



European  
Commission

# SCIENCE FOR ENVIRONMENT POLICY

## Reduced environmental impact, new green jobs: Exploring the outcomes of Italy's renewable energy plan



26th April 2021  
Issue 560

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### Source:

Dell'Anna, F. (2021) Green jobs and energy efficiency as strategies for economic growth and the reduction of environmental impacts. *Energy Policy*, 149: 112031.

### Contact:

[federico.dellanna@polito.it](mailto:federico.dellanna@polito.it)

**Transitioning energy production from a dependence upon fossil fuels to renewable energy sources (RESs) promises to reduce environmental impacts while aiding economic growth.** A study explores the benefits of implementing the Italian government's renewable energy plan, which includes installing photovoltaic (PV), hydroelectric, wind, and geothermal infrastructure from now to 2040.

Decarbonisation targets set by the EU require Member States to transition from an electricity supply derived from fossil fuels to a supply obtained from RESs. The [European 2030 Energy and Climate Framework](#) aims for a 40% reduction in greenhouse gas emissions for Member States, a 32% increase in RESs and a 32.5% reduction in energy consumption by 2030. Such an energy change would reduce the environmental impact of energy production and consumption while aiding green job growth and energy efficiency, which, in turn, would lead to lower household energy bills.

According to the International [Renewable Energy Agency \(IRENA\)](#)<sup>1</sup>, the renewable energy sector provided 11.5 million jobs worldwide in 2019 — half a million more than in 2018. The PV sector in particular is growing rapidly, accounting for one-third of these jobs. Investment in RESs generates employment impacts that are direct (e.g. connected to building new infrastructure), indirect (through effects on other sectors) and induced (e.g. through achievable energy savings for families). The social benefits of investing in renewable energy are less extensively investigated than the environmental impacts but are a key benefit to quantify, especially in times of economic recession.

This study performed Input-Output (IO) modelling — where inbound goods are inputs and products are outputs — to estimate the green job impacts of planned development of the Italian renewables sector. The results were tested using the renewable power systems proposed in the 2020 Italian national energy and climate plan ([Piano Nazionale Integrato per l'Energia e il Clima](#): PNIEC). Data for the IO model was obtained from ISTAT (*Istituto Nazionale di Statistica*), and the analysis investigated outcomes of the PNIEC visions up to 2040. The employment impacts, i.e. number of green jobs (direct, indirect and induced), were translated into monetary units via the adjusted earnings gain approach, based on gross wage data supplied by ISTAT.

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## Reduced environmental impact, new green jobs: Exploring the outcomes of Italy's renewable energy plan (continued)

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### To cite this article/service:

["Science for Environment Policy":](#)

European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol..

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1. IRENA (2020) *Renewable Energy and Jobs – Annual Review 2020*. Abu Dhabi: International Renewable Energy Agency. ISBN: 978-92-9260-266-6.

2. Biomass was examined for electricity production only. However, under the revised [Renewable Energy Directive \(REDII\)](#) biomass should be used in cogeneration units to produce both electricity and heat for greater resource and energy efficiency. Increasing its use for electricity only is not encouraged due to low energy efficiency, and raises issues in terms of bio-sustainability and long-term sustainable availability.

3. The use of RESs for heating is an important and neglected area which needs increased focus. The impact of using geothermal heat — instead of fossil fuels — has a greater potential for heating than just electricity. When used for electricity it can also be used for heating in geothermal cogeneration.

The analysis found that investment in RESs in the power sector generated jobs across the lifecycle for all the sources planned to increase under the PNIEC plan: wind power created 7135.7 roles, photovoltaics 5508.8, and hydroelectric 3475. There was an increase in RES energy production of 6.5% by 2040 compared to 2017. This increase led to a rise in employment, suggests the researcher, as a result of the policies proposed by the PNIEC. Local employment benefits were impacted by the amount of imported goods required for a RES — a high need for imported goods, as is the case for PV systems, brought fewer local employment benefits.

The two most advantageous RESs in terms of employment benefits (expressed as euros per megawatt-hour, €/MWh) were hydro – between 4.08 €/MWh and 6.59 €/MWh – and biomass – between 4.76 €/MWh and 5.89 €/MWh. However, under the PNIEC, biomass will be reduced as a percentage share of renewable energy production. The PV and wind sectors confer roughly the same employment benefits over their entire lifetime; however, gains for PV are mostly in the construction phase and less in the operation and management phase (from 2.09 to 4.56 €/MWh), while the converse is true for wind power (from 2.25 to 4.79 €/MWh).

The study findings indicate that Italy's renewable energy policy will support the anticipated future growth in energy demand while also reducing emissions and creating green job opportunities through to 2040. Furthermore, the study suggests that the data generated from the statistical analysis could be used as reference data for other integrated frameworks, such as lifecycle thinking approaches, to aid complex decision-making processes in the energy field.

Although the study does not investigate the use of RESs and biomass<sup>2</sup> for electricity generation, the researcher hopes to focus on this in a future analysis<sup>3</sup>.

It should be noted that technologies such as those explored in this study will affect different regions and citizens to contrasting extents. To account for this, it is crucial to consider social and 'distributional' impacts in analyses, and policy must seek to support those who may lose out in the energy transition (e.g. via skills development and education). This approach is highlighted by the European Commission's [long-term strategic vision](#), [Communication](#) and in-depth analysis on EU greenhouse gas (GHG) emissions reduction (*A Clean Planet for All*), and the 2030 Climate Target Plan (which aims to cut GHG emissions by 55% by 2030 under the [European Green Deal](#)).

This study acknowledges that RES progress will likely result in job losses in the fields of conventional technologies and the fossil-fuel sector, but focuses on the potential of RESs for green job creation and economic stimulation.