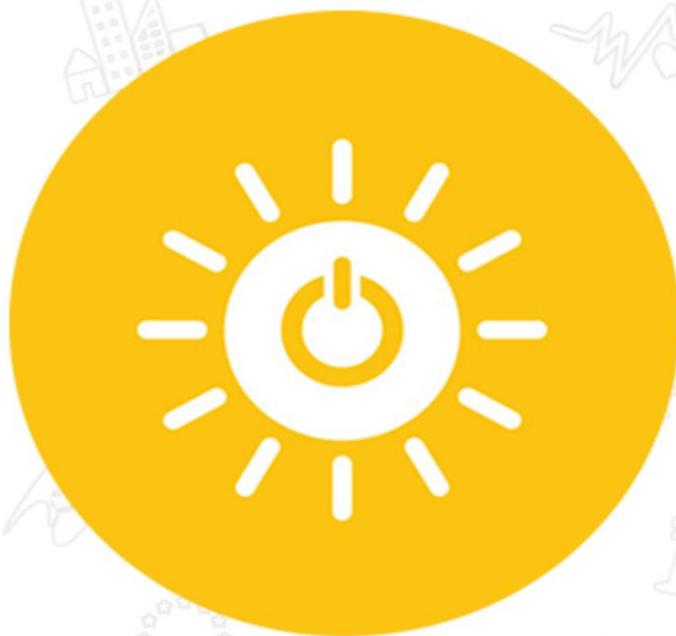




**ФОРУМ**  
ПО УСТОЙЧИВОМУ  
РАЗВИТИЮ

Committee №11

# Clean energy



Expert's **report**

## Expert`s report

The extensive worldwide use of traditional energy, which is based on fossil fuels, causes very serious damage to humankind, the environment and all living organisms. It has led to an unprecedented environmental pollution, global warming, acid rains, and a considerable number of other environmental disasters and health problems. These problems were the reason for searching for alternative and clean sources of energy, which achieve sustainable development while reducing the prevalent adverse effects on the human health and the environment. Such energy resources should rely on renewable resources that are generated naturally without producing any kind of harmful waste.

Renewable energy sources are fundamentally different from fossil fuels which include petroleum, coal, natural gas and nuclear fuel used in nuclear reactors. The usage of renewable energy reduces climate effects and the amount of carbon dioxide.

Renewable energy is produced from wind, water and sunlight. Wave and tidal movement or from geothermal energy as well as some agricultural crops and oil-producing trees may serve for generating energy.

Currently, the most renewable energy is produced in hydroelectric power stations where rivers and waterfalls that meet the necessary requirements are located.

Wind-powered and solar-powered ways are widely used in developed and some developing countries: methods of producing electricity using renewable energy sources have become common recently.

Many countries have developed plans to increase their renewable energy production to cover their energy needs by 20% in 2020. At the Kyoto Conference in Japan, most heads of the states agreed to reduce carbon dioxide production in coming years to avoid major climate change threats due to pollution and fossil fuel depletion.

There are five sustainable power sources:

1. Biomass, which includes:
  - Wood and wood waste.
  - Municipal solid waste.

- Landfill gas and biogas.
- Ethanol.
- Biodiesel.
- 2. Hydropower.
- 3. Geothermal power.
- 4. Wind.
- 5. Solar power.

Why don't we always use renewable energy?

All in all, renewable energy requires more costs to produce and use than petroleum energy. Desirable renewable resources are frequently situated in remote areas, and it requires vast spendings to build power to the cities that need this power. What is more, renewable sources are not always available:

1. Clouds reduce electricity from solar power plants.
2. Periods of low wind reduce electricity from wind farms.
3. Droughts reduce water available for hydropower, etc.

Advantages, Benefits and Importance of Renewable Energy Use:

1. Helps to protect human health.
2. Renewable energy is inexhaustible.
3. Provides clean energy free from waste (all kinds).
4. Preserves the natural environment.
5. Improves human life and reduces poverty.
7. Secure new job opportunities.
8. Reduces harmful emissions and thermal and dangerous penalties.
9. Decreases the number and severity of natural disasters resulting from global warming.
10. Does not form acid rain which damages all agricultural crops and forms of life.
13. Protects groundwater, rivers and seas from pollution.
14. Contributes to food safety and quality.
15. Increase the productivity of agricultural crops due to elimination of chemical and gas contaminants.

## Sources:

### General web-sites:

- <http://www.iea.org/>
- <http://www.cleanenergystates.org/>
- <http://www.renewable-living.com/blog/#>
- <http://www.cleanenergyresourceteams.org/blog>
- <http://www.dailyenergyreport.com/>
- <http://aleklett.wordpress.com/>
- <http://www.greentechmedia.com/>
- <http://www.avinc.com/>
- <http://greenfuels.co.uk/>
- <http://www.carbonneutral.com/>
- <http://www.yourenergyblog.com/>
- <http://thirdwavepower.com/>
- <http://blog.recycled-energy.com/>
- <http://www.cleantechblog.com/>
- <http://greeneconomypost.com/>
- <http://newenergyandfuel.com/>
- <http://physics.ucsd.edu/do-the-math/>
- <http://www.cres-energy.org/index.html>
- <http://www.newenergycorp.ca/>
- <http://www.gvepinternational.org/en>
- [https://www.eia.gov/energyexplained/index.cfm?page=renewable\\_home](https://www.eia.gov/energyexplained/index.cfm?page=renewable_home)
- <http://listverse.com/2009/05/01/top-10-renewable-energy-sources/>

### Kyoto Protocol:

- [https://wiki2.org/en/Kyoto\\_Protocol](https://wiki2.org/en/Kyoto_Protocol)
- <http://www.renewableenergyworld.com/articles/2005/02/renewables-play-their-part-as-kyoto-protocol-takes-effect-22551.html>

### Elon Musk and renewable Energy:

- <http://www.newsweek.com/elon-musk-largest-lithium-ion-battery-switched-728065>
- <https://futurism.com/elon-musk-says-we-must-switch-to-renewables-or-plunge-into-the-dark-ages/>
- <https://inhabitat.com/elon-musk-has-a-simple-plan-to-power-the-us-entirely-on-renewable-energy/>

- <https://www.vox.com/energy-and-environment/2017/11/28/16709036/elon-musk-biggest-battery-100-days>
- <http://www.goodspeaks.org/event/Is-Solar-Energy-Inevitable%3F--Absolutely%2C-says-Tesla-CEO-Elon-Musk>

## Countries:

### Sweden:

- <http://www.independent.co.uk/news/world/europe/sweden-renewable-energy-target-2040-country-on-track-a7381686.html>
- <https://sweden.se/society/energy-use-in-sweden/>
- <https://sweden.se/quickfact/renewable-energy/>
- [https://en.wikipedia.org/wiki/Energy\\_in\\_Sweden](https://en.wikipedia.org/wiki/Energy_in_Sweden)
- <http://nordic.businessinsider.com/sweden-is-to-use-100-renewable-energy-by-2040--but-no-expiration-date-has-been-set-for-nuclear-energy-2016-6/>

### Costa Rica:

- <http://www.independent.co.uk/news/world/americas/costa-rica-electricity-renewable-energy-300-days-2017-record-wind-hydro-solar-water-a8069111.html>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Costa\\_Rica](https://en.wikipedia.org/wiki/Renewable_energy_in_Costa_Rica)
- <http://bigthink.com/robby-berman/what-you-want-to-know-about-costa-ricas-renewable-energy-victory>

### Nicaragua

- <https://www.irishtimes.com/news/world/how-nicaragua-is-becoming-a-renewable-energy-paradise-1.3284386>
- <https://www.npr.org/sections/parallels/2015/03/11/392111931/nicaraguas-renewable-energy-revolution-picks-up-steam>
- <https://www.ecowatch.com/nicaragua-joins-clean-energy-revolution-vows-90-renewables-by-2020-1882145790.html>
- [https://en.wikipedia.org/wiki/Electricity\\_sector\\_in\\_Nicaragua](https://en.wikipedia.org/wiki/Electricity_sector_in_Nicaragua)

### Scotland

- <http://www.independent.co.uk/environment/scotland-renewable-wind-energy-power-electricity-three-million-homes-118-per-cent-of-households-a7855846.html>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Scotland](https://en.wikipedia.org/wiki/Renewable_energy_in_Scotland)
- <https://futurism.com/scotland-world-leader-renewable-energy/>

- <https://www.irishtimes.com/news/ireland/irish-news/scotland-on-target-for-100-renewable-energy-by-2020-1.3280498>
- <http://www.scottishrenewables.com/sectors/renewables-in-numbers/>

## Germany

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Germany](https://en.wikipedia.org/wiki/Renewable_energy_in_Germany)
- <https://www.nationalgeographic.com/magazine/2015/11/germany-renewable-energy-revolution/>
- <http://www.independent.co.uk/news/world/europe/germany-green-technology-record-power-generation-35-per-cent-renewables-solar-wind-turbines-a7820156.html>
- <http://www.businessinsider.com/renewable-power-germany-negative-electricity-cost-2017-12>
- <https://www.renewableenergymagazine.com/geothermal/climeon-wins-geothermal-order-in-germany-20180219>
- <https://cleantechnica.com/2017/12/20/germany-predicted-set-renewable-energy-record-2017/>

## Uruguay

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Uruguay](https://en.wikipedia.org/wiki/Renewable_energy_in_Uruguay)
- <https://www.theguardian.com/environment/2015/dec/03/uruguay-makes-dramatic-shift-to-nearly-95-clean-energy>
- <http://blogs.worldwatch.org/uruguay-believe-clean-energy-future/>
- <http://www.wri.org/blog/2016/03/how-uruguay-became-wind-power-powerhouse>
- <http://www.opsur.org.ar/blog/2017/10/11/clean-energy-at-what-cost-uruguays-renewables-bid-deepens-electricity-inequality/>

## Denmark

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Denmark](https://en.wikipedia.org/wiki/Renewable_energy_in_Denmark)
- <http://www.renewableenergyworld.com/articles/2017/04/denmark-to-end-all-renewable-energy-subsidies.html>
- <https://www.theguardian.com/environment/2015/jul/10/denmark-wind-windfarm-power-exceed-electricity-demand>
- <https://stateofgreen.com/en/profiles/state-of-green/news/denmark-significantly-increases-its-consumption-of-renewable-energy-in-the-first-half-of-2017>
- <http://www.independent.co.uk/news/world/europe/denmark-ran-entirely-on-wind-energy-for-a-day-a7607991.html>
- <https://www.thelocal.dk/20171206/denmarks-green-energy-grows-faster-than-expected>

## China

- <https://www.thelocal.dk/20171206/denmarks-green-energy-grows-faster-than-expected>
- <https://www.ecowatch.com/china-renewable-energy-dominance-2492879336.html>

- <https://www.theguardian.com/environment/2018/jan/10/china-on-track-to-lead-in-renewables-as-us-retreats-report-says>
- <https://futurism.com/china-new-world-leader-renewable-energy/>
- <https://www.reuters.com/article/us-china-renewables-waste/china-aims-to-stop-renewable-energy-being-wasted-by-2020-idUSKBN1DD136>
- <https://www.mckinsey.com/mgi/overview/in-the-news/china-renewable-energy-revolution>

## Morocco

- <https://www.theguardian.com/global-development/2016/nov/17/cop22-host-morocco-lights-way-africa-renewable-energy-2020>
- <https://www.ecomena.org/renewable-energy-in-morocco/>
- <https://www.csmonitor.com/Environment/2017/0913/Inside-Morocco-s-renewable-revolution>
- [https://www.mei.edu/sites/default/files/publications/PF26\\_Hochberg\\_MoroccoRenewables\\_web.pdf](https://www.mei.edu/sites/default/files/publications/PF26_Hochberg_MoroccoRenewables_web.pdf)
- <http://www.renewableenergyworld.com/articles/2018/02/new-horizons-for-renewable-energies-in-morocco-and-africa.html>
- <http://www.petroleum-economist.com/articles/low-carbon-energy/renewables/2017/morocco-renewables-revolution>

## USA

- <https://geology.com/articles/renewable-energy-trends/>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_the\\_United\\_States](https://en.wikipedia.org/wiki/Renewable_energy_in_the_United_States)
- <https://news.nationalgeographic.com/2017/06/solar-wind-renewable-energy-record/>
- <https://www.statista.com/topics/1250/renewable-energy/>
- <https://cleantechnica.com/2017/05/31/us-renewable-energy-provides-19-35-us-electricity-first-quarter/>
- <https://www.usrea.org/>

## Kenya

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Kenya](https://en.wikipedia.org/wiki/Renewable_energy_in_Kenya)
- <http://www.renewableenergy.go.ke/>
- <https://www.africa-eu-renewables.org/market-information/kenya/renewable-energy-potential/>
- <https://www.laurea.fi/en/document/Documents/Kenya%20Fact%20Sheet.pdf> (pdf)
- [https://www.the-star.co.ke/news/2017/08/10/kenya-future-lies-in-green-energy\\_c1613034](https://www.the-star.co.ke/news/2017/08/10/kenya-future-lies-in-green-energy_c1613034)

## South Africa

- <http://www.energy.org.za/>
- <https://cleantechnica.com/2017/07/09/south-africas-renewable-energy-future-crossroads/>

- <https://www.sciencedirect.com/science/article/pii/S0301421503001952>
- <http://sarec.org.za/>

## India

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_India](https://en.wikipedia.org/wiki/Renewable_energy_in_India)
- <http://www.renewableenergyindiaexpo.com/>
- <https://www.ibef.org/industry/renewable-energy.aspx>
- <http://mnre.gov.in/>

## Pakistan

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Pakistan](https://en.wikipedia.org/wiki/Renewable_energy_in_Pakistan)
- <https://tribune.com.pk/story/1469601/case-pakistan-ramp-renewable-energy-generation/>
- <https://www.reuters.com/article/pakistan-solar-idUSL8N11528F>
- <https://www.sciencedirect.com/science/article/pii/S1364032109001312>
- <https://www.sciencedirect.com/science/article/pii/S1364032117312856>

## Palestine

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Palestine](https://en.wikipedia.org/wiki/Renewable_energy_in_Palestine)
- <https://www.sciencedirect.com/science/article/pii/S1364032111004898>
- <https://www.sciencedirect.com/science/article/pii/S136403211630380X>
- <https://www.ecomena.org/renewables-palestine/>

## Vietnam

- <http://projects.worldbank.org/P103238/vietnam-renewable-energy-development-project?lang=en>
- <http://www.vn.undp.org/content/dam/vietnam/docs/Publications/Mr%20Thuc.pdf>
- <http://www.vietnam-briefing.com/news/vietnams-push-for-renewable-energy.html/>

## France

- <http://www.renewableenergyworld.com/articles/2016/11/france-sets-fresh-renewable-targets-for-2023.html>
- [http://ressources.campusfrance.org/catalogues\\_recherche/recherche/en/rech\\_energies\\_en.pdf](http://ressources.campusfrance.org/catalogues_recherche/recherche/en/rech_energies_en.pdf)
- <http://www.res-legal.eu/search-by-country/france/>
- <http://www.independent.co.uk/news/world/europe/france-ban-new-oil-gas-exploration-stop-granting-licences-macron-hulot-renewable-energy-drive-a7806161.html>

## Italy

- <https://www.thelocal.it/20170316/italy-has-already-surpassed-its-renewable-energy-target-for-2020>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Italy](https://en.wikipedia.org/wiki/Renewable_energy_in_Italy)
- <http://www.expatsfocus.com/expatriate-italy-renewables>

## United Kingdom

- <https://www.theguardian.com/business/2017/oct/07/how-green-is-britains-low-carbon-energy-supply>
- <http://www.independent.co.uk/news/business/news/renewable-energy-electricity-new-record-uk-wind-solar-a7972266.html>
- [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48128/2167-uk-renewable-energy-roadmap.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48128/2167-uk-renewable-energy-roadmap.pdf)
- [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48128/2167-uk-renewable-energy-roadmap.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48128/2167-uk-renewable-energy-roadmap.pdf)
- <https://futurism.com/a-record-breaking-29-of-the-u-k-s-electricity-is-now-generated-by-renewables/>

## Spain

- <https://www.sciencedirect.com/science/article/pii/S1364032114001178>
- <https://www.greentechmedia.com/articles/read/spain-is-a-case-study-in-how-not-to-foster-renewables>
- <https://www.masterstudies.com/Masters-Degree/Renewable-Energy/Spain/>
- <http://www.independent.co.uk/news/world/europe/spain-environment-renewable-energy-clean-energy-wind-solar-acciona-a7377586.html>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Spain](https://en.wikipedia.org/wiki/Renewable_energy_in_Spain)

## Russia

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Russia](https://en.wikipedia.org/wiki/Renewable_energy_in_Russia)
- <https://www.ft.com/content/638e1dc6-1bb2-11e7-bcac-6d03d067f81f>
- <http://www.irena.org/publications/2017/Apr/Renewable-Energy-Prospects-for-the-Russian-Federation-REmap-working-paper>
- <https://www.technologyreview.com/s/607822/russia-tells-the-un-it-wants-to-produce-more-renewable-energy/>
- <https://www.bloomberg.com/news/articles/2017-05-29/russia-starts-largest-renewable-energy-auction-in-bid-for-jobs>

## Turkey

- <http://www.invest.gov.tr/en-US/sectors/Pages/Energy.aspx>

- [http://better-project.net/sites/default/files/Renewable%20Energy%20in%20Turkey\\_Directorate%20General%20for%20Renewable%20Energy.pdf](http://better-project.net/sites/default/files/Renewable%20Energy%20in%20Turkey_Directorate%20General%20for%20Renewable%20Energy.pdf)
- <http://www.atlanticcouncil.org/blogs/new-atlanticist/turkey-takes-important-steps-toward-its-renewable-energy-future>
- <https://gettingthedealthrough.com/area/99/jurisdiction/54/renewable-energy-turkey/>
- <https://www.sciencedirect.com/science/article/pii/S1877042815052702>

## Canada

- <http://www.nrcan.gc.ca/energy/renewable-electricity/7295>
- <http://www.nrcan.gc.ca/energy/facts/renewable-energy/20069>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Canada](https://en.wikipedia.org/wiki/Renewable_energy_in_Canada)
- <https://globalnews.ca/news/3926449/renewable-energy-canada/>
- <http://www.independent.co.uk/news/world/americas/canada-electricity-renewable-energy-66-percent-hydro-biomass-wind-fossil-fuels-environment-friendly-a7715166.html>
- <https://www.canada.ca/en/services/environment/energy/renewable-energy.html>

## Mexico

- <https://www.export.gov/article?id=Mexico-Renewable-Energy>
- <http://www.renewableenergyworld.com/articles/2015/08/the-future-of-renewable-power-in-mexico.html>
- <http://www.renewableenergymexico.com/>
- <https://www.sciencedirect.com/science/article/pii/S1364032114000148>

## Lebanon

- <https://www.sciencedirect.com/science/article/pii/S136403211200305X>
- [http://www.almeelebanon.com/files/booklets/Renewable\\_Energy\\_in\\_Lebanon\\_in\\_2015.pdf](http://www.almeelebanon.com/files/booklets/Renewable_Energy_in_Lebanon_in_2015.pdf)
- [https://en.wikipedia.org/wiki/Energy\\_in\\_Lebanon](https://en.wikipedia.org/wiki/Energy_in_Lebanon)
- [http://www.lb.undp.org/content/dam/lebanon/docs/Energy%20and%20Environment/Publications/LbReport-31\\_03\\_2016-FINAL-SINGLE.PDF?download](http://www.lb.undp.org/content/dam/lebanon/docs/Energy%20and%20Environment/Publications/LbReport-31_03_2016-FINAL-SINGLE.PDF?download)
- [https://en.wikipedia.org/wiki/Energy\\_in\\_Lebanon](https://en.wikipedia.org/wiki/Energy_in_Lebanon)

## Australia

- <https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>
- <https://www.gizmodo.com.au/2018/02/australia-is-on-the-cusp-of-a-renewable-energy-boom/>
- <https://www.theguardian.com/environment/2017/aug/27/renewable-energy-generates-enough-power-to-run-70-of-australian-homes>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Australia](https://en.wikipedia.org/wiki/Renewable_energy_in_Australia)

- <https://cleantechnica.com/2018/01/25/australia-will-meet-2020-renewable-energy-target-following-record-investments/>

## Argentina

- <http://www.climateactionprogramme.org/news/argentina-to-become-latin-americas-most-attractive-renewable-energy-market>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Argentina](https://en.wikipedia.org/wiki/Renewable_energy_in_Argentina)
- <https://www.pwc.com/ar/es/publicaciones/assets/renewables-in-Argentina.pdf>

## Brazil

- <https://www.ft.com/content/a20b74bc-7eb4-11e7-ab01-a13271d1ee9c>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Brazil](https://en.wikipedia.org/wiki/Renewable_energy_in_Brazil)
- <https://www.sciencedirect.com/science/article/pii/S1364032112002079>
- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Brazil](https://en.wikipedia.org/wiki/Renewable_energy_in_Brazil)

## Colombia

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Colombia](https://en.wikipedia.org/wiki/Renewable_energy_in_Colombia)
- <http://www.nortonrosefulbright.com/knowledge/publications/134774/renewable-energy-in-latin-america-colombia>
- <https://www.export.gov/article?id=Colombia-electric-power-and-renewable-energy-systems>

## Yemen

- <http://www.powerengineeringint.com/articles/mee/print/volume-4/issue-3/features/renewables-clearing-the-hurdles-renewable-energy-in-yemen.html>
- [https://www.isesco.org.ma/ISESCO\\_Technology\\_Vision/NUM01/doc/Ali%20M.%20Al-Ashwal.pdf](https://www.isesco.org.ma/ISESCO_Technology_Vision/NUM01/doc/Ali%20M.%20Al-Ashwal.pdf)
- <https://www.sciencedirect.com/science/article/pii/S0960148198001049>

## Greece

- [https://en.wikipedia.org/wiki/Renewable\\_energy\\_in\\_Greece](https://en.wikipedia.org/wiki/Renewable_energy_in_Greece)
- <https://www.sciencedirect.com/science/article/pii/S0301421511008949>
- <http://www.renewableenergyworld.com/articles/2016/08/greece-approves-new-renewable-energy-law.html>
- <http://www.res-legal.eu/search-by-country/greece/>
- <http://www.ebrd.com/news/2017/ebd-adopts-300-million-renewable-energy-framework-for-greece.html>
- <https://energytransition.org/2016/06/the-evolution-of-renewable-energy-sources-res-in-greece-a-synopsis-of-the-legal-framework/>