

Fossil fuel jobs and the energy transition

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POLET workshop on fossil fuel decline

Context

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Global Warming of 1.5°C

An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

Summary for Policymakers

Meeting global climate targets means fossil fuels need to decline rapidly



Energy system transitions



Implications of fossil fuel industry decline for fossil fuel workers, their communities, and local regions.

Justice & political arguments

From a justice point of view it's important to plan for fossil fuel workers and their communities

(Abraham, 2017; Haggerty et al., 2018; Healy & Barry, 2017; Johnstone & Hielscher, 2017; Olson-Hazboun, 2018; Vona, 2019)

Just transition:

ILO

UNFCCC

World Bank

Political acceptability of climate policies

(Healy & Barry, 2017; Evans & Phelan, 2016; Snyder, 2018; Vona, 2019)



"I happen to love coal miners..."

Energy transitions are happening. And if an energy transition means more renewables and less fossil fuels...

And

A just transition means finding new jobs for fossil fuel workers...

What is the role of renewable energy jobs in a just transition?

Clean Energy Jobs for Fossil fuel Workers?



Energy Economics

Volume 57, June 2016, Pages 295-302



Retraining investment for U.S. transition from coal to solar photovoltaic employment

Edward P. Louie ^a, Joshua M. Pearce ^{b, c}  

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<https://doi.org/10.1016/j.eneco.2016.05.016>

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Highlights

- Many factors driving decrease in profitability and employment in coal industry
- Solar photovoltaic (PV) industry is growing rapidly in U.S. creating many jobs.
- PV represents employment opportunities for laid off coal workers.
- An analysis presented on cost to retrain current coal workers for solar PV industry.
- To cover these costs four policy scenarios are considered and their impacts discussed

ENERGY & ENVIRONMENT

Wind Project in Wyoming Envisions Coal Miners as Trainees

By DIANE CARDWELL MAY 21, 2017



RELATED COVER



Study 1: Using Integrated Assessment Models to Estimate Future Jobs Globally



(Pai, Emmerling, Drouet, Zerriffi, Jewell, 2021, One Earth)

World Induced Technical Change Hybrid (WITCH) model was developed at the [RFF-CMCC European Institute on Economics and the Environment \(EIEE\)](#)

Employment Factor Data is Difficult to Obtain

أرامكو السعودية
Saudi Aramco

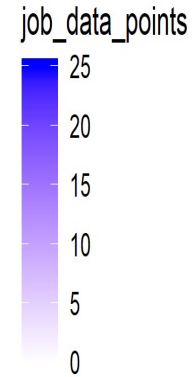
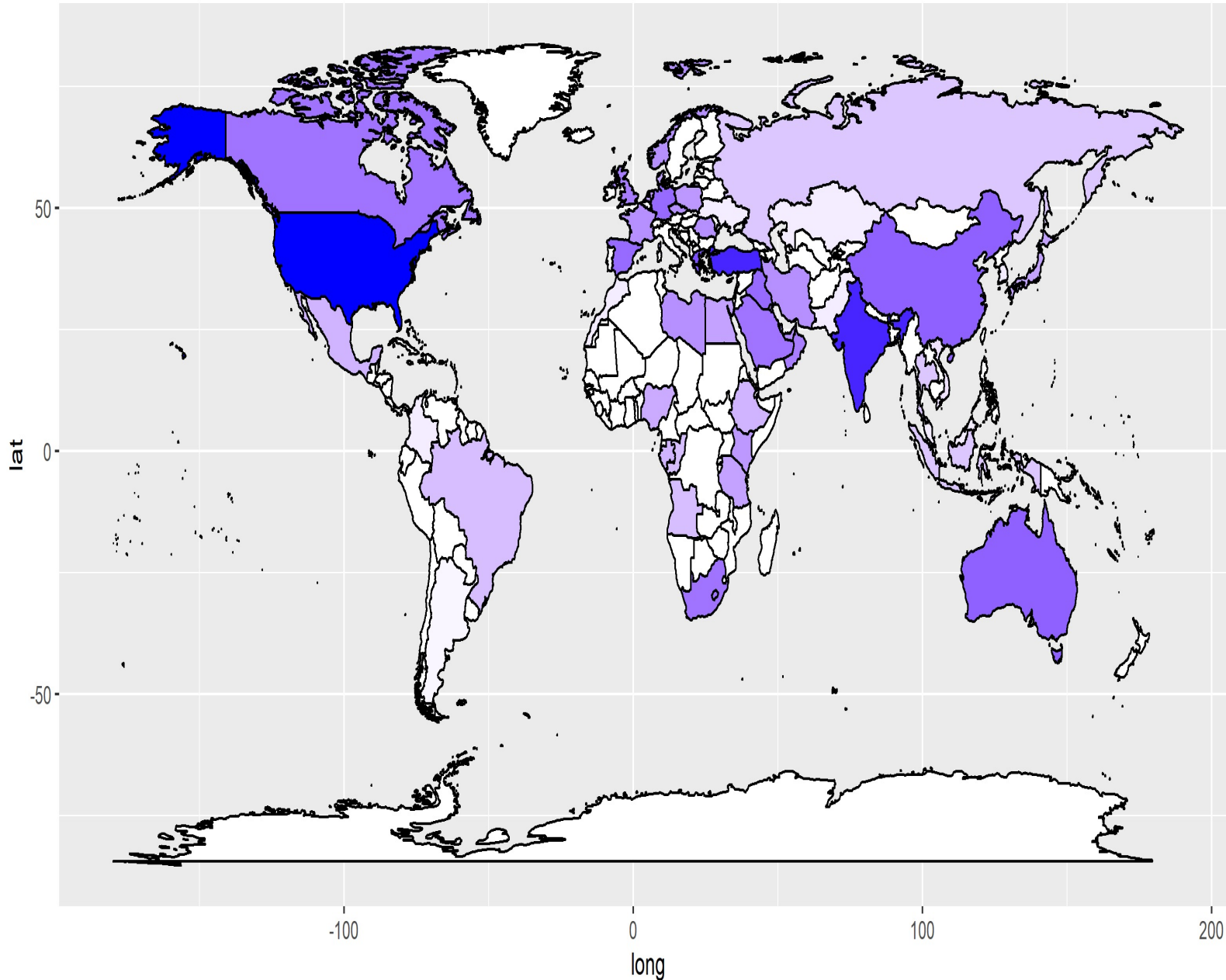


50 country dataset

- Annual reports
 - Biggest oil companies
 - Saudi Aramco (Saudi Arabia), Gazprom (Russia), Sinopec (China), and Pemex (Mexico)
 - Biggest coal companies
 - Coal India (India), SUEK Ltd (Russia)
- Written communications
 - World Nuclear Association
 - Trade unions like the Federation of Oil Unions (Iraq), Central de los Trabajadores y Trabajadoras (Brazil)
- Official national statistics



Data Coverage



11 Energy Technologies

5 Job Types

529 Data Points
(Country-level)

(Pai, Emmerling, Drouet, Zerriffi, Jewell, 2021, One Earth)

Scenarios, Pathways & Nationally Determined Contributions (NDCs)

Two scenarios, 6 pathways:

- 1) Continue on current NDC policy (SSP1, SSP2, SSP3)
- 2) Well-Below 2°C climate target (SSP1, SSP2, SSP3)

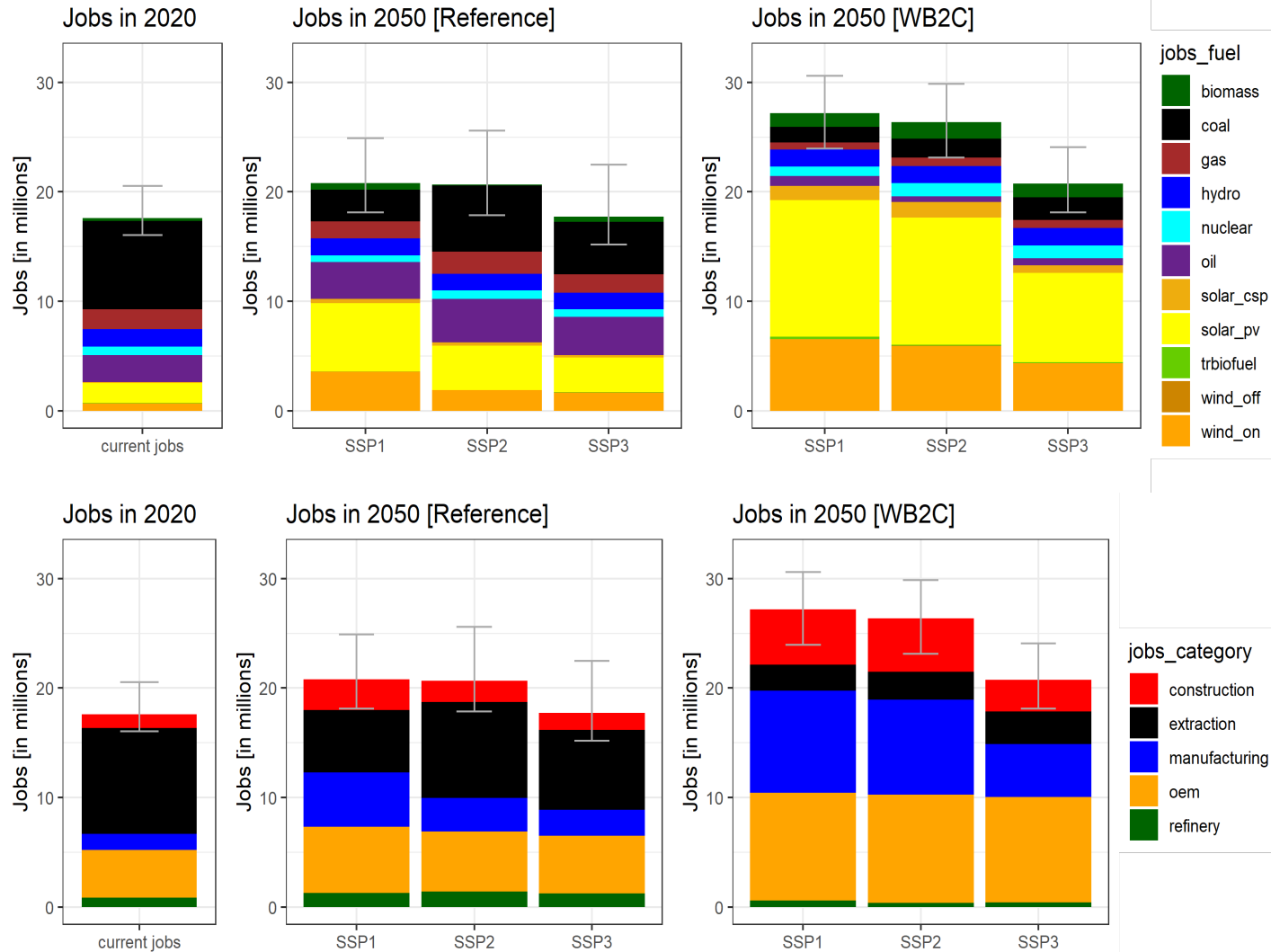
SSP = Shared Socioeconomic Pathways

SSP 1: Sustainability – Taking the Green Road (Low challenges to mitigation and adaptation)

SSP 2: Middle of the Road (Medium challenges to mitigation and adaptation)

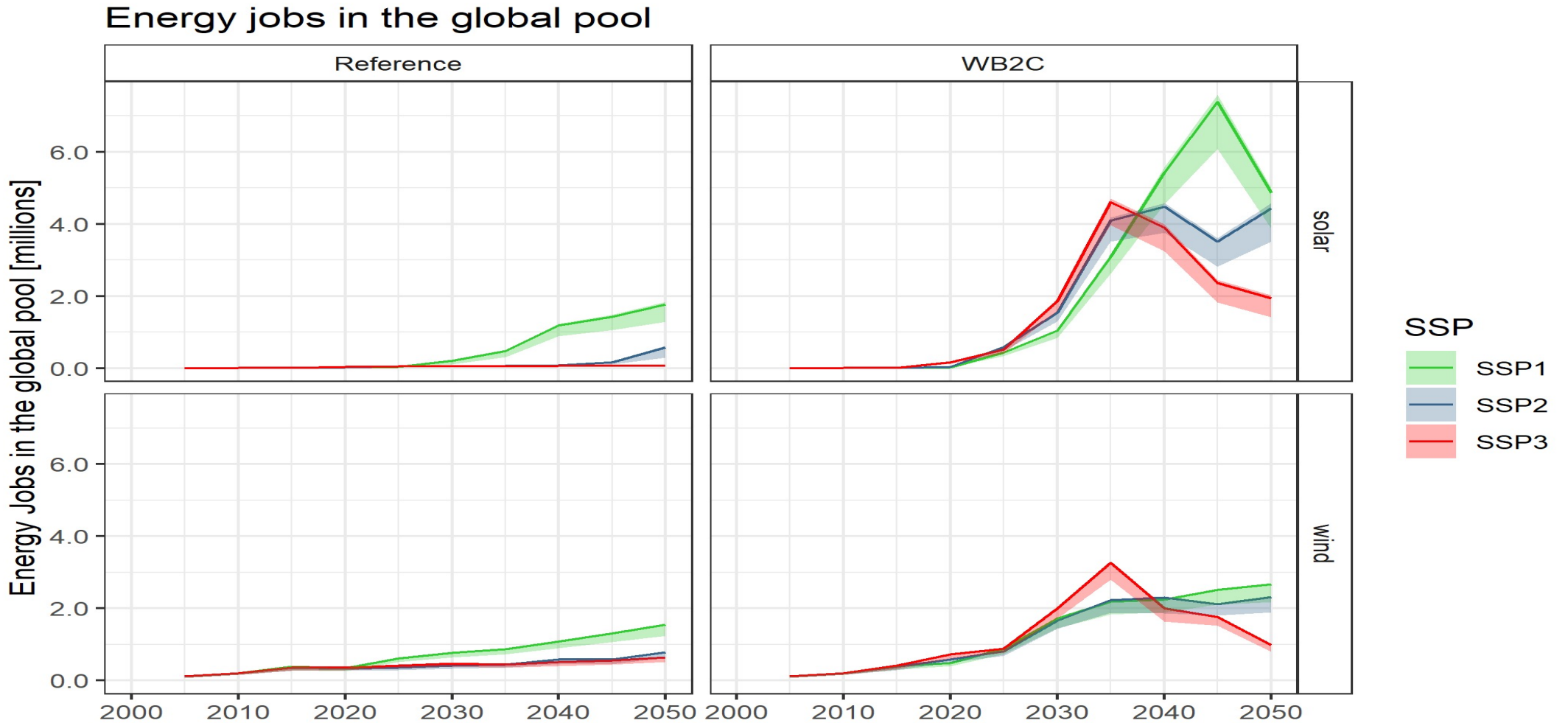
SSP3 : Regional Rivalry – A Rocky Road (High challenges to mitigation and adaptation)

Climate Mitigation → More Energy Jobs



- **2020: 18 million direct energy jobs**
- **Almost 12 million in fossil fuel industries**
 - **9.5 in coal, oil & gas extraction**
- **By 2050:**
 - **Reference: 21 million [15 -26]**
 - **Well-Below 2°C : 26 million [18 - 30]**

Climate Mitigation → More Solar/Wind Manufacturing



Solar and wind manufacturing jobs are nearly always higher in the WB2C scenario compared to the Reference scenario. Shaded areas indicate the uncertainty range.

Article

Meeting well-below 2°C target would increase energy sector jobs globally

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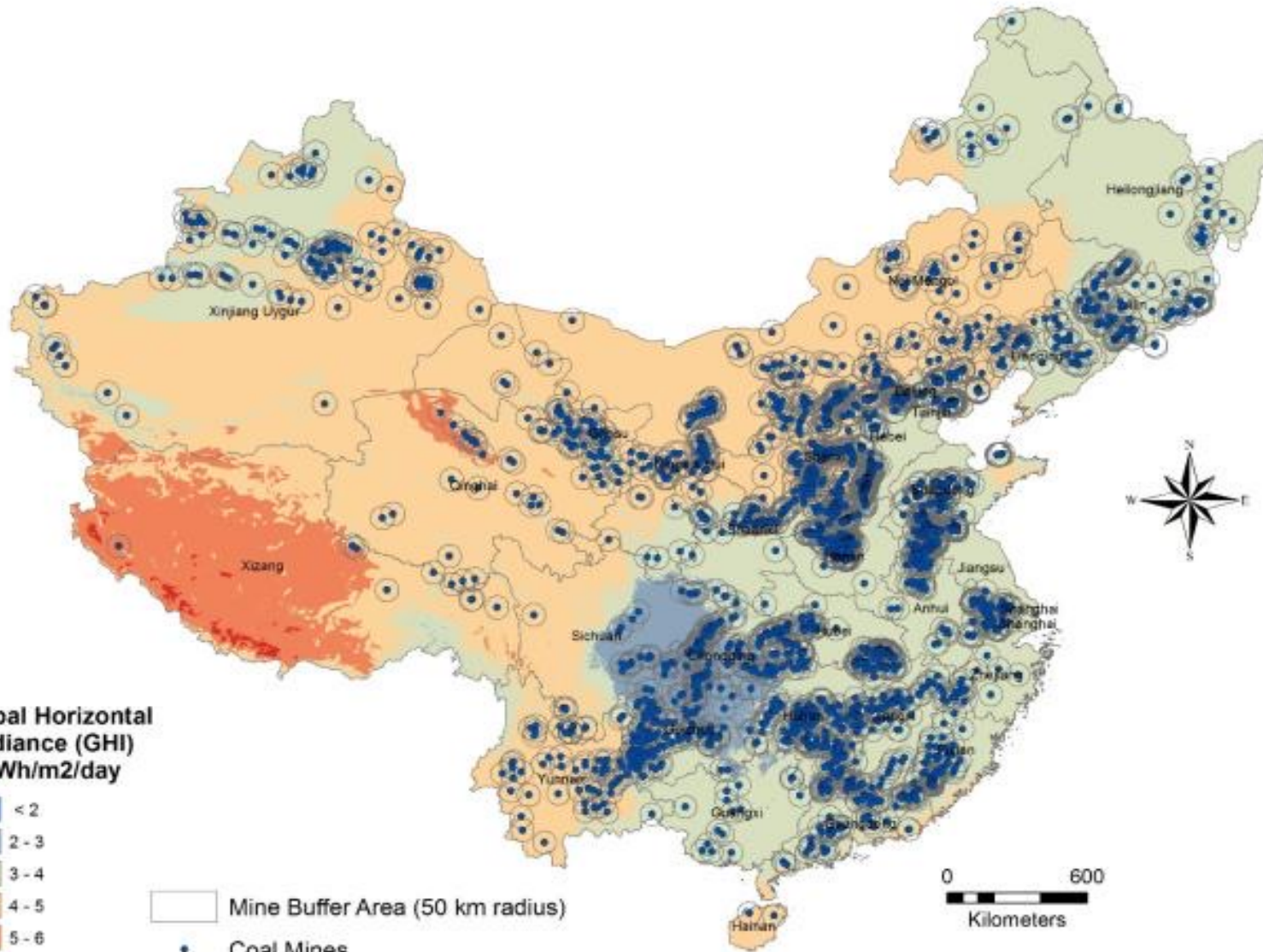
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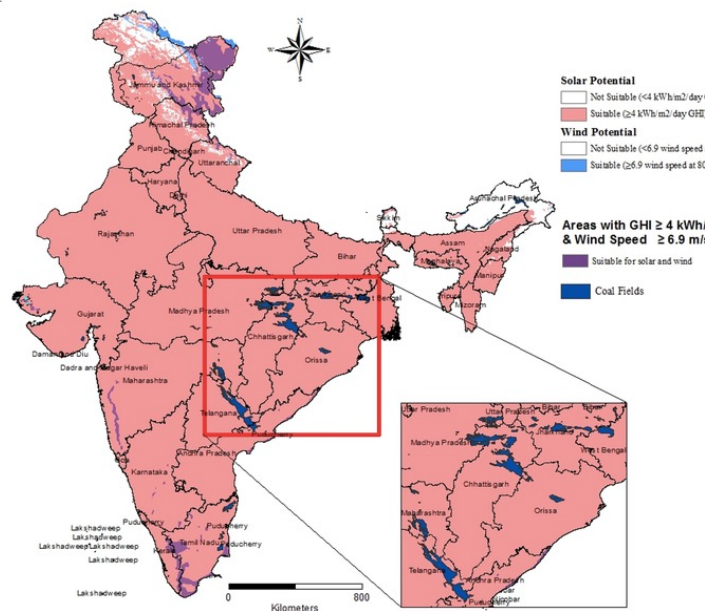
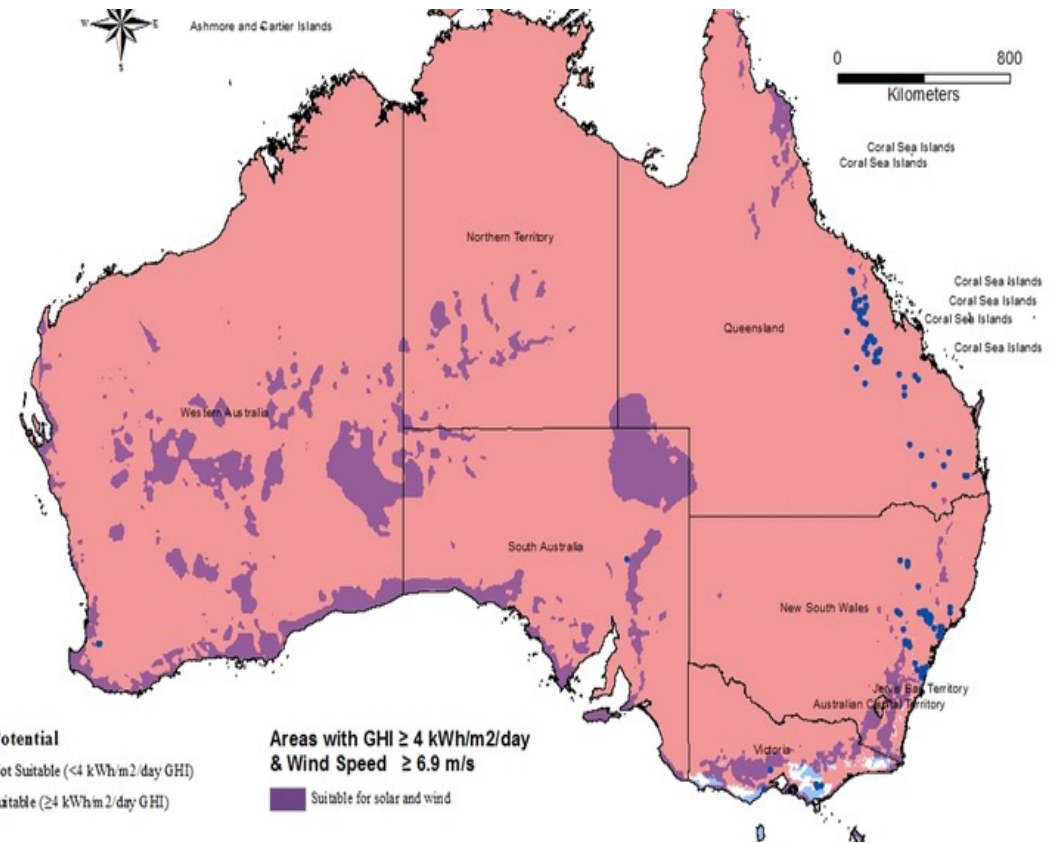
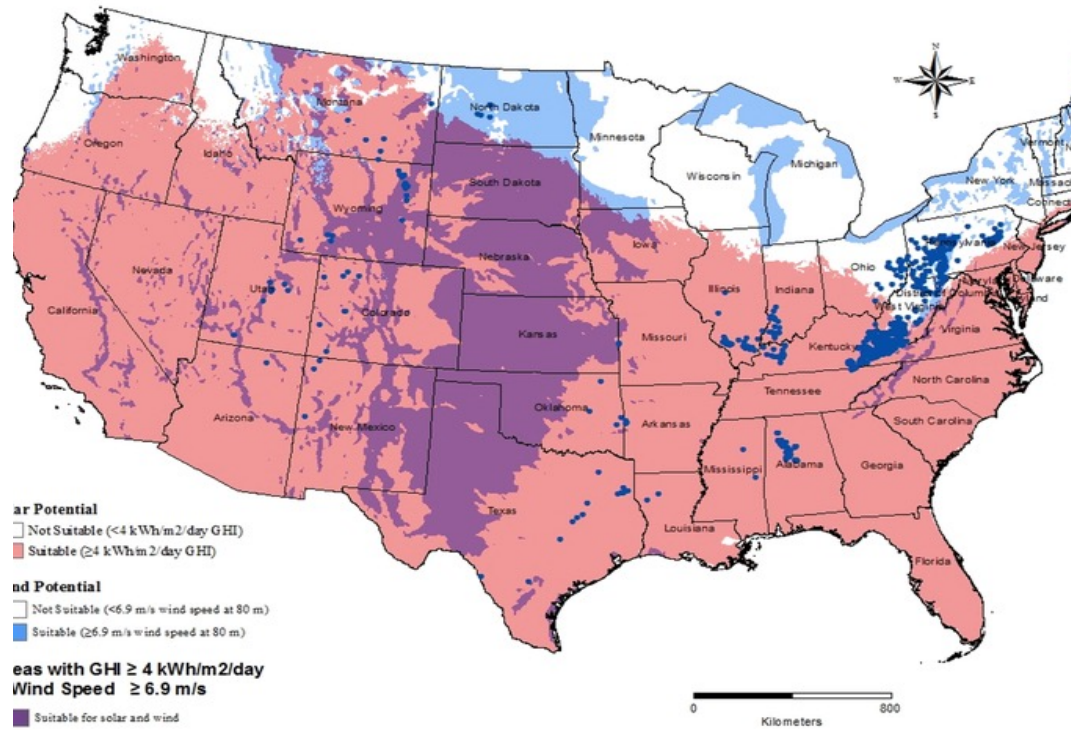
But people might care about “local” renewable jobs, not all jobs...

Are local solar/wind jobs a feasible option for coal miners in China, India, the US & Australia?

Study 2: Spatial assessment of solar/wind potential in local coal mining areas (China, India, US, Australia)



- Calculated the % of coal mining areas (w/ 50km buffer) suitable for solar/wind power
- Used employment factors to calculate the capacity required to transition coal miners



(Pai, Zerriffi, Jewell & Pathak, 2020, Environmental Research Letters)

Solar more promising than wind for replacing coal mining jobs

Country	Solar capacity required (Gwe)	% area for solar	Wind capacity required (GWe)	% area for wind
China	5.73	29%	7.5	5%
US	0.32	62%	0.18	7%
India	1.96	99%	1.96	1%
Australia	3.34	96%	4.35	3%

Two Variables:

- Wind has low suitability in all four countries
- Solar is suitable in India, Australia and to some degree in the US, but not in many coal mining areas in China
- Large capacity required locally to transition local coal miners

Environmental Research Letters



LETTER

Solar has greater techno-economic resource suitability than wind for replacing coal mining jobs

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Coal mining directly employs over 7 million workers and benefits millions more through indirect jobs. However, to meet the 1.5 °C global climate target, coal's share in global energy supply should decline between 73% and 97% by 2050. But what will happen to coal miners as coal jobs disappear ?

Take Home Messages

- ❑ Just transition requires managed fossil fuel phase-outs by developing concrete plans in consultation with affected communities.
- ❑ Meeting Paris climate goals will create more direct energy sector jobs than today.
- ❑ Renewable energy jobs could be an option for some fossil fuel workers but not for all.

Thank you

Twitter (@SandeepPai)

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