

RENEWABLE ENERGY LAW

With the rapid growth of the renewable energy sector, it has become increasingly important to understand how renewable energy is defined in national laws around the world and what regulatory mechanisms these countries are deploying to achieve their renewable energy goals. In *Renewable Energy Law: An International Assessment*, Dr Penelope J. Crossley compares the national renewable energy laws for each of the 113 countries that have such a law, shedding light on the question of whether energy laws are converging globally to facilitate trade or engaging in regulatory competition. The book includes over sixty extracts from different national laws, case studies on the European Union and the Chinese wind sector, and many examples of the particular challenges facing specific countries. This work should be read by scholars, policymakers, regulators, employees of commercial entities operating in the energy sector, and anyone else interested in the legal and regulatory landscape of renewable energy.

Penelope Crossley is a Director of the Energy Users Association of Australia and a member of the Technical Working Group of the Energy Security Board. Prior to entering academia, Penelope practised as a Solicitor in London and Beijing specialising in Global Energy and Infrastructure Law.

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Renewable Energy Law

AN INTERNATIONAL ASSESSMENT

PENELOPE CROSSLEY

The University of Sydney Law School



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This book is dedicated to Hayden and Madeleine.

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Acronyms and Abbreviations

| | |
|-------------------|---|
| AC | alternating current |
| \$AU | Australian dollar |
| CDM | Clean Development Mechanism |
| CHP | combined heat and power |
| CO ₂ | carbon dioxide |
| CO ₂ e | carbon dioxide equivalent |
| COGEN | cogeneration |
| dB | decibel |
| DC | direct current |
| EC | European Commission |
| EIA | Energy Information Administration (US) |
| ES | energy storage |
| ETS | emissions trading scheme |
| EU | European Union |
| FIP | feed-in premium |
| FIT | feed-in tariff |
| GATT | General Agreement on Tariffs and Trade |
| G ₂₀ | Group of Twenty |
| GDP | Gross Domestic Product |
| GHG | greenhouse gas |
| GW | gigawatt (1GW = 1000MW) |
| GWh | gigawatt-hour |
| GO | guarantee of origin |
| H ₂ O | water |
| IEA | International Energy Agency |
| IISD | International Institute for Sustainable Development |
| IPCC | Intergovernmental Panel on Climate Change |
| IPP | independent power producer |

| | |
|-------|---|
| IPR | intellectual property right |
| IRENA | International Renewable Energy Agency |
| ITC | investment tax credit |
| kW | kilowatt (1kW = 1000watts) |
| kWh | kilowatt-hour |
| LNG | liquefied natural gas |
| LRET | large-scale renewable energy target |
| MW | megawatt (1MW = 1000kW) |
| MWh | megawatt-hour |
| NDRC | National Development and Reform Commission (China) |
| NFFO | Non-Fossil Fuel Obligation |
| NGO | non-governmental organisation |
| NREL | National Renewable Energy Laboratory (US) |
| NSW | New South Wales, Australia |
| OECD | Organisation for Economic Co-operation and Development |
| OPEC | Organization of Petroleum Exporting Countries |
| OTEC | ocean thermal energy conversion (also called ‘maremotermica’) |
| PM | particulate matter |
| PPA | power purchase agreement |
| PTC | production tax credit |
| PV | photovoltaic |
| R&D | research and development |
| REEEP | Renewable Energy and Energy Efficiency Partnership |
| RES | renewable energy sources |
| RES-E | electricity derived from renewable energy sources |
| RET | Renewable Energy Target |
| RO | Renewables Obligation |
| RPS | Renewable Portfolio Standards |
| SCM | Agreement on Subsidies and Countervailing Measures |
| SEDA | Sustainable Energy Development Authority of NSW (now defunct) |
| SOE | state-owned enterprises |
| SRET | small-scale renewable energy target |
| TFEU | Treaty on the Functioning of the European Union |
| TGC | tradeable green certificates |
| TPES | total primary energy supply |
| TW | terawatt (1TW = 1000GW) |
| UAE | United Arab Emirates |
| UK | United Kingdom |
| UN | United Nations |

List of Acronyms and Abbreviations

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| | |
|--------|---|
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNIDO | United Nations Industrial Development Organization |
| US | United States of America |
| \$US | United States dollar |
| VAT | value added tax |
| W | watt |
| WHO | World Health Organization |
| WTO | World Trade Organization |

National Renewable Energy Legislation

Afghanistan

اساسنامه تصدی طرح تولید و ترویج وسایل استفاده از انرژی جدید و قابل تجدید
15/03/1369, [No. 101 Statute of the scheme means of production and
promotion of new and renewable energy, 18 April 1989] [Linguistico
Translations translation from Dari]

Albania

Për Burimet E Energjisë Së Rinovueshme No. 138/2013 [Law on Renewable
Energy Sources 2013] [Linguistico Translations translation from
Albanian]

Algeria

Loi n° 04–09 du 27 Jomada Ethania 1425 correspondant au 14 août 2004
relative à la promotion des énergies renouvelables dans le cadre du
développement durable [Law No. 04–09 of 27 Jumada Ethania 1425
corresponding to 14 August 2004 on the promotion of renewable energies
in the framework of sustainable development] [Stephanie Watson trans-
lation from French]

Andorra

Llei 93/2010, del 16 de desembre, de mesures de promoció de l'activitat
econòmica i social, i de racionalització i d'optimització dels recursos de
l'administració [Law 93/2010 of 16 December on the Promotion of
Economic Activity and Social and Rationalisation and Optimisation of
Resources Administration] [Linguistico Translations translation from
Catalan]

Antigua and Barbuda

Renewable Energy Act 2015

Argentina

Energía Eléctrica Ley 26.190. Regimen de Fomento Nacional para el uso de fuentes renovables de energía destinada a la producción de energía eléctrica [Electricity Law 26.190: National Development Regimen for using renewable energy for electricity production 2006] [Linguistico Translations translation from Spanish]

Armenia

The Law of the Republic of Armenia on Energy Saving and Renewable Energy, No. ZR-67, 9 November 2004 [National Assembly of the Republic of Armenia translation from Armenian]

Australia

Renewable Energy (Electricity) Act 2000 (Cth)

Austria

75. Bundesgesetz über die Förderung der Elektrizitätserzeugung aus erneuerbaren Energieträgern (Ökostromgesetz) 2012 [75 Federal Act on the promotion of electricity generation from renewable energy sources (Green Electricity Act) 2012] [Mitchell Cleaver translation from German]

The Bahamas

Electricity Act 2015

Bangladesh

Sustainable and Renewable Energy Development Authority Act 2012 [Linguistico Translations translation from Bengali]

Barbados

Electric Light and Power Act 2013–21, 2014

Belarus

ЗАКОН РЕСПУБЛИКИ БЕЛАРУСЬ, 27 декабря 2010 г. № 204-З, О возобновляемых источниках энергии [Law of the Republic of Belarus, 27 December 2010 No. 204–3 on the use of Renewable Energy] [Levi Romanov translation from Russian]

Belgium

Arrêté royal relatif à l'établissement de mécanismes visant la promotion de l'électricité produite à partir des sources d'énergie renouvelables [Royal Decree on the establishment of mechanisms for the promotion of electricity produced from renewable energy sources, 16 July 2002] [Tallulah Bur translation from French]

Brazil

Law No. 10,438 of 2002 [Linguistico Translations translation from Portuguese]

Bulgaria

Закон за енергията от възобновяеми източници State Gazette No. 35/3.05.2011 [Energy from Renewable Sources Act 2011] [Bulgarian Government translation from Bulgarian]

Cabo Verde

Decreto-Lei No. 1/2011, promocao, incentivo, acesso, licenciamento, exploração, produção independente Energia Electrica [Decree Law No. 1/2011 on the promotion, access, licensing and development of electrical energy from renewable sources] [Linguistico Translations translation from Portuguese]

Cameroon

Law No. 2011/022 Governing the Electricity Sector in Cameroon

Chile

Ley núm. 20.257 introduce modificaciones a la ley general de servicios eléctricos respecto de la generación de energía eléctrica con fuentes de energías renovables no convencionales [Law No. 20,257 Non-Conventional Renewable Energy Law 2008] [Linguistico Translations translation from Spanish]

China

中华人民共和国可再生能源法 [Renewable Energy Law of the People's Republic of China 2005] [Ministry of Commerce of the People's Republic of China translation from Mandarin]

Colombia

Ley 697 de 2001 (Octubre 3) Diario Oficial No. 44,573, de 05 de octubre de 2001 mediante la cual se fomenta el uso racional y eficiente de la energía, se promueve la utilización de energías alternativas y se dictan otras disposiciones [Law 697 on the promotion of the efficient and rational use of energy and alternative energies, Official Gazette No. 44,573, 5 October 2001] [Linguistico Translations translation from Spanish]

Congo, Democratic Republic of the

Loi n° 14/011 du 17 juin 2014 relative au secteur de l'électricité [Law No. 14/011 of 17 June 2014 relating to the Electricity Sector] [Linguistico Translations translation from French]

Cote d'Ivoire

The Code of Electricity [The Electricity Code, Law No. 2014–132]

Croatia

Zakon o obnovljivim izvorima energije i visokoučinkovitoj kogeneraciji
 [Law on Renewable Energy Sources and Highly Effective
 Cogeneration, No. 100/2015] [Croatian Government translation from
 Croatian]

Cuba

Decreto Ley 345: Una revolución dentro de la revolución energética [Law
 Decree 345 on the development of renewable resources and efficient use
 of energy 2018] [Linguistico Translations translation from Spanish]

Cyprus

Νόμος που προνοεί για την προώθηση και ενθάρρυνση της χρήσης
 Των ανανεώσιμων πηγών ενέργειας [The Promotion and Encouragement
 of the Use of Renewable Energy Act of 2013] [Cyprus Energy Regulatory
 Agency translation from Greek]

Czech Republic

Zákon č. 165/2012 Sb. podporovaných zdrojích energie [Act No. 165/2012 on
 promoted energy sources] [Linguistico Translations translation from
 Czech]

Denmark

Lov om fremme af vedvarende energi [Promotion of Renewable Energy
 Act, No. 1392 of 2008] [Global Denmark Translations on behalf of the
 Danish Government translation from Danish]

Dominican Republic

Ley No. 5707 sobre Incentivo al Desarrollo de Fuentes Renovables de
 Energía y de sus Regímenes Especiales [Renewable Energies Incentive
 Law 57-07, 2007] [Linguistico Translations translation from Spanish]

Ecuador

Ley Orgánica del Servicio Público de Energía Eléctrica [Organic Law on
 the Public Service of Electricity, Electricity Law 2015] [Linguistico
 Translations translation from Spanish]

Egypt, Arab Republic of

قرار رئيس الجمهورية بالقانون رقم 203 لسنة 2014 بشأن تحفيز إنتاج الكهرباء من مصادر الطاقة
 المتجددة [Decree-Law of the President of the Arab Republic of Egypt No.
 203 of 2014 Regarding the Stimulation of Producing Electricity from

Renewable Energy Sources] [The Middle East Library for Economic Services translation from Arabic]

El Salvador

Ley De Incentivos Fiscales Para El Fomento De Las Energías Renovables En La Generación De Electricidad [Fiscal Incentives Law for the Promotion of Renewable Energy, No. 462, 2007] [Linguistico Translations translation from Spanish]

Estonia

Elektrituruseadus [Electricity Market Act 2003] [Estonian Government translation from Estonian]

Finland

Laki uusiutuvilla energialähteillä tuotetun sähkön tuotantotuesta [Act on Production Subsidy for Electricity Produced from Renewable Energy Sources, Act No. 1396/2010] [Finlex (Ministry of Justice, Government of Finland) translation from Finnish]

France

Code de l'énergie, version consolidée au 1 août 2018 [Energy Code, version consolidated to 1 August 2018] [Legifrance (Government of France) translation from French]

The Gambia

The Renewable Energy Act 2013

Germany

Gesetz für den Ausbau erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG 2017) [Renewable Energy Sources Act 2017] [German Federal Ministry for Economic Affairs and Energy translation from German]

Ghana

Renewable Energy Act 2011

Greece

Νόμος 4414/2016 Νέο καθεστώς στήριξης των σταθμών παραγωγής ηλεκτρικής ενέργειας από Ανανεώσιμες Πηγές Ενέργειας και Συμπαράγωγή Ηλεκτρισμού και Θερμότητας Υψηλής Απόδοσης – Διατάξεις για το νομικό και λειτουργικό διαχωρισμό των κλάδων προμήθειας και διανομής στην αγορά του φυσικού αερίου και άλλες διατάξεις [Law No. 4414/2016 New Support Scheme of Renewable Energy and CHP Plants – Provisions concerning the Legal and

Administrative Unbundling of Natural Gas Supply and Distribution and
 Miscellaneous Provisions] [Greek Government translation from Greek]

Guatemala

Decreto número 52–2003 ley de incentivos para el desarrollo de proyectos
 de energia renovable 2003 [Renewable Energy Project Incentives Act
 2003] [Linguistico Translations translation from Spanish]

Honduras

Ley de Promocion a la Generacion de Energia Electrica con Recursos
 Renovables 2007 [Law for the Promotion of Electricity Generation with
 Renewable Resources 2007] [Linguistico Translations translation from
 Spanish]

Hungary

2007. évi LXXXVI. törvény a villamos energiáról [Act No. LXXXVI of 2007
 on Electric Energy] [Linguistico Translations translation from
 Hungarian]

Iceland

Raforkulaga [Electricity Act 2003] [Orkustofnun (National Energy
 Authority) translation from Icelandic]

India

The Electricity Act 2003

Indonesia

Undang-Undang Republik Indonesia Nomor 30 Tahun 2007 Tentang
 Energi [Law of the Republic of Indonesia Number 30 of 2007 About
 Energy] [Ellen Marie O'Brien translation from Indonesian]

Ireland

Electricity Regulation Act 1999

Italy

Decreto Legislativo 3 marzo 2011, n. 28 Attuazione della direttiva 2009/28/
 CE sulla promozione dell'uso dell'energia da fonti rinnovabili, recante
 modifica e successive abrogazione delle direttive 2001/77/CE e 2003/30/
 CE [Legislative Decree No. 28, 2011 Implementation of the Directive
 2009/28/EC on the promotion of the use of energy from renewable
 sources] [Linguistico Translations translation from Italian]

Jamaica

The Electricity Act 2015

Japan

電気事業者による再生可能エネルギー電気の調達に関する特別措置法 [Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electric Utilities, No. 108 of 2011] [Ministry of Justice translation from Japanese]

Jordan

قانون الطاقة المتجددة وكفاءة الطاقة رقم 13 لسنة 2012 [The Renewable Energy and Energy Efficiency Law, Law No. 13 of 2012] [Kingdom of Jordan translation from Arabic]

Kazakhstan

О поддержке использования возобновляемых источников энергии Закон Республики Казахстан от 4 июля 2009 года № 165-IV [Law of the Republic of Kazakhstan No. 165-IV About the Support of the Use of Renewable Energy of 4 July 2009] [Government of the Republic of Kazakhstan translation from Kazakh]

Kenya

The Energy Act 2006

Korea, South

신에너지 및 재생에너지 개발·이용·보급 촉진법 [Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy, No. 14670, 2017] [Korean Legislative Research Institute translation from Korean]

Kosovo

Law on Energy 2016

Kyrgyzstan

Закон Кыргызской Республики “О Возобновляемых Источниках Энергии [Law of Kyrgyz Republic ‘On Renewable Energy’, No. 283 of 2008] [Levi Romanov translation from Russian]

Latvia

Elektroenerģijas tirgus likums 2005 [Electricity Market Law 2005] (Latvia) 82 115/0825/201105 [Latvian Government translation from Latvian]

Liechtenstein

Gesetz vom 24. April 2008 über die Förderung der Energieeffizienz und der erneuerbaren Energien (Energieeffizienzgesetz; EEG) [Energy Efficiency Act (24 April 2008) Law on the requirement of energy efficiency and renewable energy (EEG)] [Laura Peck translation from German]

Lithuania

Atsinaujinančių išteklių energetikos įstatymas [Law on Energy from Renewable Sources No. XI-1375, 2011] [Linguistico Translations translation from Lithuanian]

Luxembourg

Loi du 18 février 2010 relative à un régime d'aides à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles [Act of 18 February 2010 establishing a support system for environmental protection and rational use of natural resources] [Tallulah Bur translation from French]

Macedonia

Закон За Енергетика [Energy Law 2018] [Government of the Republic of Macedonia translation from Macedonian]

Madagascar

Loi n° 2017–020 portant Code de l'Electricité à Madagascar [Law No. 2017–020 Madagascan Electricity Code] [Linguistico Translations translation from French]

Malawi

Energy Regulation Act 20 of 2004

Malaysia

Renewable Energy Act 2011

Malta

Skema Ta' Tariffi Feed-In (Elettriku Ġenerat Minn Stallazzjonijiet Fotovoltajċi Tax-Xemx) (Leġislazzjoni Sussidjarja 545.27 Regolamenti Dwar Skema Ta' Tariffi Feed-In) [Feed-In Tariffs Scheme (Electricity Generated from Solar Photovoltaic Installations) 2013] [Linguistico Translations translation from Maltese]

Mauritius

The Mauritius Renewable Energy Agency Act 2015

Mexico

Ley De Transición Energética [Energy Transition Law 2015] [Linguistico Translations translation from Spanish]

Moldova

Закон Республики Молдова От 26 Февраля 2016 Года №10 О Продвижении Использования Энергии Из Возобновляемых

Источников [Law of the Republic of Moldova of February 26, 2016 No. 10 About promotion of energy use from renewable sources] [Linguistico Translations translation from Russian]

Mongolia

Монгол Улсын Хууль Сэргээгдэх Эрчим Хүчний Тухай [Law of Mongolia on Renewable Energy 2007] [Ministry of Mineral Resources and Energy, Mongolia translation from Mongolian]

Montenegro

Zakon o energetici [Energy Law, Law as published in the Official Gazette of Montenegro, No. 5/2016 and 51/2017] [Montenegro Investment Promotion Agency translation from Montenegrin]

Morocco

Loi n° 13–09 relative aux énergies renouvelables [Renewable Energy Law No. 13.09, 2010] [Tallulah Bur translation from French]

Netherlands

Electricity Act 1998 [Government of the Netherlands translation from Dutch]

Nicaragua

Ley Para La Promoción De Generación Eléctrica Con Fuentes Renovables [Law for the Promotion of Renewable Energy Generation, No. 532, 2005] [Nicaraguan Government translation from Spanish]

Norway

Lov om elsertifikater 2011 [Electricity Certificates Act 2011] [Linguistico Translations translation from Norwegian]

Pakistan

Regulation of Generation, Transmission and Distribution of Electric Power Act, Act XL of 1997

Palau

Palau Energy Act of 2015, RPPL 9–54, amending Title 37 of the Palau National Code

Palestine

قرار بقانون رقم 14 لسنة 2015 بشأن الطاقة المتجددة وكفاءة الطاقة [Decree Law No. 14/2015 on renewable energy and energy efficiency] [Birzeit University Institute of Law translation from Arabic]

Panama

Asamblea Legislativa Ley No. 6 Por La Cual Se Dicta El Marco Regulatorio E Institucional Para La Prestacion Del Servicio Publico De Electricidad [Legislature Law No. 6 The Regulatory and Institutional Framework for the Provision of Public Electricity Services 1997] [Linguistico Translations translation from Spanish]

Paraguay

Poder Legislativo Ley No. 3009 De La Producción Y Transporte Independiente De Energía Eléctrica (PTIEE) [Law No. 3009 On the Production and Transport of Independent Electricity (PTIEE) 2006] [Linguistico Translations translation from Spanish]

Peru

Decreto Legislativo De Promoción De La Inversión Para La Generación De Electricidad Con El Uso De Energías Renovables [Legislative Decree of Investment Promotion for Electricity Generation with the Use of Renewable Energy, No. 1002/2008] [Linguistico Translations translation from Spanish]

Philippines

Renewable Energy Act of 2008

Poland

USTAWA z dnia 20 lutego 2015 r. o odnawialnych źródłach energii [Law on renewable energy sources, 20 February 2015] [Poland Office of Sejm translation from Polish]

Portugal

Ministry of Industry and Energy Decreto-Lei n.º 141/2010 [Decree-Law No. 141/2010] [Linguistico Translations translation from Portuguese]

Romania

Legea 220/2008 pentru stabilirea sistemului de promovare a producerii energiei din surse regenerabile de energie, republicata 2010 [Law 220/2008 on establishing the promotion system of energy production from renewable energy sources] [Linguistico Translations translation from Romanian]

Russia

ПОСТАНОВЛЕНИЕ От 28 Мая 2013 Г. № 449 О Механизме Стимулирования Использования Возобновляемых Источников Энергии На Оптовом Рынке Электрической Энергии И Мощности

[Decree of 28 May 2013 No. 449 on the mechanism for promoting the use of renewable energy sources in the wholesale market of electric energy and power] [CIS Legislation translation from Russian]

San Marino

Legge 7 maggio 2008 n.72 – Promozione ed incentivazione dell’efficienza energetica degli edifici e dell’impiego di energie rinnovabili in ambito civile e industriale [Law No. 72 on the Promotion and Incentives for Energy Efficiency in Buildings and the Use of Renewable Energy in the Civil and Industrial Fields 2008] [Linguistico Translations translation from Italian]

Senegal

Loi n° 2010–21 du 20 Décembre 2010 relative à l’orientation sur le droit de l’énergie renouvelable [Act No. 2010–21 of 20 December 2010 concerning guidance on renewable energy law] [Ashley Richards translation from French]

Serbia

Закон о енергетици No. 145/2014 [Energy Law 2014] [Energy Agency, Republic of Serbia translation from Serbian]

Seychelles

Energy Act 2012

Slovakia

Zákon 309/2009 Z.z. o podpore obnoviteľných zdrojov energie [Act 309 of 19 June 2009 on the promotion of renewable energy sources and high-efficiency cogeneration and on amendments to certain acts] [Slovakian Government translation from Slovakian]

Slovenia

Energetski zakon No. 17/14, 2014 [Energy Act 2014] [Linguistico Translations translation from Slovenian]

South Africa

National Energy Act 2008

Spain

Real Decreto 413/2014 de 6 de junio, por el que se regula la actividad de producción de energía eléctrica a partir de fuentes de energía renovables, cogeneración y residuos [Royal Decree 413/2014 regulating the activity of electricity production from renewable energy sources, cogeneration and waste] [Spanish Government translation from Spanish]

Sri Lanka

Sustainable Energy Authority Act 2007

St. Lucia

Chapter 9.02 Electricity Supply Act 1994

St. Vincent and the Grenadines

Geothermal Resources Development Act 2015

Suriname

Elektriciteitswet 2016 [Electricity Act 2016] [Linguistico Translations translation from Dutch]

Sweden

Lag om elcertifikat No. 2011:1200 [Electricity Certificates Act 2011] [Swedish Government translation from Swedish]

Switzerland

SR 730.0 Energiegesetz EnG 2016 [Energy Act 2016, SR 730.0] [Swiss Federal Office of Energy translation from German]

Syria

قانون الكهرباء [Electricity Law, No. 32 of 2010] [Linguistico Translations translation from Arabic]

Taiwan

再生能源發展條例 [Renewable Energy Development Act 2009] [Laws & Regulations Database of The Republic of China translation from Mandarin]

Tajikistan

Закон Республики Таджикистан Об Использовании Возобновляемых Источников Энергии [The Law of the Republic of Tajikistan on the use of Renewable Energy Sources 2010] [UNDP in Tajikistan translation from Russian]

Thailand

พระราชบัญญัติ การประกอบกิจการพลังงาน พ.ศ. ๒๕๕๐ [Energy Industry Act 2007, B E 2550] [Thai Law Forum Translation from Thai]

Togo

Loi No. 2018-010 relative à la promotion de la production d'électricité à base des sources d'énergies renouvelables [Clean Energy Act 2018] [Linguistico Translations translation from French]

Tonga

Renewable Energy Act 2008

Tunisia

Loi n° 2015–12 du 11 mai 2015, relative à la production d'électricité à partir des énergies renouvelables [Law No. 2015–12 dated 11 May 2015 relating to the electricity generation from renewable energies] [Ashley Richards translation from French]

Turkey

Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına İlişkin Kanun Kanun Numarası [Law Regarding the Use of Renewable Energy Resources for Electricity Production, No. 5346, 2005] [Linguistico Translations translation from Turkish]

Ukraine

Закон України Про альтернативні джерела енергії [Law on Alternative Energy Sources, No. 555-IV, 2003] [Linguistico Translations translation from Ukrainian]

United Kingdom

Electricity Act 1989

Energy Act 2008

The Promotion of the Use of Energy from Renewable Sources Regulations 2011

United States of America

Public Utilities Regulatory Policies Act 1978

Energy Policy Act of 2005

Uruguay

Decreto N° 354/009 se declaran promovidas las actividades tendientes a la generación de energía eléctrica 2009 [Declaration No. 354/009 promoting activities aimed at generating electricity 2009] [Linguistico Translations translation from Spanish]

Uzbekistan

Energiyadan oqilona foydalanish to'g'risida [Law on the Rational Use of Energy 1997, No. 412-I,] [Uzbekistan Energy Centre translation from Uzbek]

O'zbekiston Respublikasi Vazirlar Mahkamasining 2015 yil 13 avgustdagi № 238-son Qarori bilan energiya samaradorligi va qayta tiklanadigan energiya manbalarini rivojlantirish masalalari bo'yicha Respublika komissiya

[Resolution of the Cabinet of Ministers of the Republic of Uzbekistan of 13 August 2015 No. 238 about approval of the Regulations on the Republican Commission on questions of energy efficiency and development of renewable energy resources] [CIS Legislation translation from Uzbek]

Venezuela, Republic of

Ley de uso racional y eficiente de la energía [Law on the Rational and Efficient Use of Energy 2011] [Linguistico Translations translation from Spanish]

Yemen

قانون الكهرباء رقم 1 لسنة 2009 [Electricity Law 2009] [Linguistico Translations translation from Arabic]

Other Legislation and Treaties

- Acts Interpretation Act 1901 (Australia)
- Agreement on Subsidies and Countervailing Measures, WTO Doc 1869 UNTS 14 (15 April 1994)
- Carbon Tax Act 2008 (British Columbia)
- Code Général des Impôts, version consolidée au 1 septembre 2018 [General Tax Code, version consolidated to 1 September 2018] [Legifrance (Government of France) translation from French]
- Council of Ministers Decision No. 2013/5625 published in the Official Gazette No. 28842, dated 5 December 2013 (Turkey)
- VYHLÁŠKA N°18/2017 Úradu pre reguláciu sieťových odvetví z 8. februára 2017, ktorou sa ustanovuje cenová regulácia v elektroenergetike a niektoré podmienky vykonávania regulovaných činností v elektroenergetike [DECREE N° 18/2017 of the Regulatory Office for Network Industries dated 8 February 2017 establishing price regulation in the electricity sector and certain conditions for the implementation of regulated activities in the electricity sector] (Slovakia)
- Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market [2001] OJ L 283
- Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC [1993] OJ L 140/16
- Electricity Supply Act 1995 (NSW)
- Electricity Supply Amendment (Solar Bonus Scheme) Act 2009 (NSW)
- Environmental Pollution Fee 1999 (Ukraine)

- International Renewable Energy Agency, Statute of the International Renewable Energy Agency (Adopted at the Conference on the Establishment of the International Renewable Energy Agency, Bonn, 26 January 2009, entered into force 8 July 2010)
- Νόμος 4399/2016 – Νόμος 4399/2016 Θεσμικό πλαίσιο για τη σύσταση καθεστώτων Ενισχύσεων Ιδιωτικών Επενδύσεων για την περιφερειακή και οικονομική ανάπτυξη της χώρας – Σύσταση Αναπτυξιακού Συμβουλίου και άλλες διατάξεις [Law 4399/2016 Institutional Framework for the Establishment of Private Investment Aid Schemes for the Regional and Economic Development of the Country – Establishment of a Development Council and other provisions] (Greece) [Start-up Greece (Government of Greece) translation from Greek]
- 风力发电设备产业化专项资金管理暂行办法 [Management Regulations on Special Fund for the Industrialization of Wind Power Manufacturing Sector in China] (Ministry of Finance Document No. 476, People's Republic of China, 11 August 2008)
- Marrakesh Agreement Establishing the World Trade Organization, opened for signature 15 April 1994, [1994] 1867 UNTS 3 (entered into force 1 January 1995)
- Renewable Energy Development Act 2009 (Utah)
- Renewable Energy (Electricity) Amendment Act 2015 (Australia)
- Renewable Energy (Electricity) Regulations 2001 (Australia)
- Resolution of the Council of Ministers of the Republic of Belarus of 07.08.2015 N°45 'On the tariffs for electricity produced from renewable energy sources on the territory of the Republic of Belarus by individual entrepreneurs and legal entities who are not members of the State Electricity Production Association "Belenergo", and released to supply companies of this association'
- Treaty on European Union, opened for signature 7 February 1992, [2009] OJ C 115/13 (entered into force 1 November 1993)
- Treaty on the Functioning of the European Union, opened for signature 7 February 1992, [2009] OJ C 115/13 (entered into force 1 November 1993)
- United Nations Convention on the Law of the Sea, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994)
- Valtioneuvoston asetus uusiutuvan energian ja uuden energiateknologian investointituen myöntämisen yleisistä ehdoista 25.02.2016/145 [Government Decree No. 145/2016 on Granting Investment Aid for Renewable Energy and New Energy Technologies] (Finland)

Units of Measurement

Throughout this book, reference is made to both units of power and units of energy. A brief explanation of the difference between these two common units of measurement is provided below.

Units of Power

The watt (W) is a unit of power, which represents the *rate* at which energy is produced or consumed at a specific point in time. For example, light bulbs are designated into categories by watts. A 100W light bulb will require a greater flow of energy to power the globe than a 30W light bulb.

Units of Energy

The watt-hour (Wh) is a unit of energy, which represents the *amount* of energy used or generated to carry out ‘work’ within a specified time period, in this case an hour. For example, a kilowatt-hour (kWh) is the amount of energy used in one hour at a rate of 1,000 watts.

Standard Prefixes for Units of Power and Units of Energy

The following prefixes are used in relation to both watts and watt-hours:

kilo (k) = 1,000 = 10^3

Mega (M) = 1,000,000 = 10^6

Giga (G) = 1,000,000,000 = 10^9

Tera (T) = 1,000,000,000,000 = 10^{12}

Peta (P) = 1,000,000,000,000,000 = 10^{15}