Energy interventions that facilitate sustainable development and have a positive impact on health: an overview of systematic reviews (Protocol)

Dr Michelle Haby, Dr Evelina Chapman, Ms Rachel Clark, Dr Luiz Galvão

Contacts: Dr Luiz Galvão, galvaolu@paho.org; Dr Michelle Haby, haby@unimelb.edu.au
Funded by the Pan American Health Organization
Date finalized: 8 January 2014

Background

What is sustainable development?

History of sustainable development, including key conferences
The United Nations Conference on the Human Environment (also known as the Stockholm Conference) was an international conference convened under United Nations auspices held in Stockholm, Sweden from June 5-16, 1972. It was the UN's first major conference on international environmental issues, and marked a turning point in the development of international environmental politics.

The need for the integration of economic development, natural resources management and protection and social equity and inclusion was introduced for the first time by the 1987 Brundtland Report – Our Common Future (World Commission on Environment and Development, 1987), and it became central in framing the discussions at the 1992 United Nations Conference on Environment and Development also known as the Earth Summit. At this conference (held in Rio de Janeiro, Brazil from 3-14 June) sustainable development was formally endorsed by the international community. The Earth Summit resulted in the creation of Agenda 21, an ambitious action plan for global sustainable development, and the Rio Declaration, which outlined 27 principles for global sustainability.

The United Nations Commission on Sustainable Development was established by the UN General Assembly in December 1992, as the UN high level political body entrusted with the monitoring and promotion of the implementation of the Rio outcomes, including Agenda 21.

The 2002 World Summit on Sustainable Development advanced the mainstreaming of the three dimensions of sustainable development in development policies at all levels through the adoption of the Johannesburg Plan of Implementation (JPOI). The conference was held in Johannesburg, South Africa from 26 August to 4 September, 2002.

From 22-26 June 2012, world leaders and participants from government, NGOs, the private sector, and civil society gathered again in Rio de Janeiro for the UN Conference on Sustainable Development
(commonly referred to as Rio+20) to advance sustainable development—20 years after the 1992 Earth Summit that resulted in agreement on important principles but insufficient action. The conference resulted in a focused political outcome document – The future we want – which contains clear and practical measures for implementing sustainable development (UN, 2012). In Rio, Member States decided to launch a process to develop a set of Sustainable Development Goals, which will build upon the Millennium Development Goals and converge with the post 2015 development agenda.

**Definition of sustainable development**

The term *sustainability* comes from the concept of sustainable development defined in the 1987 report *Our Common Future* by the Brundtland Commission of the United Nations as:

> “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987).

Though this definition is ambiguous, as have been all subsequent alternative definitions which scholars have come up with, it is widely accepted and used (Kates et al., 2005). Sustainable development is supported by three pillars—the economic, social, and environmental —where health is both an outcome of, and a precondition for, all three pillars (UN, 2012).

**An integrated framework for realizing the “future we want for all”**

Prior to Rio+20 the UN System Task Team on the Post-2015 UN Development Agenda proposed an integrated framework for realizing the “future we want for all” in the post-2015 UN development agenda (Figure 1) (UN System Task Team, 2012). The framework includes the core values of human rights, equality and sustainability and four key dimensions of: (1) inclusive social development; (2) inclusive economic development; (3) environmental sustainability; and (4) peace and security. These four dimensions build on the three pillars of sustainable development. The fourth dimension recognizes peace and security, or “freedom from fear” as an important element in realizing the “future we want for all” (UN System Task Team, 2012). There are also four broad areas of “enablers” in the framework, which are indicative of each of the four dimensions, yet understood as supportive to all (UN System Task Team, 2012). Policies for these “enablers” should be seen as not just effective towards achieving goals related to one dimension, but rather across all dimensions and are designed to bring coherence among policies at different levels, e.g. national, regional, global (UN System Task Team, 2012).

**How does energy fit into the integrated framework?**

Providing sustainable energy for all is an “enabler” in the proposed integrated framework (Figure 1). Increasing access to sustainable energy is imperative for a stable climate, which is part of the key dimension of “environmental sustainability”. It is also important for “inclusive economic development” and “inclusive social development”. Sustainable energy for all also impacts on the core values of human rights, equality and sustainability.

**Linkages between sustainable energy policies and better public health**

The United Nations Secretary General’s Advisory Group on Energy and Climate Change (AGECC) wrote in their summary report that: “Energy is at the heart of most critical economic, environmental and developmental issues facing the world today. Clean, efficient, affordable and reliable energy services are indispensable for global prosperity. Developing countries in particular need to expand access to reliable and modern energy services if they are to reduce poverty and improve the health of their citizens, while
at the same time increasing productivity, enhancing competitiveness and promoting economic growth’ (UN-AGECC, 2010).

Figure 1. An integrated framework for realizing the “future we want for all” in the post-2015 UN development agenda

Improving access to low-emission, renewable, and modern energy technologies both in the home and the community can contribute to long term goals of sustainability and benefit health (WHO, 2012c). Notably, the inefficient combustion of fossil fuels and biomass (wood, crop, residues, animal dung, and charcoal) for energy purposes is the major cause of climate change. Air pollution, often due to inefficient modes of energy production, distribution, and consumption, is a large and growing cause of environmental health risks (WHO, 2012c). Some indicative statistics:

- Some 3.5 million deaths/year and 4.3% of global disability adjusted life years (DALYs) in 2010 may be due to household air pollution from rudimentary biomass and coal stoves (Lim et al., 2012).
- Approximately 3.3 million deaths/year may be due to outdoor air pollution (Lim et al., 2012) – with exposures highest in developing cities.
- In some developing countries, over one-half of health care facilities have no electricity or lack reliable electricity (WHO, 2012c).
• Some 1.3 billion people lack access to electricity and rely on kerosene lamps and other polluting alternatives for lighting. At the same time, conventional electric grid systems waste a great deal of energy (WHO, 2012c).

However, while many sustainable energy strategies to reduce climate change have large, immediate health benefits, others may pose health risks or tradeoffs, which need to be considered when choosing measures to address climate change (WHO, 2012a). For example, while liquefied petroleum gas (LPG) reduces health-damaging indoor air pollution exposures by more than 90% in comparison to open fires or traditional stoves, the environmental impacts related to production and transport or logistics and equity impacts of accessing fuel sources (due to cost), particularly in rural areas, also need to be considered (WHO, 2012a). Also, growth of biofuels that compete for land with food crops could increase food prices, which will have an adverse impact on health.

Another issue is the health of those working with “green technologies”. While there are potential health gains for workers, including potential improvements in health equity, there are health risks that need mitigation and management (WHO, 2012b). Risks include: exposure to air pollution hazards, ergonomic risks, and exposure to toxic emissions (WHO, 2012b). (These issues are also being considered in the companion ‘overview’ on sustainable jobs.)

Energy access and associated health impacts are very closely linked to inequities (WHO, 2012c). For instance, the collection of increasingly stressed supplies of biomass takes up valuable time, especially for women and girls. That time spent on collection could be used for income generation or schooling and puts them at risk for injury and violence. Reliance on kerosene lighting presents health risks that extend beyond air pollution alone, including burns, scalds, and poisoning, especially to women and young children.

**Sustainable energy interventions – some examples**
The United Nations Secretary General’s Advisory Group on Energy and Climate Change (AGECC) recommended focusing on two specific areas: energy access and energy efficiency (UN-AGECC, 2010).

The AGECC defined energy access as: “access to clean, reliable and affordable energy services for cooking and heating, lighting, communications and productive uses”. “Affordable” in this context means that the cost to end users is compatible with their income levels (no more than 10-20 percent of their income) and no higher than the cost of traditional fuels, in other words what they would be able and willing to pay for the increased quality of energy supply. Otherwise temporary subsidies may be needed to ensure affordability, at least in the short-term (UN-AGECC, 2010). Universal energy access requires:

• Increasing access to electricity – through grid extension, mini-grid access or off-grid access (e.g. a solar house-hold system).
• Increasing access to modern fuels and technologies, including natural gas, LPG, diesel, and renewables such as biodiesel and bio-ethanol. There are also many technology options to make use of modern fuels, or to use traditional fuels more efficiently, such as improved cooking stoves.
• Providing the building blocks at national and international level, including:
  o Making energy access a top agenda item for government.
  o Providing access to financing, including government subsidies.
Building the capabilities and capacities of local institutions for delivery, quality monitoring, financing, and operations and maintenance services.

Improving the performance of public utilities.

Energy efficiency is the key to driving incremental reductions in energy intensity. It is one of the few “no-regret” policies that can offer a solution across challenges as diverse as climate change, energy security, industrial competitiveness, human welfare and economic development (UN-AGECC, 2010). There are substantial energy efficiency improvement opportunities on both the supply side and the demand side. On the supply side, the power sector in the developing world in particular has substantial potential to improve the efficiency of power generation and to reduce transmission and distribution losses, thereby reducing the amount of primary energy (e.g. coal, gas, oil) consumed for the same output (UN-AGECC, 2010). The demand side includes end-use efficiency opportunities in industry, buildings and transport. For example:

- For buildings, much will depend on the widespread uptake of energy-efficient electric equipment and efficient lighting. Improvements in building design are also important, e.g. to reduce cooling loads in hot climates.
- In the transport sector, a mix of energy-efficient vehicles including all-electric and hybrid electric vehicles, integrated traffic planning and modern public transportation systems can create significant gains.

Sustainable energy technologies and interventions analyzed by the Intergovernmental Panel on Climate Change (IPCC) in the Fourth Assessment Report of Working Group III (Metz et al., 2007) and considered by a WHO expert consultation on ‘Health in the green economy’ (WHO, 2012b) include:

- Renewable energy sources: solar (thermal power generation, solar photovoltaic, passive solar heating and cooling), wind, biofuels (multiple sources), innovative biomass resources and bioenergy conversion technologies;
- Replacement and/or reduction of traditional fossil fuel energy: selected industries and vehicles;
- Energy efficiency in buildings;
- Transportation: reduced energy consumption and efficiency;
- Mitigation measures in agriculture: techniques for reduction of carbon emissions;
- Mitigation measures in forestry: techniques for reduction of carbon emissions and fixation;
- Waste management;
- Fuel cells;
- Carbon dioxide capture and storage.

Other types of interventions mentioned by experts in the field of sustainable development and/or health include:

- Implementing cooking stoves with improved efficiency in households that currently burn biomass or coal in open fires (Haines et al., 2012, WHO, 2012c);
- Switching to biogas or liquefied petroleum gas for cooking stoves (Haines et al., 2012, WHO, 2012c);
- Improvements in insulation by changes to the materials used in the walls, windows, floor and roof of houses (Haines, 2012);
- Improved ventilation control in the most tightly sealed houses (Haines, 2012);
- Fuel use in houses – substitution of domestic fossil fuel use by electricity generated from low carbon sources (Haines, 2012);
Supportive policies and decision-making tools, including the use of health impact assessment to estimate potential health gains from improved technologies (WHO, 2012a); and

Financial instruments such as carbon finance, which is an important way to help poor communities access cleaner fuels and technologies (WHO, 2012a).

Focus of this overview – sustainable energy
The focus of this overview is interventions that promote or provide sustainable energy. To classify as ‘sustainable’ interventions need to aim (explicitly or implicitly) to positively impact on at least two dimensions of the integrated framework, e.g. environmental stability and inclusive social development (which includes health) or environmental sustainability and inclusive economic development (but where impact on health is also measured).

Objectives
The objective of this overview is to answer the following questions using the best available evidence:

1. What are the interventions that facilitate sustainable energy use and have a positive impact on health?
   a. What is their impact on health inequalities (including gender, socio-economic status, area of residence (e.g. urban/rural), age)?
   b. What evidence is there for their cost-effectiveness?
   c. Which dimensions of the integrated framework are affected by the intervention and how?

2. Given the interdisciplinary and inter-sectorial nature of sustainable development, which sectors should the health sector engage with in order to promote sustainable energy use to preserve and promote public health and equity?

Methods
Criteria for considering reviews for inclusion
Publications in English, Spanish or Portuguese and published in the last 15 years (from 1997 to present) will be included.

Types of studies
Systematic reviews of studies of effectiveness, including reviews of randomized controlled trials (individuals or clusters), quasi-randomized controlled trials, controlled before-and-after studies, interrupted time series, analytic observational studies (cohort, case-control, cross-sectional studies) and modelling/simulation studies will be included. A systematic review is characterized by (Higgins and Green, 2011):

- a clearly stated set of objectives with pre-defined eligibility criteria for studies;
- an explicit, reproducible methodology;
- a systematic search that attempts to identify all studies that would meet the eligibility criteria;
- an assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias;
• a systematic presentation, and synthesis, of the characteristics and findings of the included studies.

Studies that satisfy most but not all of these characteristics will still be included but their methodological quality will be assessed (see ‘Data collection and analysis’) and limitations noted.

Economic evaluations (cost-effectiveness, cost-utility, and/or cost-benefit) and systematic reviews of economic evaluations will also be included.

**Types of participants**
Studies of individuals, groups, communities, countries or regions will be included. Both developed and developing countries will be included.

**Types of interventions**
Interventions include programs, policies, strategies, courses of action and legislation to facilitate sustainable energy use. To classify as ‘sustainable’ interventions need to aim (explicitly or implicitly) to positively impact on at least two dimensions of the integrated framework, e.g. environmental sustainability and inclusive social development (which includes health) or environmental sustainability and inclusive economic development (but where impact on health is also measured).

**Types of comparisons**
Suitable comparisons include:
- No intervention
- Another intervention
- Current practice

**Types of outcome measures**

*Primary outcomes*
Health measures at the level of the individual, group, community, country, region, and/or globally, including:
- Disease incidence, prevalence, burden.
  Note: diseases for which indoor and outdoor air pollution are risk factors include: lower respiratory infections; trachea, bronchus, and lung cancers; ischaemic heart disease; cerebrovascular disease; and chronic obstructive pulmonary disease
- Mortality
- Morbidity
- Symptoms and signs of disease
- Indoor and outdoor air pollution
- Health service use
- Health-related costs
- Health-inequalities, including by gender, age, socio-economic status, area of residence (e.g. urban/rural), etc.

Indicators specific to sustainable energy include (WHO, 2012c):
- Rates of adult and child disease burden and injuries (deaths and disability-adjusted life years (DALYs)) attributable to household air pollution from the incomplete combustion of biomass fuels and coal for cooking and heating;
Rates of adult and child disease burden (deaths and DALYs) attributable to outdoor air pollution in both urban and rural settings;

Secondary outcomes

Secondary outcomes will be examined if reported in an eligible study. Studies reporting only secondary outcomes without reporting any primary outcomes will not be eligible for the review. These measures are considered intermediaries between sustainable energy use and health outcomes and were recommended by a WHO Expert Consultation (WHO, 2012c). They include:

- Household access to modern, low-emissions heating/cooking technologies;
- Energy access at community health facilities – particularly for reliable electricity;
- Clean electricity generation across the energy supply chain – in terms of reduced pollution; greater efficiencies and reliance on renewable energy sources.
- Whether or not health and health equity impacts (by gender, age, and socio-economic status) are routinely assessed and accounted for in the design and implementation of major energy policies such as through the use of health impact assessments.

Search methods for identification of reviews

Sources

Databases

The following sources from 1997 to the present will be searched:

- PubMed (which includes Medline content)
- EMBASE - Excerpta Medica database
- GreenFILE
- ASSIA - Applied Social Sciences Index and Abstracts
- ScienceDirect
- LILACS (http://lilacs.bvsalud.org/en/). Note: a separate search of LILACS will also be undertaken through the Biblioteca Virtual en Salud Evidence Portal http://bvsalud.org/en/.
- SciELO - Scientific Electronic Library Online (http://www.scielo.org/php/)
- CAB Abstracts

Specialized sources of systematic reviews and syntheses of systematic reviews:

- The Cochrane Library Plus, including the Database of Abstracts of Reviews of Effectiveness (DARE) and the Health Technology Assessment (HTA) database
- The Campbell Library (http://www.campbellcollaboration.org/)
- Health-evidence Canada (http://health-evidence.ca/articles/search)
- Effective Public Health Practice Project (http://www.ephpp.ca/)
- Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) (http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=61)
- 3ie – International Initiative for Impact Evaluation (http://www.3ieimpact.org/)

Specialized sources of economic evaluations:

- Paediatric Economic Database Evaluation (PEDE) (http://pede.ccb.sickkids.ca/pede/index.jsp)
• EconLit - Economics Literature
• NHS Economic Evaluation Database (NHSEED) database - available through the Cochrane Library (http://regional.bvsalud.org/php/index.php)

Grey literature / manual search
Some of the selected databases index a combination of published and unpublished studies (for example, doctoral dissertations and conference abstracts) therefore unpublished studies will be partially captured through the electronic search process. In addition key websites will be searched:

• World Health Organization, including WHOLIS (a bibliographic database that contains publications from the World Health Organization http://www.who.int/library/databases/en/) and IRIS (WHO’s Institutional Repository for Information Sharing http://apps.who.int/iris/)
• Google
• National Institute of Environmental Health Sciences (http://www.niehs.nih.gov/)
• Centre for Sustainable Energy (http://www.cse.org.uk/)
• Sustainable Energy | United Nations Development Program (http://www.undp.org/energy/)

The reference list of included systematic reviews will also be searched.

Search strategy
Databases will be searched using the following keywords (Table 1) – searched for in title and abstract, except where otherwise stated. Keyword areas will be joined using ‘AND’. Searches will be limited to Humans and with a publication date between 1st January 1997 and the present.

Databases will be searched using keyword areas 1 and 4. The search will be extended to keyword area 3 if the number of records found is more than 50 and then keyword area 2 if the number of records is still more than 50. Specialized sources of systematic reviews and economic evaluations will be searched using keyword areas 1, 2 and 3, starting with 1 and adding 3 and 2 where the number of results returned is greater than 50.

If additional relevant key words are detected during any of the electronic or other searches the electronic search strategies will be modified to incorporate these terms – any changes will be documented.

Searches for economic evaluations will be limited to the databases listed under “Sources of economic evaluations” (above) using keywords from area 1. For EconLit, keyword area 1 will be combined (using ‘AND’) with SUBJECT (cost-effectiveness OR cost-utility OR cost-benefit analysis).

Results will be downloaded into the EndNote reference management program and duplicates removed. The search strategy for PubMed can be found in Appendix 1. This will be modified for other databases as appropriate.

---

1 Do these two databases include different information?
Table 1. Keyword areas for searching

<table>
<thead>
<tr>
<th>Keyword Areas</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable energy</td>
<td>“renewable energy”[MESH Term] OR “conservation of energy resources” [MESH Term] OR &quot;Climate Change/prevention and control&quot;[MESH Term] OR &quot;Global Warming/prevention and control&quot;[MESH Term] OR &quot;Greenhouse Effect/prevention and control&quot;[MESH Term] OR &quot;renewable energy&quot; OR &quot;wind energy&quot; OR &quot;solar energy&quot; OR &quot;natural gas&quot; OR &quot;biomass&quot; OR biodiesel OR bioethanol OR &quot;bio ethanol&quot; OR biofuel* OR bioenergy OR &quot;efficient light*&quot; OR &quot;hybrid electric&quot; OR &quot;carbon emissions&quot; OR &quot;greenhouse gas*&quot; OR electricity OR “efficient heat*” OR diesel OR “liquefied petroleum gas” OR biogas OR kerosene OR LPG* OR “household energy” OR “improved stove*” OR cookstoves</td>
</tr>
<tr>
<td>Interventions</td>
<td>program OR policy OR policies OR strategy OR legislation OR law OR intervention OR technique OR planning OR practice OR fiscal OR regulation OR tax$ OR subsid$ OR procurement OR incentive OR “health impact assessment”</td>
</tr>
<tr>
<td>Outcomes</td>
<td>disease OR injury OR burden OR incidence OR prevalence OR mortality OR morbidity OR health$ OR asthma OR “air quality” OR “air pollution” OR particles OR “particulate matter” OR PM OR “carbon monoxide”</td>
</tr>
<tr>
<td>Systematic reviews</td>
<td>“systematic review” OR &quot;meta-analysis&quot;</td>
</tr>
</tbody>
</table>

Data collection and analysis

Selection of reviews and economic evaluations
Searches will be conducted and screened according to the selection criteria by one review author (MH). The full text of any potentially relevant papers will be retrieved for closer examination. The inclusion criteria will be applied against these papers by two reviewers. All studies which initially appear to meet the inclusion criteria but on inspection of the full text paper do not meet the inclusion criteria will be detailed in a table ‘Characteristics of excluded systematic reviews’ together with reasons for their exclusion. Disagreements regarding eligibility of studies will be resolved via consensus.

The results of the review selection process will be presented in a flow chart using the format suggested in the PRISMA statement (Moher et al., 2009) – Figure 2.

Data extraction
One reviewer will extract all relevant data from included papers and a second reviewer will verify the extracted data. Differences will be resolved by discussion and consensus. Data extracted for each included systematic review will include:

- Objectives
• Inclusion criteria for the systematic review (Participants, Interventions, Comparisons, Outcomes, Study types - PICOS)
• Date of search
• Country of studies
• Number of studies included
• Details of the included studies, including participants, interventions and study types and the sectors involved in each of the interventions studied.
• The dimensions of the integrated framework that the individual studies attempted to impact.
• Summary of findings – including impact on health and impact on any of the four dimensions of the integrated framework
• Limitations
• Research gaps

Information cited in the systematic review on factors that influence the effectiveness of the interventions (‘critical success factors’) will also be noted.

Assessment of methodological quality of included reviews
The quality of included systematic reviews will be assessed by two reviewers using AMSTAR: A MeaSurement Tool to Assess Reviews (Shea et al., 2007). AMSTAR assesses the degree to which review methods avoided bias by evaluating the methods against 11 distinct criteria. Each item on AMSTAR is rated as yes (clearly done), no (clearly not done), can’t answer, or not applicable. Disagreements regarding scores will be resolved through discussion and consensus. A review that adequately meets all of the 11 criteria is considered to be a review of the highest quality. For this overview we will consider reviews that achieve scores of between 8 to 11 high quality; scores of 4 to 7 medium quality; and scores of 0 to 3 low quality. The review quality assessment will be used to interpret the results of reviews when synthesized in this overview and in the formulation of conclusions.

Data synthesis
Descriptive summaries about the efficacy of the interventions will be generated.

Results
Among other tables, a matrix showing the connection between the interventions and the four dimensions of the integrated framework will be included:

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Inclusive economic development</th>
<th>Environmental Sustainability</th>
<th>Inclusive Social Development</th>
<th>Peace and Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Among other sections, there will be a sub-heading for each of the four dimensions of the integrated framework – which will include a description (and quantitative data, where available) of the impact of the interventions.
Figure 2. Systematic review selection flow chart

Records identified through database searching (n = ) → Records after duplicates removed (n = )

Records screened (n = ) → Records excluded (n = )

Full-text articles assessed for eligibility (n = ) → Full-text articles excluded, with reasons (n = )

Additional systematic reviews identified through hand searching of reference lists of included systematic reviews (n = ) → Systematic reviews included (n = )
References
UN System Task Team 2012. Realizing the future we want for all. Report to the Secretary-General. New York: UN System Task Team on the Post-2015 UN Development Agenda, United Nations
**Appendix 1 – Detailed search strategy**

**PubMed – 4 Dec 2013**

<table>
<thead>
<tr>
<th>Search</th>
<th>Query</th>
<th>Items found</th>
</tr>
</thead>
<tbody>
<tr>
<td>#7</td>
<td>Search #3 AND #4 Filters: Publication date from 1997/01/01 to 2013/12/31; Humans</td>
<td>24</td>
</tr>
<tr>
<td>#6</td>
<td>Search #3 AND #4 Filters: Humans</td>
<td>25</td>
</tr>
<tr>
<td>#5</td>
<td>Search #3 AND #4</td>
<td>51</td>
</tr>
<tr>
<td>#4</td>
<td>Search (&quot;systematic review&quot;[Title/Abstract]) OR &quot;meta-analysis&quot;[Title/Abstract]</td>
<td>79814</td>
</tr>
<tr>
<td>#3</td>
<td>Search #1 OR #2</td>
<td>29263</td>
</tr>
<tr>
<td>#2</td>
<td>Search (((((((((((((((((&quot;renewable energy&quot;[Title/Abstract]) OR &quot;wind energy&quot;[Title/Abstract]) OR &quot;solar energy&quot;[Title/Abstract]) OR &quot;natural gas&quot;[Title/Abstract]) OR &quot;biomass fuel&quot;[Title/Abstract]) OR biodiesel[Title/Abstract]) OR bioethanol[Title/Abstract]) OR &quot;bio ethanol&quot;[Title/Abstract]) OR biofuel*[Title/Abstract]) OR bioenergy[Title/Abstract]) OR &quot;efficient light&quot;<em>[Title/Abstract]) OR &quot;hybrid electric&quot;[Title/Abstract]) OR &quot;carbon emissions&quot;[Title/Abstract]) OR &quot;greenhouse gas&quot;</em>[Title/Abstract]) OR electricity[Title/Abstract]) OR &quot;efficient heat&quot;*[Title/Abstract]) OR diesel[Title/Abstract]) OR &quot;liquefied petroleum gas&quot;[Title/Abstract]) OR biogas[Title/Abstract]</td>
<td>22760</td>
</tr>
<tr>
<td>#1</td>
<td>Search (&quot;renewable energy&quot;[MeSH Major Topic]) OR &quot;conservation of energy resources&quot;[MeSH Major Topic]) OR &quot;Climate Change/prevention and control&quot;[Mesh]) OR &quot;Global Warming/prevention and control&quot;[Mesh]) OR &quot;Greenhouse Effect/prevention and control&quot;[Mesh]</td>
<td>8867</td>
</tr>
</tbody>
</table>