission reductions scenario B compared to scenario A [Mt]	211.41
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	2,391,956,374.13
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	2,010,047,373.22
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	32,623,057,098.60
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	18,463,980,936.47

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.6 CPA – Centrally planned Asia and China

2.6.1 Included countries

Cambodia, China, Hong Kong, Korea (North), Laos, Macau, Mongolia, Vietnam

2.6.2 Key messages and data

About **413 million** TVs are in use in **Centrally planned Asia and China**. With an average annual electricity consumption of **211 kWh** each, altogether they account for about **15.4 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **58.8 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **183.3 TWh** of electricity and **121** million tons of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

413 million TVs are in use in **Centrally planned Asia and China**. The average annual consumption of one of these TVs amounts to about **211 kWh**. In total, this causes an annual electricity consumption of **87 TWh** (Scenario reference year 2010). As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in Centrally planned Asia and China can be achieved. While the stock is expected to grow by **61 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **25 %**. Although the stock is expected to grow by another **30 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **41 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **171 %** by 2020 (see Figure 9).

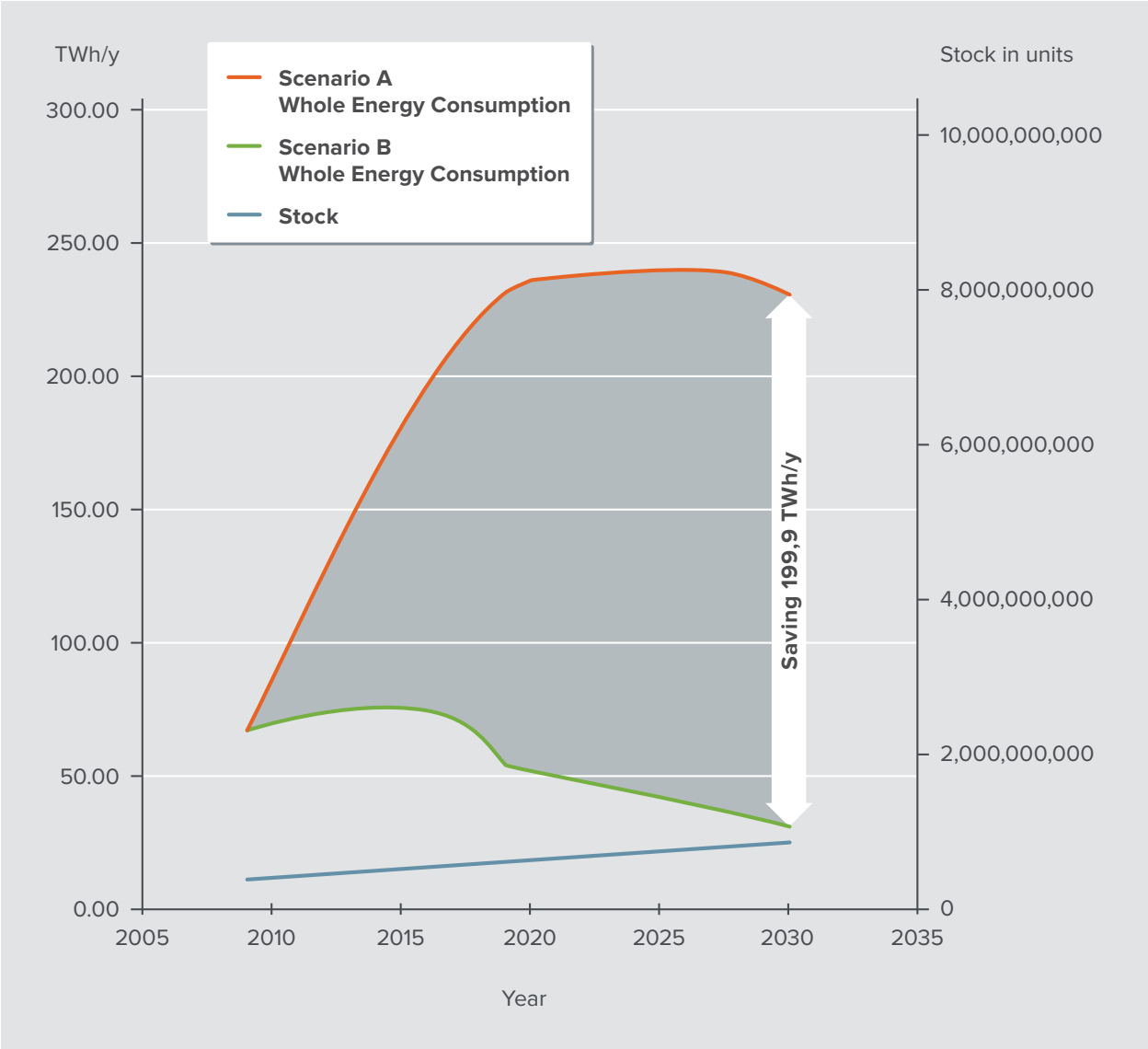

Figure 9: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 7). For hints and links to good practice policy examples also visit www.bigee.net.

Table 7: Population and electricity consumption data of TVs for Centrally planned Asia and China for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	1,496,590,500
	Total electricity net consumption per year [TWh/year]	3,103
	Total domestic electricity consumption per year [TWh/year]	435
	Total energy consumption of TVs per year [TWh/year]	87.03
	Stock number TVs	413,374,143
	Average annual energy consumption of TVs in the stock [kWh/year]	210.53
	Total annual CO_2eq emissions related with TVs [Mt/year]	58.80
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	183.27
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-34.39
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	120.91
	Stock number of TVs in 2020	666,876,238
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	58.69
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	10,973,143,652.85
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	9,221,129,120.04
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	115,179,978,377.76
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	58,680,383,595.86
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	199.92
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-55.92
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	120.91
	Stock number of TVs in 2030	866,909,856
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	15,404,868,866.46
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	12,945,267,955.01
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	316,842,405,292.86
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	176,125,410,230.85

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	4,001.87
	Total GHG emission reductions scenario B compared to scenario A [Mt]	2,622.71
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	26,378,012,519.31
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	22,166,397,075.05
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	406,805,519,830.89
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	231,316,382,415.26

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.7 SAS – South Asia

2.7.1 Included countries

Afghanistan, Bangladesh, Bhutan, Fiji, French Polynesia, India, Maldives, Nepal, Pakistan, Sri Lanka

2.7.2 Key messages and data

About **167 million** TVs are in use in **South Asia**. With an average annual electricity consumption of **182 kWh** each, altogether they account for **14 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **20.6 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **53.9 TWh** of electricity and **35.5 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **167 million** TVs are in use in **South Asia**. The average annual consumption of one of these TVs amounts to about **182 kWh** (Scenario reference year 2010). In total, this causes an annual electricity consumption of **30.5 TWh**. As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in South Asia can be achieved. While the stock is expected to grow by **41 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **28 %**. Although the stock is expected to grow by another **39 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **35 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **136 %** by 2020 (see Figure 10).

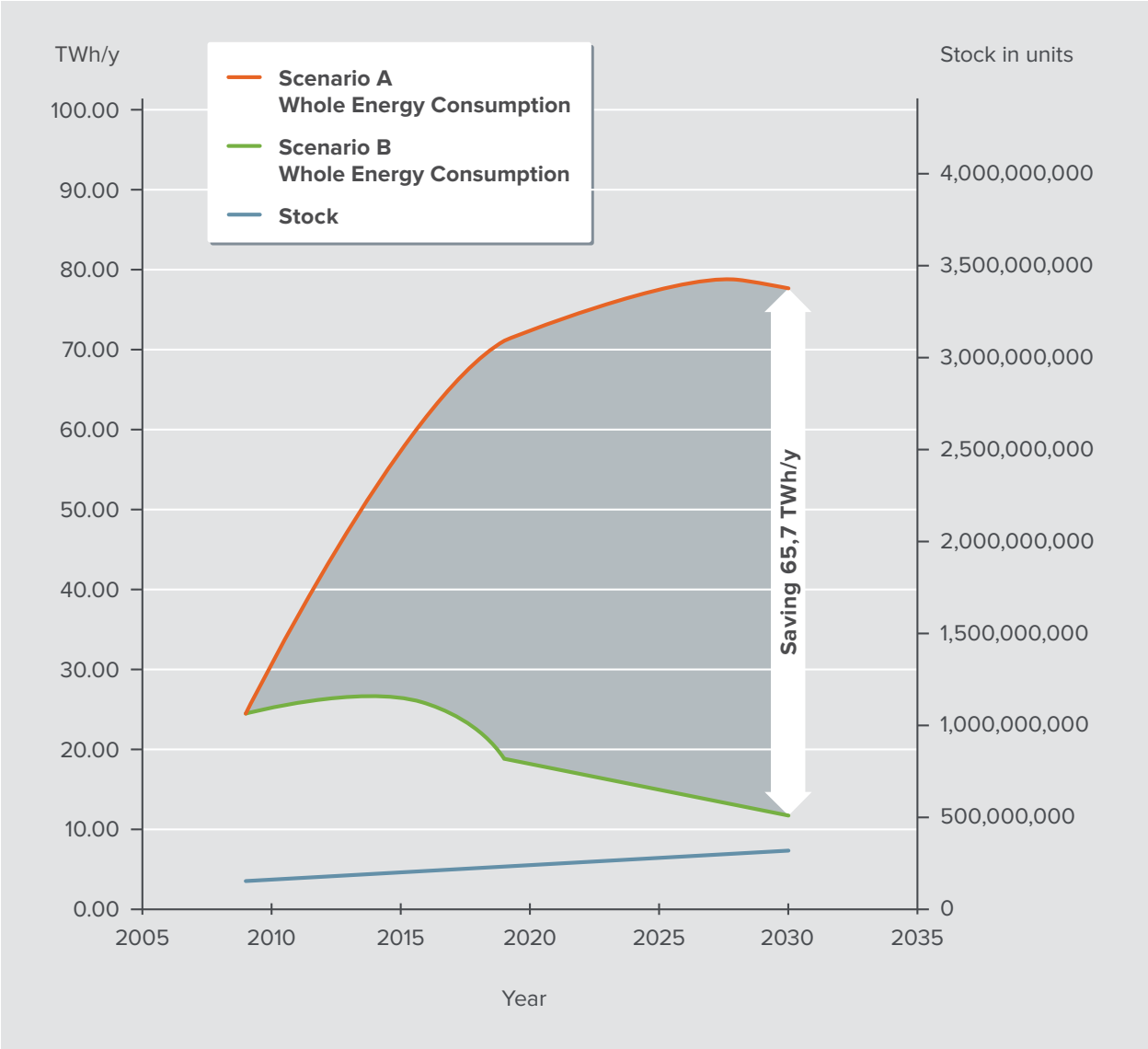

Figure 10: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 8). For hints and links to good practice policy examples also visit www.bigee.net.

Table 8: Population and electricity consumption data of TVs for South Asia for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	1,620,871,000
	Total electricity net consumption per year [TWh/year]	693
	Total domestic electricity consumption per year [TWh/year]	174.2
	Total energy consumption of TVs per year [TWh/year]	30.52
	Stock number TVs	167,448,741
	Average annual energy consumption of TVs in the stock [kWh/year]	182.27
	Total annual CO_2eq emissions related with TVs [Mt/year]	20.62
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	53.87
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-12.34
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	35.54
	Stock number of TVs in 2020	235,322,021
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	57.93
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	3,807,939,481.52
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	3,199,949,144.13
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	33,124,190,967.82
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	16,618,857,865.88
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	65.74
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-18.76
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	35.54
	Stock number of TVs in 2030	327,150,631
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	5,813,433,346.68
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	4,885,238,106.46
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	95,889,486,754.42
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	52,694,252,190.09

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	1,247.09
	Total GHG emission reductions scenario B compared to scenario A [Mt]	816.68
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	9,621,372,828.20
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	8,085,187,250.59
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	125,226,625,449.41
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	70,646,762,794.39

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.8 PAS – Other Pacific Asia (without South Korea)

2.8.1 Included countries

American Samoa, Brunei, Burma (Myanmar), Indonesia, Kiribati, Malaysia, Micronesia, Nauru, New Caledonia, Papua New Guinea, Philippines, Salomon Islands, Samoa, Singapore, Taiwan, Thailand, Timor-Leste, Tonga, Vanuatu.

2.8.2 Key messages and data

About **83 million** TVs are in use in **Other Pacific Asia (excluding South Korea)**. With an average annual electricity consumption of **190 kWh** each, altogether they account for **7.2 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **10.7 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **26 TWh** of electricity and **17.2 million tons of CO_2-eq** per year can be saved by 2020. Further savings are achievable by 2030.

About **84 million** TVs are in use in **Other Pacific Asia (excluding South Korea)**. The average annual consumption of one of these TVs amounts to about **190 kWh**. In total, this causes an annual electricity consumption of **15.9 TWh** (Scenario reference year 2010). As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in Other Pacific Asia (excluding South Korea) can be achieved. While the stock is expected to grow by **43 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **30 %**. Although the stock is expected to grow by another **19 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **46 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **124 %** by 2020 (see Figure 11).

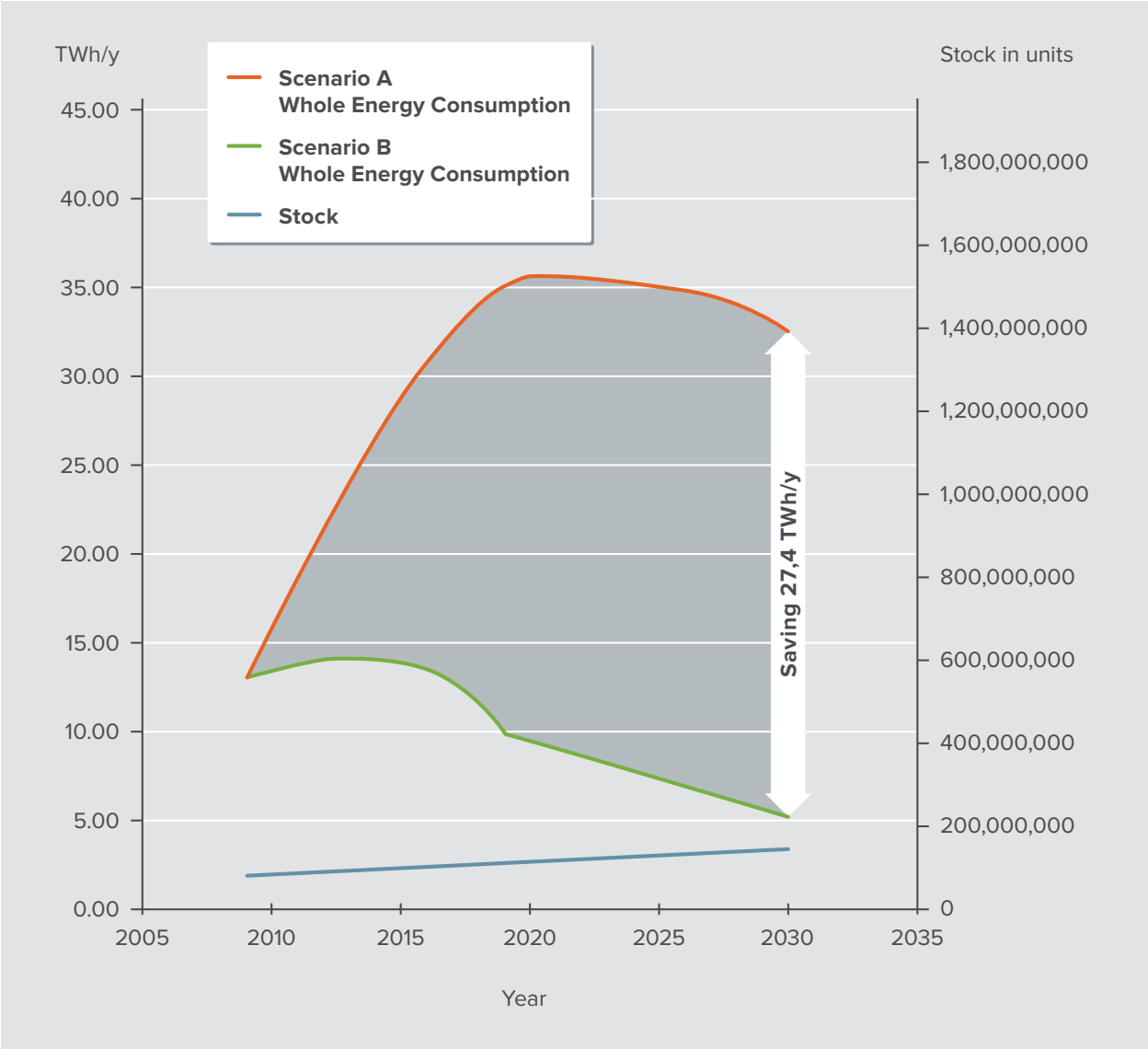

Figure 11: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 9). For hints and links to good practice policy examples also visit www.bigee.net.

Table 9: Population and electricity consumption data of TVs for Other Pacific Asia (without South Korea) for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	504,917,270
	Total electricity net consumption per year [TWh/year]	687.3
	Total domestic electricity consumption per year [TWh/year]	180.6
	Total energy consumption of TVs per year [TWh/year]	15.86
	Stock number TVs	83,481,910
	Average annual energy consumption of TVs in the stock [kWh/year]	190.04
	Total annual CO_2eq emissions related with TVs [Mt/year]	10.72
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	26.14
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-6.41
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	17.24
	Stock number of TVs in 2020	119,767,583
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	59.60
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	1,931,384,251.35
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	1,623,011,975.93
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	15,879,716,894.78
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	7,923,001,203.11
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	27.35
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-10.75
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	17.24
	Stock number of TVs in 2030	142,751,004
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	2,536,676,960.54
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	2,131,661,311.37
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	43,362,793,574.88
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	23,787,909,641.03

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	558.67
	Total GHG emission reductions scenario B compared to scenario A [Mt]	366.20
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	4,468,061,211.89
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	3,754,673,287.30
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	55,692,782,745.06
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	31,317,596,487.43

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.9 MEA – Middle East and North Africa

2.9.1 Included countries

Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates, Western Sahara, Yemen.

2.9.2 Key messages and data

About **66 million** TVs are in use in **Middle East and North Africa**. With an average annual electricity consumption of **190 kWh** each, altogether they account for **2.8 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **8.5 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **22.2 TWh** of electricity and **14.7 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **66 million** TVs are in use in **Middle East and North Africa**. The average annual consumption of one of these TVs amounts to about **190 kWh**. In total, this causes an annual electricity consumption of **12.5 TWh** (Scenario reference year 2010). As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in Middle East and North Africa can be achieved. While the stock is expected to grow by **52 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **26 %**. Although the stock is expected to grow by another **27 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **42 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **141 %** by 2020 (see Figure 12).

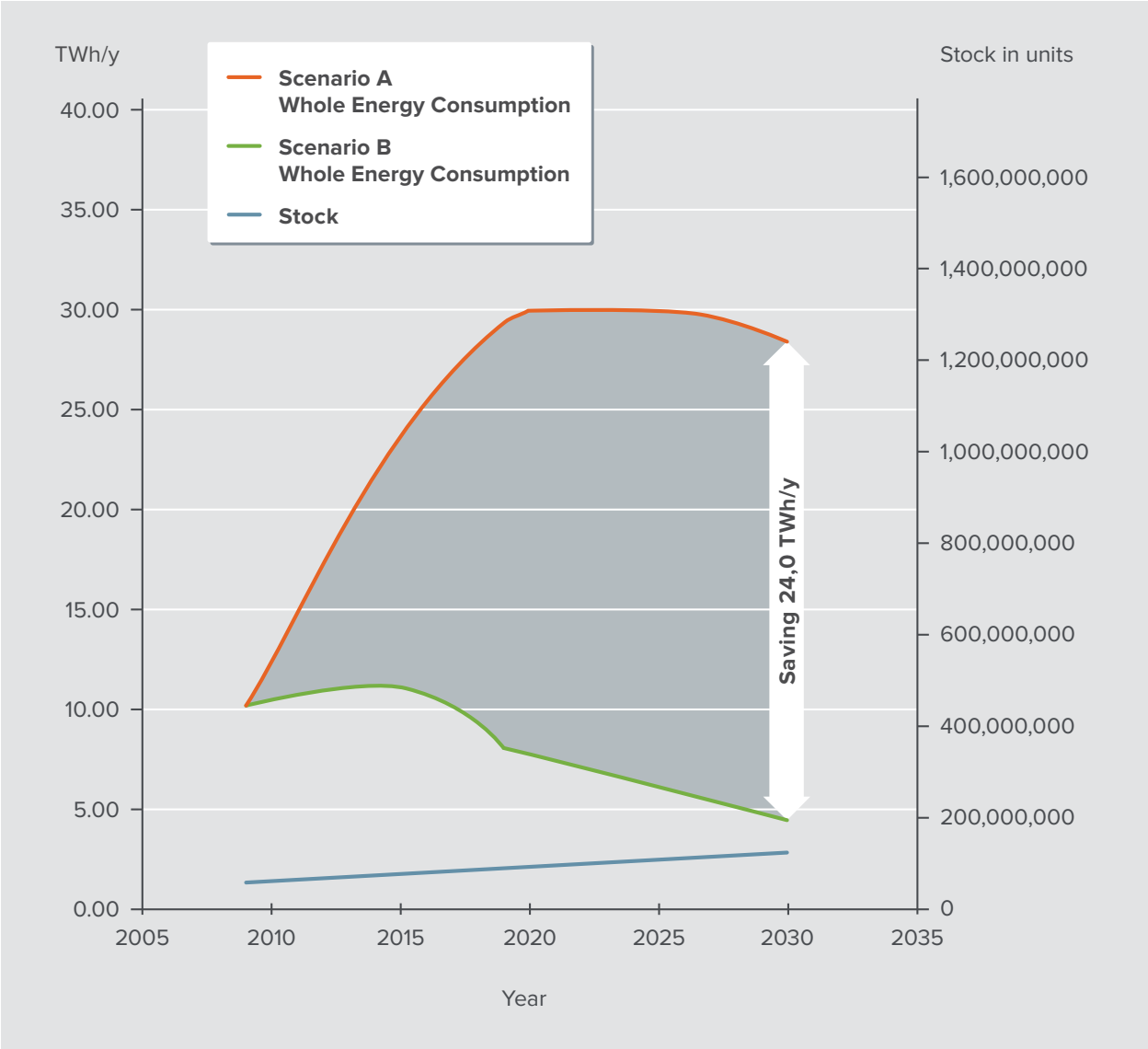

Figure 12: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 10). For hints and links to good practice policy examples also visit www.bigee.net.

Table 10: Population and electricity consumption data of TVs for Middle East and North Africa for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	420,130,000
	Total electricity net consumption per year [TWh/year]	812.5
	Total domestic electricity consumption per year [TWh/year]	370.2
	Total energy consumption of TVs per year [TWh/year]	12.53
	Stock number TVs	65,897,481
	Average annual energy consumption of TVs in the stock [kWh/year]	190.17
	Total annual CO_2eq emissions related with TVs [Mt/year]	8.47
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	22.23
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-4.61
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	14.66
	Stock number of TVs in 2020	100,199,191
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	58.69
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	1,642,356,867.48
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	1,380,131,821.41
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	13,425,299,190.93
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	6,694,431,628.31
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	24.05
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-7.95
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	14.66
	Stock number of TVs in 2030	127,597,303
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24,92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	2,267,389,892.62
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	1,905,369,657.66
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	37,199,643,302.97
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	20,381,108,991.11

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	481.41
	Total GHG emission reductions scenario B compared to scenario A [Mt]	315.49
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	3,909,746,760.10
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	3,285,501,479.08
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	47,955,090,285.64
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	26,951,310,580.95

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

2.10 LAM - Latin America and the Caribbean

2.10.1 Included countries

Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, French Guyana, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, St. Lucia, St. Vincent / Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela.

2.10.2 Key messages and data

About **126 million** TVs are in use in **Latin America and the Caribbean**. With an average annual electricity consumption of **191 kWh** each, altogether they account for **7 %** of the total domestic electricity consumption and cause annual greenhouse gas emissions of **16.3 million tons** of CO_2-eq (Scenario reference year 2010). If every time a TV is purchased, the most energy-efficient model is chosen, **41 TWh** of electricity and **27 million tons** of CO_2-eq per year can be saved by 2020. Further savings are achievable by 2030.

About **126 million** TVs are in use in **Latin America and the Caribbean**. The average annual consumption of one of these TVs amounts to about **191 kWh**. In total, this causes an annual electricity consumption of **24 TWh** (Scenario reference year 2010). As model calculations show, enormous efficiency improvements can be achieved, especially if old inefficient models are replaced by modern efficient ones. The calculations of the efficiency scenario are based on the assumption that every time a new TV is bought, the most efficient model (BAT) is chosen and that the improvements of the most efficient models over the years are taken into account.

By this means, an absolute decoupling of the annual energy consumption and the increasing stock of TVs in Latin America and the Caribbean can be achieved. While the stock is expected to grow by **47 %** until 2020, in the efficiency scenario the energy consumption can be reduced by **29 %**. Although the stock is expected to grow by another **24 %** until 2030, in the efficiency scenario the energy consumption would further decrease by **43 %**. Thereby, higher living standards, represented by increasing appliance ownership rates and a technological change towards more efficient FPD TVs have been anticipated. In contrast, in the baseline scenario the energy consumption would increase by **130 %** by 2020 (see Figure 13).

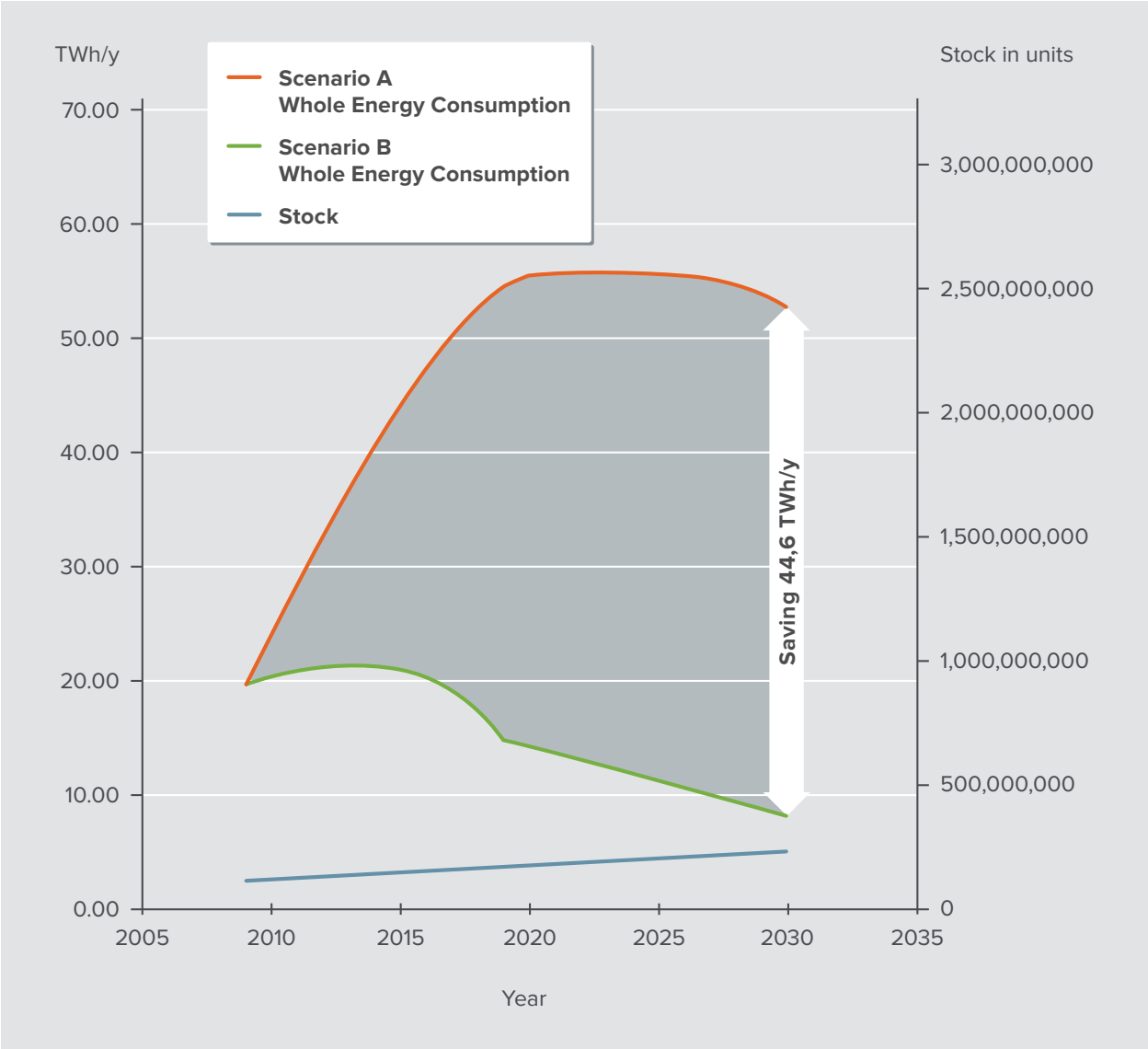

Figure 13: Total electricity consumption of TVs, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Own calculation

However, the likelihood of realising this efficiency potential is largely dependent on different investment costs as well as different electricity tariffs. The incremental investment costs for the best available technology (BAT) in this calculation is assumed to be 10 % of the investment costs of the non-BAT TVs. Policy measures and programmes have to address the energy efficiency potentials under consideration of cost-effectiveness for society as well as for end-users (Table 11). For hints and links to good practice policy examples also visit www.bigee.net.

Table 11: Population and electricity consumption data of TVs for Latin America and the Caribbean countries for 2010 (Scenario reference year) and potential changes by 2020 and 2030

Base year 2010	Population	578,528,100
	Total electricity net consumption per year [TWh/year]	1,035
	Total domestic electricity consumption per year [TWh/year]	282
	Total energy consumption of TVs per year [TWh/year]	24.08
	Stock number TVs	126,181,518
	Average annual energy consumption of TVs in the stock [kWh/year]	190.87
	Total annual CO_2eq emissions related with TVs [Mt/year]	16.27
2020	Energy savings potential in 2020 vs. baseline development [TWh/year]	40.94
	Resulting change in energy consumption 2020 vs. 2010 [TWh/year]	-9.62
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	27.01
	Stock number of TVs in 2020	185,138,353
	Average annual energy consumption of new TVs (all BAT) in 2020 [kWh/year]	58.68
	Total incremental investment costs [not discounted] until 2020 (end-user perspective) [€]	2,979,067,959.30
	Total incremental investment costs [not discounted] until 2020 (societal perspective) [€]	2,503,418,453.19
	Total economic benefit until 2020 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	24,879,866,845.92
	Total economic benefit until 2020 [not discounted] (societal perspective) [€] scenario B vs. scenario A	12,431,661,944.32
2030	Energy savings potential in 2030 vs. baseline development [TWh/year]	44.59
	Resulting change in energy consumption 2030 vs. 2010 [TWh/year]	-15.84
	CO_2eq emission reduction potential vs. baseline development [Mio.t/year]	27.01
	Stock number of TVs in 2030	229,689,695
	Average annual energy consumption of new TVs (all BAT) in 2030 [kWh/year]	24.92
	Total incremental investment costs [not discounted] between 2021 and 2030 (end-user perspective) [€]	4,081,684,780.53
	Total incremental investment costs [not discounted] between 2021 and 2030 (societal perspective) [€]	3,429,987,210.53
	Total economic benefit until 2030 [not discounted] (end-user perspective) [€] scenario B vs. scenario A	69,038,499,497.81
	Total economic benefit until 2030 [not discounted] (societal perspective) [€] scenario B vs. scenario A	37,893,298,084.01

Lifetime data for TVs	Total electricity savings, scenario B compared to scenario A [TWh]	891.30
	Total GHG emission reductions scenario B compared to scenario A [Mt]	584.09
	Total incremental investment costs [not discounted] (end-user perspective) [€] scenario B vs. scenario A	7,060,752,739.83
	Total incremental investment costs [not discounted] (societal perspective) [€] scenario B vs. scenario A	5,933,405,663.72
	Total economic benefit [not discounted] (end-user perspective) [€] scenario B vs. scenario A	89,030,576,571.38
	Total economic benefit [not discounted] (societal perspective) [€] scenario B vs. scenario A	50,113,477,413.59

Source: Own calculation; WEC 2009 and IEA 2010 for base year (2010) electricity consumption and population data 2008

3 Glossary

Cost of conserved energy	The cost of conserved energy is an investment statistic developed by Alan K. Meier. For any given conservation measure (e.g. purchasing a BAT appliance instead of a non-BAT appliance) it calculates the price for saving one unit of energy. To derive this statistic the capital cost are divided by the annual energy savings and multiplied by the capital recovery factor.
Net Present Value	A measure of the economic attractiveness of an investment. For instance, it is used to assess whether choosing the more energy-efficient alternative is economical. Within the model calculation the purchase of the more energy-efficient appliance (BAT) is considered an investment. The cash outflow in period 0 is the difference between the cost of the BAT appliance and the cost of the non-BAT appliance. The cash inflow in the subsequent periods is the financial value of the conserved energy.
Total economic benefit	Within the model calculation, the total economic benefit is the net present value of an investment in the more energy-efficient alternative times the number of additional cases, in which the more energy-efficient alternative has been chosen due to policy. It only includes the benefit created because individuals are incentivized or obliged to choose an investment, which in most cases is economical in itself (i.e. the more energy-efficient alternative). It however does not consider the benefit due to the avoidance of social costs, especially by avoiding GHG emissions. This economic benefit is considerably higher, but not quantified within the model.

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