

## Energy

### CSI 027 Final energy consumption by sector

#### Indicator definition:

Final energy consumption covers energy supplied to the final consumer's door for all energy uses. It is calculated as the sum of final energy consumption from all sectors. These are disaggregated to cover industry, transport, households, services and agriculture.

#### Key policy question:

Are we using less energy?

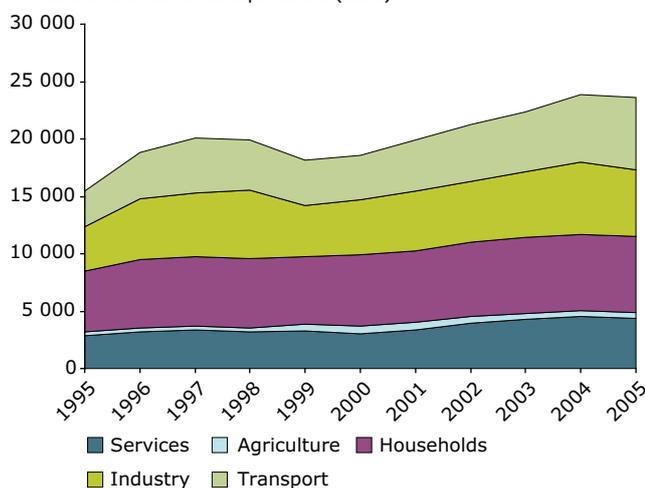
### Past and present trends

#### Key message:

Final energy consumption in the Western Balkan countries has increased since 1995, despite an abrupt annual fall in 1999. Transport, the fastest-growing sector, doubled over the past decade. Household consumption, although losing share to transport, remained as the largest consumer of final energy in 2005.

#### Final energy consumption by sector in the Western Balkans, 1995–2005

Thousand tonnes of oil equivalent (ktoe)



#### Assessment:

Final energy consumption in the Western Balkan region has increased by 53 % between 1995 and 2005, with an abrupt annual fall in 1999 of 9 % due to the political turmoils in the region.

The fastest-growing sector is transport, whose energy consumption doubled since 1995, reaching a total share of 27 % in 2005, while the largest sector remains households, with 28 %.

Final energy intensity per capita in 2005 for the Western Balkan region was 1.12 toe/cap, which is more than half of the energy intensity for the EU-27 of 2.4 toe/cap.

**Source:** Data on final energy consumption by sector and by country: Data Services, International Energy Agency, <http://wds.iea.org/WDS/Common/Login/login.aspx>.  
Data on population: National Accounts Main Aggregates Database, United Nations Statistics Division, <http://unstats.un.org/unsd/snaama/selectionbasicFast.asp>.

**Temporal coverage:** 1995–2005.

**Spatial coverage:** Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.

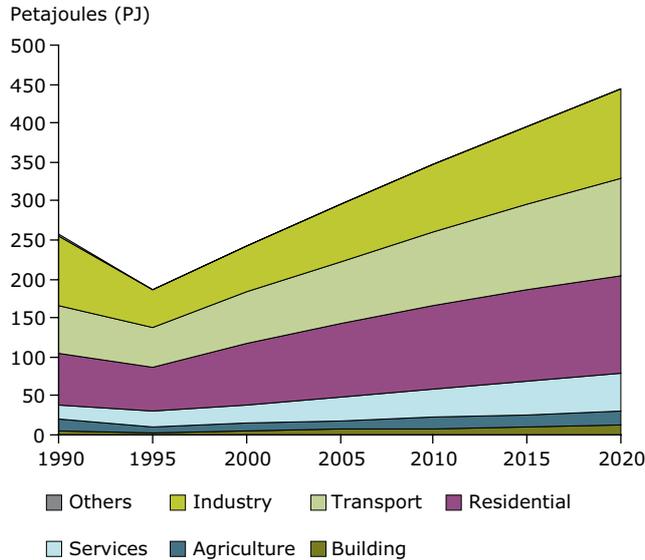


## Outlook trends in Croatia

### Key message:

Final energy consumption in Croatia is projected to grow over 50% from 2005 to 2020. Transport presents the highest growth rate, closely followed by services and industry. Residential consumption is forecast to grow more slowly, but should in 2020 still be the largest consumer of final energy ahead of transport, albeit by a small margin.

### Final energy consumption in Croatia per sector, 1990–2020



**Note:** Based on historical data up to 1995.

### Assessment:

Final Energy Consumption in Croatia is projected to grow ca 50 % from 2005 to 2020. That corresponds to 2 % growth per annum for this period.

The strongest drivers of consumption growth are transport, services and industry with 58 %, 56% and 54 % respectively

In 2020, Residential consumption is projected to remain the largest consumer of energy with 28.4 % (down from 31.3 % in 2005), closely followed by the faster growing transport sector with 28.3 % (up from 27 % in 2005). The share of industrial energy consumption increases to 25.5 % (from 24.9 % in 2005).

**Source:** First National Communication of Croatia under UNFCCC (2002).

**Temporal coverage:** 1990–2020.

**Spatial coverage:** Croatia.



### Outlook trends – Eurasia without Russia

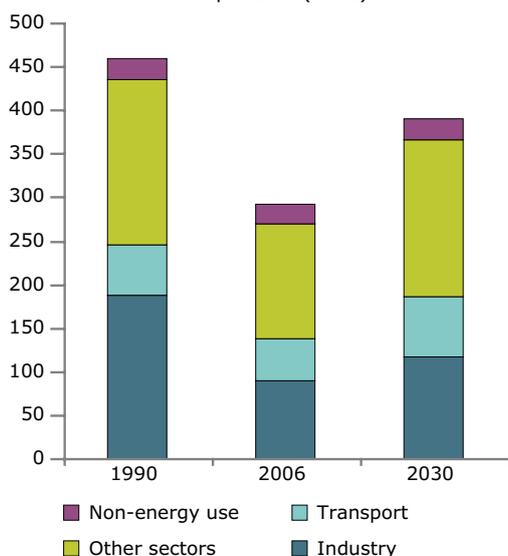
The outlook below is based on data for a larger region that includes the Western Balkans. It should therefore be used with care and only seen as an indication of trends.

#### Key message:

If current technological trends continue and government policies that have been adopted are implemented, final energy consumption is expected to grow almost 34 % from 2006 to 2030. The fastest growing sector is projected to be transport with an increase of 42 % over this period while energy consumption by industry is forecast to increase by 31 % and other sectors, (including household consumption) grow by 36 % and thereby collectively remain the largest consumer of final energy through 2030.

#### Final energy consumption by sector in Eurasia without Russia, 1990, 2006 and projections for 2030

Million tonnes of oil equivalent (mtoe)



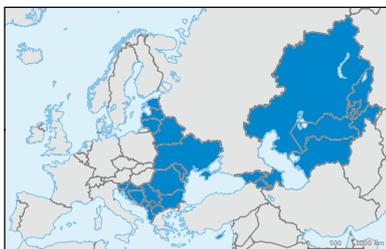
#### Assessment:

Final energy consumption in Eurasia without Russia is expected to grow with almost 34 % over the covered time period. Transport continues to have the strongest growth in energy consumption. It is also projected to have its dependence on oil based energy sources increase from 67 % in 2006 to 70 % in 2030. Biofuels are expected to account for only 1 % of energy use in the transport sector in 2030, up from 0 % in 2006.

**Source:** IEA – World Energy Outlook 2008.

**Temporal coverage:** 1990–2030.

**Spatial coverage:** Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



## CSI 028 Total energy intensity

### Indicator definition:

Total energy intensity is the ratio between Gross Inland Consumption of Energy (or total primary energy consumption) and Gross Domestic Product calculated for a calendar year.

Gross Inland Consumption of Energy is calculated as the sum of the primary energy consumption of the five types of energy: solid fuels, oil, gas, nuclear and renewable sources.

The time series of GDP is taken in constant prices to avoid the impact of the inflation (in million USD at constant 1990 prices).

The energy intensity ratio is the result of dividing Gross Inland Energy Consumption by GDP.

### Key policy question:

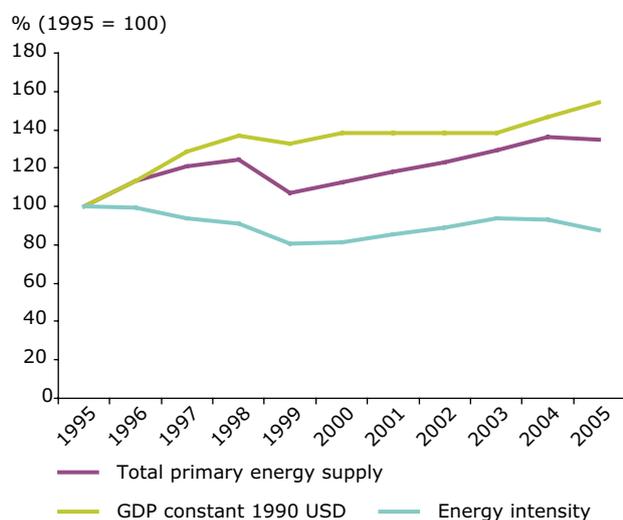
Are we decoupling energy consumption from economic growth?

## Past and present trends

### Key message:

Total primary energy supply and GDP have both increased gradually in the Western Balkan countries since 1995. However, total energy intensity overall has decreased in the same period. This could be associated with the increase in GDP rather than with improvements in energy efficiency.

### Energy intensity in the Western Balkans, 1995–2005



### Assessment:

Total primary energy supply and GDP increased by 35 % and 54 %, respectively between 1995 and 2005. The total energy intensity overall has decreased in the same period as a result of the faster increase in GDP rather than improvements in energy efficiency. All three trends saw a sharp fall in 1999 as a result of political turmoil in the region. Serbia, as the biggest country, is the biggest energy consumer in the region.

**Source:** Data on total primary energy supply by country: Data Services, International Energy Agency, <http://wds.iaea.org/WDS/Common/Login/login.aspx>.  
Data on GDP constant 1990 USD: National Accounts Main Aggregates Database, United Nations Statistics Division, <http://unstats.un.org/unsd/snaama/selectionbasicFast.asp>.

**Temporal coverage:** 1995–2005.

**Spatial coverage:** Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.



## CSI 029 Primary energy consumption by fuel

### Indicator definition:

Total energy consumption by fuel is made up of production plus imports, minus exports, minus international marine bunkers plus/minus stock changes. It is also called 'total primary energy supply' or 'gross inland energy consumption' and represents the quantity of all energy necessary to satisfy inland consumption.

### Key policy question:

Are we switching to less polluting fuels to meet our energy consumption?

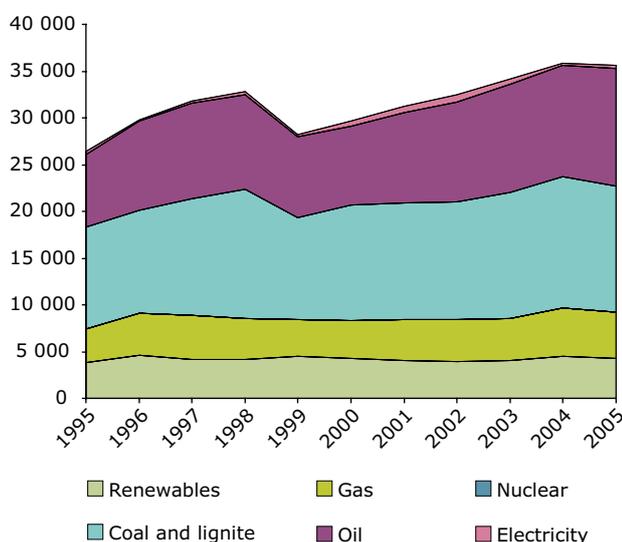
## Past and present trends

### Key message:

Fossil fuels in the Western Balkans are dominant in the total energy consumption. Renewable energy sources provided 12 % of the region's energy in 2005, somewhat higher than the EU-27 average, mainly due to abundant water resources and hydroelectric production in the region.

### Primary energy consumption by fuel in the Western Balkans, 1995–2005

Thousand tonnes of oil equivalent (ktoe)



### Assessment:

In the Western Balkan region, fossil fuels provided almost 87 % of energy consumed in 2005. Renewable energy sources accounted for 12 %, almost twice the EU-27 average of 6.7 %, mainly due to the rich water resources in the region. Total primary energy consumption increased by 35 % over the period from 1995 to 2005.

The countries in the region are establishing new legislation and strategies to address energy efficiency, reduce the consumption of fossil fuels and promote the usage of renewable sources.

**Source:** Data on primary energy consumption by fuel: Data Services, International Energy Agency, <http://wds.iea.org/WDS/Common/Login/login.aspx>.

**Temporal coverage:** 1995–2005.

**Spatial coverage:** Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.



### Outlook trends – Eurasia without Russia

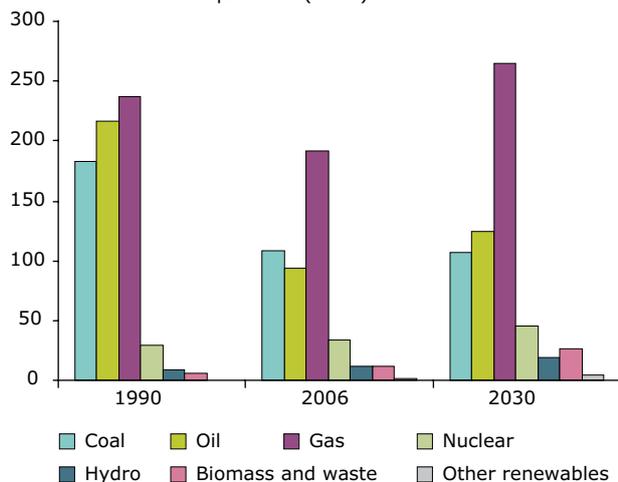
The outlook below is based on data for a larger region that includes the Western Balkans. It should therefore be used with care and only seen as an indication of trends.

#### Key message:

If current technological trends continue and government policies that have been adopted are implemented, overall energy consumption will grow and fossil fuels are projected to remain dominant in the Eurasian region throughout 2030. The share of renewable energy sources should however increase.

#### Total primary energy consumption by fuel in Eurasia without Russia, 1990, 2006 and projections for 2030

Million tonnes of oil equivalent (mtoe)



#### Assessment:

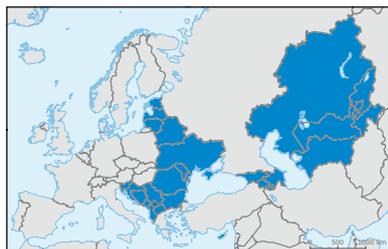
Based on current trends and policies, coal is projected to decrease its share in Primary Energy Consumption from 24 % to 18 % and gas to increase its share from 42 % to almost 45 % while oil hovers around the 21 % mark. Fossil fuels are projected to remain the major source of primary energy in Eurasia.

Renewable energy sources are forecast to increase their share considerably, with biomass and hydroelectricity leading this growth. Projections for Total Energy Consumption in Eurasia indicate a 32 % increase over the 2006-2030 timeline.

**Source:** IEA – World Energy Outlook 2008.

**Temporal coverage:** 1990–2030.

**Spatial coverage:** Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



## CSI 030 Renewable primary energy consumption

### Indicator definition:

Renewable energy consumption is the ratio between the gross inland consumption of energy from renewable sources and the total (primary) gross inland energy consumption calculated for a calendar year. It is usually expressed as a percentage of the former to the latter. It measures the contribution of renewable energy sources to the total primary consumption of energy. Renewable energy sources are defined as renewable non-fossil energy sources: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.

### Key policy question:

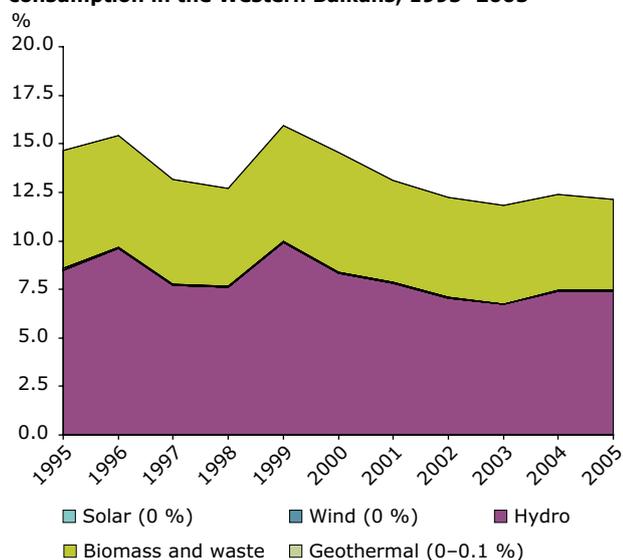
Are we switching to renewable energy sources to meet our energy consumption?

## Past and present trends

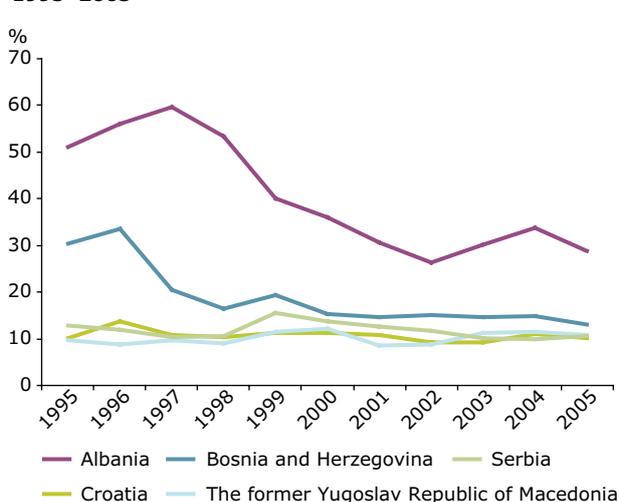
### Key message:

The share of renewable energy sources, mainly hydropower and biomass, in primary energy consumption declined slowly between 1995 and 2005. Other renewable sources of energy — e.g. wind, solar and geothermal sources — remained negligible with less than 1 % of the total.

### Share of renewable sources in total primary energy consumption in the Western Balkans, 1995–2005



### Share of renewable sources in primary energy consumption in the Western Balkans by country, 1995–2005



### Assessment:

A gradual decline of renewable energy sources in primary energy consumption since 1995 could be explained through the increase in total primary energy consumption of 35 %. The West Balkan region has already achieved the EU indicative target of 12 % share of renewable energies in 'primary energy consumption in the EU by 2010', but the future trend should be closely monitored due to the visible decline in the last decade.

**Source:** Data Services, International Energy Agency, <http://wds.iea.org/WDS/Common/Login/login.aspx>.

**Temporal coverage:** 1995–2005.

**Spatial coverage:** Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.



### Outlook trends – Eurasia without Russia

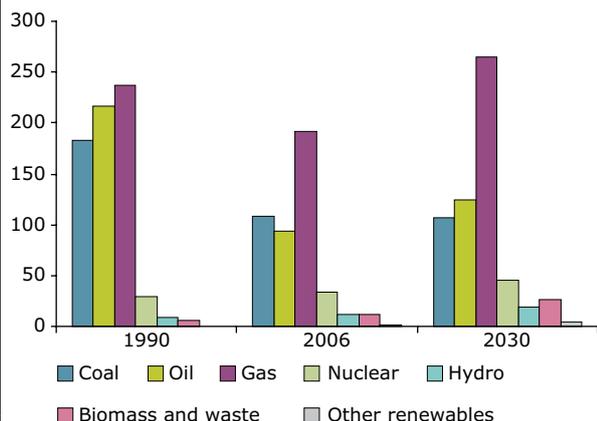
The outlook below is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

**Key message:**

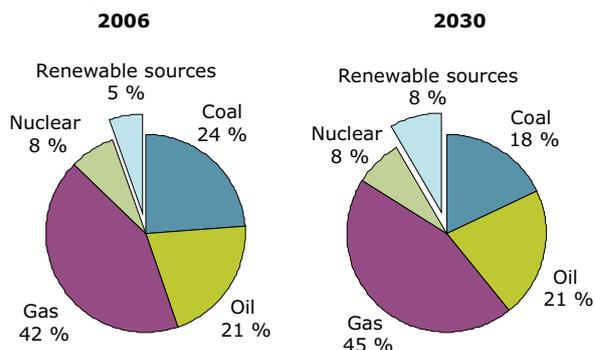
If current technological trends continue and government policies that have been adopted are implemented, the share of renewable primary energy consumption is projected to increase slightly in Eurasia in the coming years.

**Total primary energy consumption by fuel in Eurasia without Russia, 1990, 2006 and projections for 2030**

Million tonnes of oil equivalent (mtoe)



**Energy production by fuel in Eurasia without Russia, 2006 and projections for 2030**



**Assessment:**

The share of renewable energy sources in the Eurasian region is projected to rise from 5.3 % in 2006 to 8.4 % in 2030 taking over market share from coal which is projected to see a decrease in its share of primary energy consumption from 24 % to 18 % over the same period of time.

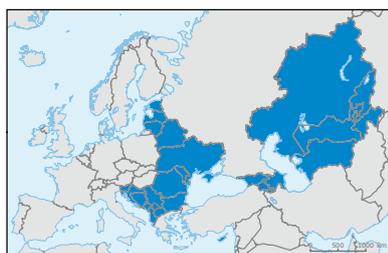
Biomass is projected to be the strongest growing source of renewable energy, with an increase from 2.7 % of overall energy consumption in 2006 to 4.4 % in 2030.

Projections for primary energy consumption in Eurasia indicate a 32 % increase over the 2006–2030 timeline.

**Source:** IEA – World Energy Outlook 2008.

**Temporal coverage:** 1990–2030.

**Spatial coverage:** Eurasia without Russia – Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.



## CSI 031 Renewable electricity

### Indicator definition:

The share of renewable electricity is the ratio between the amount of electricity produced from renewable sources (e.g. wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases) and gross national electricity consumption calculated for a calendar year. It is usually expressed as a percentage.

### Key policy question:

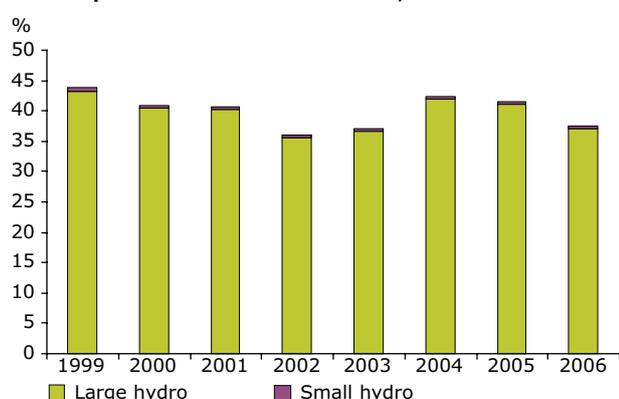
Are we switching to renewable energy sources to meet electricity consumption in the region?

## Past and present trends

### Key message:

Renewable electricity generation provides a significant share of the consumption of electricity in the Western Balkan countries. Almost all the renewable electricity in the region comes from large hydropower plants. Hydropower production is strongly affected by climate factors such as low rainfall — which occurred in 2002, 2003 and 2006. The production of electricity from other renewable sources in this region is insignificant at the moment. The Western Balkan countries as a whole have a higher share of renewable electricity compared with the EU-27 (14 %) and have already exceeded the EU target of 21 % for 2010.

### Share of renewable electricity in total national electricity consumption in the Western Balkans, 1999–2006



### Share of renewable electricity (%) in the Western Balkans, 1999–2006

	1999	2000	2001	2002	2003	2004	2005	2006
Albania	94	81	67	58	84	92	91	86
Bosnia and Herzegovina	61	63	71	53	53	67	62	52
Croatia	45	40	43	34	30	42	37	34
The former Yugoslav Republic of Macedonia	21	17	9	11	18	19	17	21
Serbia	34	34	34	34	32	33	35	30
Region	44	41	41	36	37	42	42	37

**Note:** Facilities with installed capacity exceeding 10 MW are considered as large hydropower plants. The indicator includes Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia and Serbia. Nevertheless, data for some countries is not available or based on estimates. For the former Yugoslav Republic of Macedonia, the split between large and small hydro for 2003 and 2005 is missing and was estimated, and the figures for 2006 were also based on estimates. Data for Serbia was collected every four years between 1990 and 2002, so rough estimates were used for the period from 1999 to 2001.

### Assessment:

Renewable electricity generation provided 37 % of electricity consumption in the Western Balkan region in 2006. The share of renewable electricity production ranges from 21 % in the former Yugoslav Republic of Macedonia to 86 % in Albania. The share of renewable electricity produced declined by 7 percentage points over the period 1999–2006, which saw a 21 % increase in total amount of electricity consumption in the same period.

**Source:** Albania: Albanian National Agency of Natural Resources, based on Albania Power Corporation (KESH) data; Bosnia and Herzegovina: private company Bosna-S, based on the Study on Energy Sector in Bosnia and Herzegovina; Croatia: Energy Institute Hrvoje Požar, Ministry of Economy, Labour and Entrepreneurship; the former Yugoslav Republic of Macedonia: the State Statistical Office, 'Energy balances of The Republic of Macedonia' — Ministry of Economy; Serbia: the Energy balances of the Republic of Serbia, Ministry of Mining and Energy (Ref: [www.mem.gov.rs/](http://www.mem.gov.rs/)), Electric Power Industry of Serbia, (Ref: [www.eps.co.rs/](http://www.eps.co.rs/)).

**Temporal coverage:** 1999–2006.

**Spatial coverage:** Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Serbia.



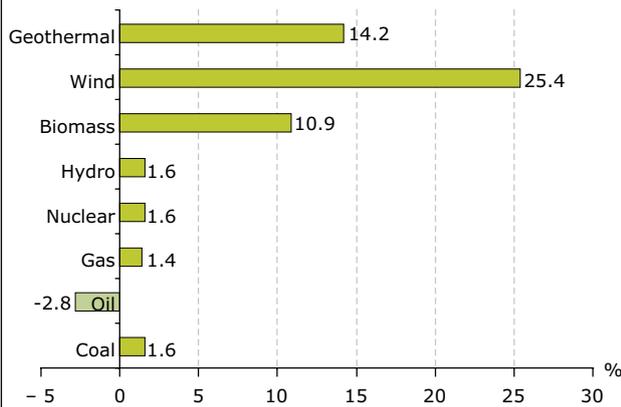
**Outlook trends — Eurasia without Russia**

The outlook below is based on data for a larger region containing the Western Balkans data. It should therefore be used with care and only seen as an indication of trends.

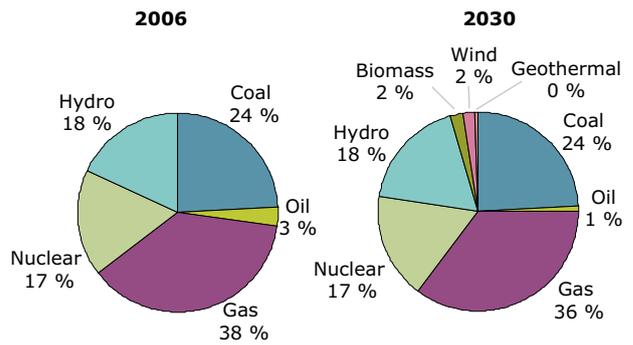
**Key message:**

If current technological trends continue and government policies that have been adopted are implemented, the share of renewable electricity in overall electricity production is forecast to increase from 18 % in 2006 to about 22.5 % in 2030.

**Projected growth of energy sources in Eurasia without Russia, 2006–2030**



**Fuel shares in electricity generation in Eurasia without Russia, 2006 and projections for 2030**



**Assessment:**

Hydropower is projected to remain the most important source of renewable electricity in Eurasia for the foreseeable future with a steady 18 % share of electricity generation.

The shares of wind, geothermal electricity and biomass/waste grow significantly; this however to their relatively small importance in 2006. By 2030 they are expected to reach 2 %, 0.45 % and 1.5 % of overall electricity generation respectively. Solar power will grow but is only projected to reach a negligible contribution to electricity generation (0.16 %)

**Source:** IEA — World Energy Outlook 2008.

**Temporal coverage:** 1990–2030.

**Spatial coverage:** Eurasia — Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Albania, Bosnia and Herzegovina, Croatia, Montenegro, the former Yugoslav Republic of Macedonia, Serbia, Bulgaria, Cyprus, Malta, Latvia, Lithuania, Romania, Slovenia, Estonia, Gibraltar.

