SDGVisionPath: An ACRP project to research and design paths to a sustainable future
Working Paper No. 4a – IPAM model outcomes

SDG
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Insights from a participative Inequality and Poverty Assessment Modelling process (IPAM)

Focus on the validation and evaluation of transition pathways, conflict potentials and derived policy recommendations

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Abstract

This working paper represents WP4- M4d within the SDGVisionPath research project working paper series and presents the qualitative results of the Inequality and Poverty Assessment Model (IPAM), a participatory modeling approach that integrates environmental and social impact assessments. The focus is on validating and evaluating transition pathways, identifying conflict potentials, and deriving policy recommendations. The findings are based on measures and ideas proposed by experts not directly involved in the research project's workshops, with the aim of enhancing and validating the previous project's stakeholder outcomes. Building on previous the work packages, this phase aligns key issues from the project proposal and WP1 with specific Sustainable Development Goals (SDGs), including Energy Poverty (SDG1), GHG Emissions (SDG13), Job Satisfaction and GDP (SDG8), and newly introduced themes of WP2 such as Transparency (SDG16), Education (SDG4), and Community (SDG11/SDG10). These topics are organized into four thematic clusters: **Energy Poverty & Community**, **GHG Emissions & Education**, **Job Satisfaction & Education, and GDP & Transparency**. The evaluation process involved expert input from diverse stakeholder groups, aiming to validate the findings from participatory workshops (WP3/WP4) and propose additional measures to address key challenges. The analysis highlights the critical role of integrating environmental, economic, and social dimensions to foster a just transition. Actionable policy recommendations are provided for each cluster, emphasizing the need for energy justice through progressive tariffs, energy-efficient building renovations, the incorporation of sustainability in education and vocational training, and the rethinking of economic metrics like GDP to account for environmental and social costs. While promising, the proposed measures also reveal significant conflicts, particularly in areas such as energy redistribution, financing energy-efficient renovations, and restructuring education systems. Issues related to distribution, legal frameworks, and recognition could pose challenges to the successful implementation of these measures. Addressing these conflicts will require inclusive policy design, transparent communication, and robust legal frameworks to ensure equitable support for all stakeholders, especially vulnerable groups. Ultimately, this paper underscores the value of participatory modeling in shaping evidence-based policy recommendations. By integrating social, economic, and environmental considerations, the SDGVisionPath project offers a comprehensive roadmap for achieving a just and sustainable transition. The findings demonstrate the necessity of stakeholder engagement and transparent policymaking to ensure that the transition is effective, inclusive, resilient, and adaptable to evolving challenges.

1 Introduction

The Sustainable Development Goals (SDGs) framework offers a unique opportunity to explore pathways toward a climate-neutral future, while aligning this transition with broader environmental, social, and economic development objectives. This research specifically focuses on the intersection of four critical SDGs—Climate Action (SDG 13), No Poverty/Reduced Inequality (SDG 1/10), and Decent Work and Economic Growth (SDG 8)—which are often perceived as being in tension. Despite these perceived conflicts, the inherent flexibility of these SDGs offers ample room for interpretation, fostering opportunities to identify synergies and address trade-offs effectively. The SDGVisionPath project aims to engage stakeholders in a collaborative, co-creative process to integrate diverse expertise and visions, developing a shared understanding of how these SDGs can be achieved in tandem. Through this approach, we seek to identify key leverage points and intervention strategies that can guide sustainable transformation. To tackle the complex intersections of poverty, inequality, and environmental sustainability, the Inequality and Poverty Assessment Model (IPAM) has been adapted as an Environmental and Social Impact Assessment (ESIA) tool (Bukowski and Kreissl, 2022) in the SDGVisionPath project. IPAM is a qualitative modeling tool designed to assess socio-environmental conflict potentials and to address the socio-economic and environmental determinants of inequality.

Integrating the systematic framework of traditional Environmental and Social Impact Assessments (ESIAs) with a targeted focus on inequality, IPAM offers a structured approach for identifying, assessing, and mitigating the social and ecological impacts of development initiatives, particularly those aligned with the SDGs (Bukowski, 2019; Bukowski et al., 2024). By combining both quantitative and qualitative data analysis with participatory modeling, IPAM enhances the relevance and accuracy of impact assessments, ensuring that local realities and priorities are adequately reflected. This methodology enables policymakers to generate actionable insights and design interventions that balance environmental conservation with equitable socio-economic outcomes. Addressing the conflicts, trade-offs, and potential synergies between climate action and other SDGs is crucial for advancing sustainable transformation. First, recognizing the entanglement of different stakeholder interests can help mitigate conflicts (Adger et al., 2007). Second, synergies can be harnessed and trade-offs reduced by implementing policies that account for these interactions (Klenert et al., 2018). Third, the inherent flexibility of the SDGs offers opportunities for innovative solutions, especially when the indicators themselves may not fully capture their intended goals, as highlighted by Zeng et al. (2020). Therefore, a clear, adaptable approach is essential to facilitate stakeholder understanding and decision-making, one that employs holistic system methods to effectively address SDG interactions.

1.1 Stakeholder Integration

Embedding stakeholder and expert knowledge into a system assessment not only enriches the modeling process but also enhances the representation of real-world dynamics, narrowing the gap between theoretical models and practical applications (Hirsch Hadorn et al., 2006). By fostering a comprehensive, stakeholder-informed understanding, it becomes possible to identify critical intervention points that drive meaningful change, extending beyond simple adjustments to individual parameters (van Dijk et al., 2023). A core element of socio-ecological impact assessments like IPAM is the Participatory approaches ensure that the voices of affected communities are heard, fostering trust and improving the social justice outcomes of development projects (Jones et al., 2017; Ostrom, 1990). In this study, IPAM's co-creative modeling framework exemplifies this participatory approach by involving stakeholders and experts in the joint development of SDG-aligned strategies and solutions. By integrating the outcomes of this stakeholder-driven process within the SDGVisionPath

project, this paper evaluates the effectiveness of a co-designed policy scenario aimed at advancing SDGs 1/10, 8, and 13 in Austria. Specifically, the research explores potential synergies, investigates dynamic interactions between SDGs, and assesses the spillover effects on other sustainability dimensions from a systems perspective.

1.2   Main Objectives

A first application of IPAM in the SDGVisionPath project was applied in the third workshop (see Bukowski et al., 2024). This paper focuses on the evaluation of measures proposed by the stakeholders in the final workshop. The main research questions addressed are thus:

- What are the effects of stakeholder-derived policy interventions on progress toward SDGs in Austria, particularly within the four thematic clusters: Energy Poverty & Community (SDG 1/10); GHG Emissions & Education (SDG 13/SDG 4); Job Satisfaction & Education; and GDP & Transparency?
- What socio-environmental conflicts emerge from the implementation of stakeholder-driven policy measures for sustainable development in Austria?

2   Methodological Background

The Inequality and Poverty Assessment (IPAM) model was applied to conduct a kind of Environmental and (Social) Impact Assessments (ESIA) in model form through the framework of distribution, participation, legitimacy, recognition, and fair climate and environmental adaptation. This highlighted potential conflicts and challenges associated with implementing policy options, offering insights into the complexities of achieving sustainable development goals. Designed and applied to analyze SDG-related issues of concern, the IPAM follows a multidimensional approach (Bukowski and Kreissl, 2022) that is based on a previous design of a Conservation Justice and Conflict Modell (CJC) (Bukowski, 2019, 2018), with the emphasis on five recurring justice dimensions mentioned in the relevant scientific literature to reduce poverty and inequality (Nussbaum, 2011; Sen, 2009). Using different methods from a qualitative content analysis (supported by a computerized comparative data analysis), stakeholder integration and literature review, it has narrowed down the vast quantity of scientific publications, and filtered the most frequently appearing and most agreed upon dimensions that are relevant for inequality and poverty (Nussbaumer et al., 2013). Additionally, the indicator sets include environmental management and governance research (Madden and McQuinn, 2014; Redpath et al., 2015), which play a key role in the theoretical framework of this model and serve as guidance and foundation for the development of the analysis framework. These indicators are partly derived from Ostrom's et al. 'design principles' for a sustainable resource management that lowers social conflict potentials (Ostrom, 1990; Sen, 2009). The triangulation of different justice theories and approaches allows a closer examination of socio-environmental and economic problems and inequality potentials, with regards to SDG action implementation and institutional performance (Schlosberg, 2007). To address the research questions outlined earlier, a **qualitative environmental and social impact assessment modeling approach** was employed, integrating stakeholder knowledge derived from prior research within the **SDGVisionPath** project.

2.1   IPAM Application Process (Modeling Process)

The second phase of the **IPAM application** presented in this paper focuses on validating and evaluating the outcomes of previous research findings in SDGVisionPath, specifically the policies recommended by stakeholders in the final SDGVisionPath workshop. In this phase, IPAM organizes the central topics from the project proposal and WP1, aligning them with specific SDGs. These

include **Energy Poverty (SDG1)**, **GHG Emissions (SDG13)**, **GDP and Job Satisfaction (SDG8)**, as well as newly introduced dimensions such as **Transparency (SDG16)**, **Education (SDG4)**, and **Community (SDG11/SDG10)**, as derived in the second SDGVisionPath stakeholder workshop (Hinterberger et al., 2024). To ensure operational clarity and facilitate context-specific policy development, these thematic areas were grouped into four clusters (see Figure 1):

- Energy Poverty & Community
- GHG Emissions & Education
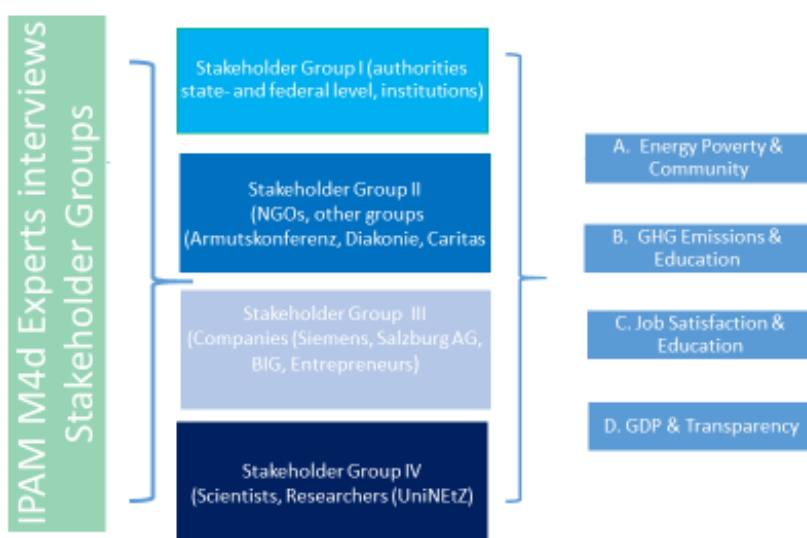- Job Satisfaction & Education
- GDP & Transparency

Figure 1: Expert Stakeholder Groups

These clusters, together with the dimensions and categories of the IPAM framework, guided the expert evaluation of the measures developed in WP3. The evaluation process had two primary objectives: (a) to validate the findings from the workshops, and (b) to propose additional measures. Experts were selected through a stakeholder analysis, ensuring representation from four key groups:

1. **Government institutions** (at both state and federal levels),
2. **Businesses** (including those in the production, energy, and construction sectors),
3. **Non-governmental organizations (NGOs)**, particularly those focused on social issues such as **Caritas**, **Diakonie**, and the **Poverty Conference**, and
4. **Academics and researchers** (including those from the UniNEtZ initiative).

This comprehensive stakeholder engagement process ensures that the evaluation and recommendations are grounded in a diverse range of expertise, providing a robust basis for policy formulation and sustainable development strategies. In total, 17 representatives from these groups participated in the IPAM expert interviews, each lasting about 45 minutes. To evaluate the five IPAM dimensions, each expert was given 9 points to distribute according to the socio-ecological conflict potential within each category. In total, 153 points were allocated. The results (see Figure 2) show that both experts and workshop participants identified "Distribution" (distributive justice) as the IPAM dimension with the highest conflict potential (46 points). However, experts rated "Legitimacy" (legal perspectives) as the second highest (41 points), followed by "Fair Climate and Environmental Adaptation" (34 points). In contrast, the remaining dimensions, "Participation" (18 points) and

"Recognition" (14 points), were deemed to have lower conflict potential. An interesting outcome of the analysis is that both experts and workshop participants assigned lower conflict potential to social measures within the dimensions of "Participation" (procedural justice) and "Recognition" (acknowledging special needs like disabilities, socio-economic status, age, intersectionality, religion). This contrasts with earlier model applications, where intersectional concerns and multiple discrimination issues in the "Recognition" dimension were viewed as significant conflict factors (Bukowski, 2018).
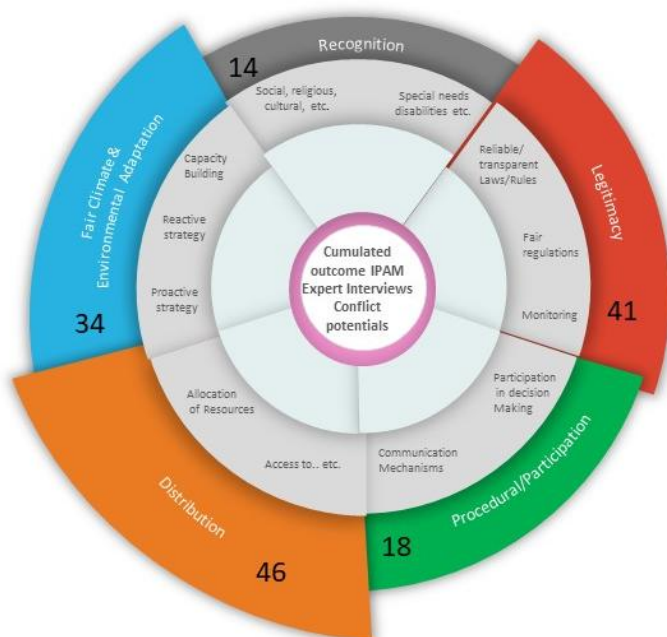

Figure 2: IPAM Results

The measures and options for action proposed by workshop participants were directly supplemented or critiqued by external experts during the IPAM evaluation process. Suggestions that elicited no objections from the experts were omitted from this report but can be found in other SDGVisionPath working papers (Bukowski et al., 2024; Wretschitsch et al., 2024). The following sections present the recommendations for measures and instruments and the correlating conflict potentials provided by experts for each thematic cluster. The experts were organized into balanced groups representing each of the four stakeholder categories (see above) and were assigned to the predefined clustered action areas. Along the dimensions and categories of the Inequality and Poverty Assessment Model (IPAM), these expert groups developed a range of proposals for measures and policy options, which are detailed in the following.

2.2   Proposal of additional measures

Energy Poverty & Community: The Experts recommend the implementation of basic energy security, meaning progressive energy tariffs to ensure affordable access to energy for basic needs while discouraging excessive consumption. This strategy is aimed at mitigating energy poverty, enhancing energy equity, and reducing CO_2 emissions. Subsidies for decentralized Renewable Energy Communities (REC) are proposed to foster local sustainability and diversify energy sources. The development of the social tariffs should involve collaboration with poverty advocacy groups to ensure inclusivity and fairness. Legal measures are necessary to establish clear frameworks for pricing models as well as for Renewable Energy Communities, with simplified regulatory processes to enhance trust among stakeholders. The proposed energy policies should account for a range of

socioeconomic needs, incorporating educational initiatives and solidarity-driven events to engage disadvantaged groups. A basic energy guarantee is recommended to align social and environmental objectives, despite existing concerns over the energy efficiency of devices in low-income households.

GHG Emissions & Education (Energy-efficient Buildings): Findings from the participative modeling suggest the prioritization of inclusive energetic refurbishment projects to enhance energy efficiency in older buildings, specifically targeting low- and middle-income households. These renovations should be accompanied by educational initiatives to engage residents and provide practical, hands-on learning opportunities. Experts advocate for the introduction of energy literacy at an early stage, incorporating energy efficiency topics into elementary education and collaborating with companies for practical training. There is a call for the formal integration of energy education into educational frameworks, supported by legal amendments. Educational materials should be designed to accommodate diverse audiences, using accessible formats such as pictograms and barrier-free resources. Climate adaptation strategies emphasize energy-efficient renovations and the mandatory implementation of cooling measures, such as external shutters, to make living spaces adaptable to climate extremes without compromising affordability.

Job Satisfaction & Education: The experts propose a comprehensive strategy to integrate sustainability and job satisfaction within education and professional development. This includes expanding access to sustainability-focused workplace training, enhancing employer qualifications, and fostering collaborations between schools and industries for experiential learning. Stakeholder participation is critical at every level, with an emphasis on co-creative planning processes that involve students and youth in curriculum development. Changes to educational and vocational curricula are recommended to include practical units (visiting a best practice project e.g.) on energy education and sustainability as well as the businesses take a stronger focus on inner developing goals (IDGs) and Corporate Social Responsibility (CSR), though such modifications may encounter challenges due to necessary organizational and legal adjustments. Training programs should be inclusive and accessible, catering to diverse linguistic and physical needs to reduce educational disparities. Educational content should aim to balance energy efficiency, environmental protection, and job satisfaction, while acknowledging potential implications for energy-intensive industries.

Transparency & GDP: The expert-driven, participative modeling outcome underscores the need to integrate CO_2 budgeting on a per capita basis and to revise GDP metrics to encompass the environmental and social costs of economic activities, including health impacts. This shift requires a participatory process involving diverse stakeholder groups, including companies, to ensure comprehensive acceptance and effective implementation. The development of specialized legal frameworks is necessary to support these changes, integrating participatory mechanisms to bolster legitimacy. Effective communication strategies, utilizing user-friendly visual aids such as pictograms, are crucial to making information accessible to a broad audience. CO_2 budgeting and the adjustment of GDP metrics are central to equitable climate adaptation, though significant resistance is anticipated from industries wary of increased scrutiny and the potential financial consequences.

2.3 Assessment of Conflict Potentials of the experts-driven measures

Energy Poverty & Community: The primary sources of conflict in this area stem from the financial and legal dimensions of energy redistribution (see Figure 3). The implementation of progressive energy tariffs and the promotion of Renewable Energy Communities challenge the established power structures in the energy sector. Traditional energy companies are expected to resist these decentralization efforts due to concerns over market control and financial implications. Legal frameworks must be carefully crafted to address these tensions while ensuring equitable access to

energy. The conflict potential in the distribution (15), legal (17), and climate (8) aspects highlights the need for balanced, inclusive policy solutions.
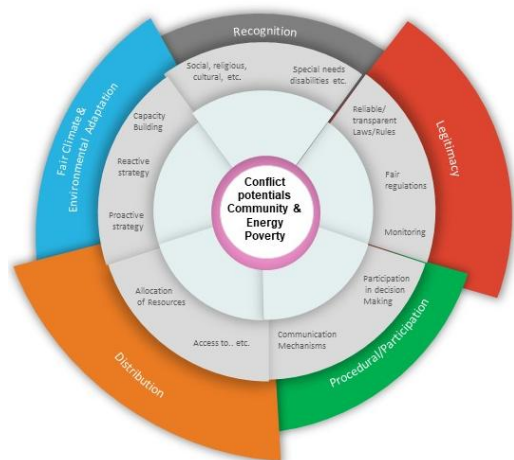

Figure 3: Expert's evaluation and assessment conflict potentials: **Community & Energy Poverty**

GHG Emissions & Education: In this cluster (see Figure 4), conflicts are moderate, primarily related to the economic and regulatory challenges of financing energy-efficient building renovations. Although there is substantial support for educational initiatives in the field of energy efficiency, concerns remain about the affordability and financing of renovation projects, especially in low-income communities. Ensuring that energy efficiency measures do not exacerbate housing costs is crucial for achieving both social and environmental goals. Conflict potentials are evident in the distribution (10), legal (10), and recognition (8) areas, where stakeholders are cautious about the potential impacts on marginalized groups.
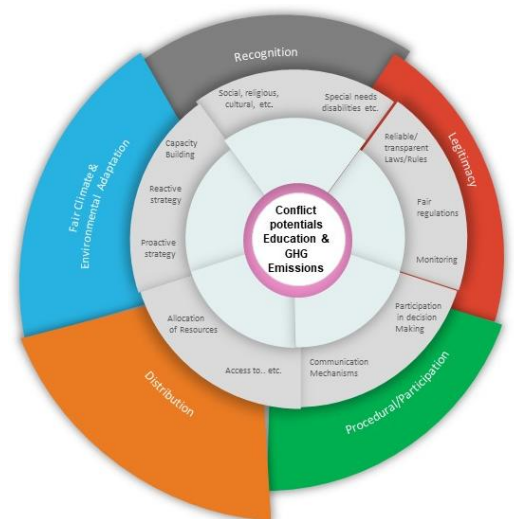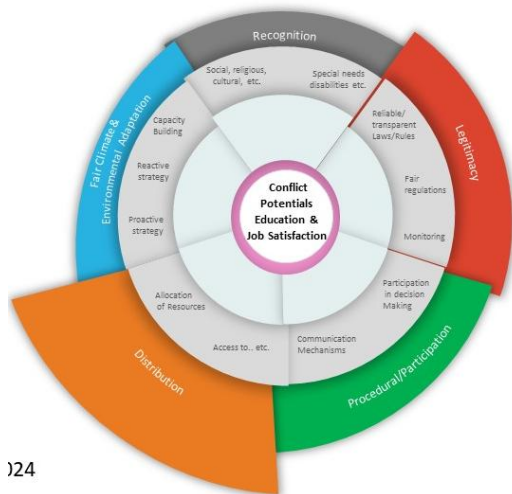

Figure 4: Expert's evaluation and assessment conflict potentials: **Education & GHG Emissions**

Job Satisfaction & Education: The primary conflict potential in this category centers around the restructuring and funding of educational and vocational training programs to incorporate sustainability and corporate social responsibility (CSR) topics (see Figure 5). Resistance is anticipated, particularly from businesses, due to increased regulatory demands and the necessity of adapting to new standards. Despite these challenges, inclusive education and training initiatives are seen as crucial for long-term workforce development, job satisfaction, and attracting new talent. The most

significant areas of conflict are related to distribution (21) and legal frameworks (10), especially concerning the practical implementation and financing of these updated educational programs.

*Figure 5: Expert's evaluation and assessment conflict potentials: **Education & Job Satisfaction***

GDP & Transparency: Conflict potentials in this area (see Figure 6) are most pronounced concerning the incorporation of CO_2 budgeting and the extension of GDP metrics to reflect the environmental and climate impacts of various industries, as well as the health-related effects of production (14). The legal challenges associated with incorporating the true costs of environmental degradation, unsustainable subsidies, and health risks into GDP indicators were significant points of contention within the expert group, which is reflected in the model outcome (11). Business representatives are particularly concerned about the fairness of such evaluations and the potential negative impacts on their products and services. However, the issue of transparency regarding purchasing power and the labor income share of GDP was broadly supported by experts, as it provides a more holistic and accurate understanding of economic well-being.
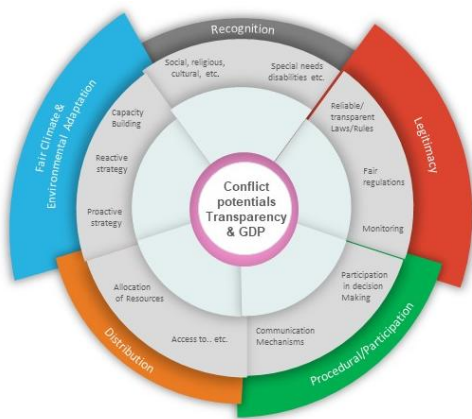

*Figure 6: Expert's evaluation and assessment conflict potentials: **GDP & Transparency***

In summary, the conflicts in Energy Poverty & Community arise from the financial and legal challenges of implementing progressive energy tariffs and promoting Renewable Energy Communities, which disrupt traditional energy markets and face resistance from established companies. Legal frameworks must address these tensions to ensure equitable energy access, with conflict potential in distribution, legal, and climate aspects. In GHG Emissions & Education, conflicts center around the costs and financing of energy-efficient renovations, particularly in low-income

communities, while educational initiatives on energy efficiency are generally supported. Conflicts appear in distribution, legal, and recognition areas, especially concerning marginalized groups. For **Job Satisfaction & Education**, resistance is expected from businesses regarding the restructuring of educational programs to include sustainability and CSR topics, with conflicts in distribution and legal frameworks, especially around financing these updates. In **GDP & Transparency**, conflicts focus on integrating CO_2 budgeting into GDP metrics and addressing the environmental and health impacts of industries, with significant legal challenges. However, the transparency of labor income and purchasing power in GDP is broadly supported, offering a more accurate understanding of economic well-being.

2.4   The derived policy recommendations

In addition to the above-mentioned recommendations, derived through the stakeholder workshop and analysis inWP4, the second IPAM application utilized expert input to guide both the modeling process, validation and evaluation of the outcomes and the development of targeted policy recommendations. By pursuing the following concrete actions, IPAM aims to strike a balance between economic growth, social equity, and environmental protection:

- Basic energy security for all
- Implementation of progressive energy tariffs to ensure affordability for essential consumption while discouraging excessive use.
- Support of renewable energy communities
- Renewable Energy communities with decentralized renewable energy supply through legal improvement and financial incentives.
- Furthering energy literacy
- Implementation of energy education in the curricula, also from early childhood education to foster a culture of energy consciousness.
- Facilitate energy-efficient renovations:
- Energy-efficient refurbishment with the active participation of residents, particularly in lower-income areas.
- Develop inclusive and accessible training programs:
- Development of training and education focused on sustainability to improve job satisfaction and retain a skilled workforce.
- Development of further GDP indicators to enhance transparency
- Development of further GDP indicators to reveal the social and environmental costs and benefits

3 Discussion

This discussion synthesizes the outcomes of the Inequality and Poverty Assessment Model (IPAM) application, integrating expert insights with relevant literature and the current state of research to address the systemic challenges inherent in sustainable development and energy transitions. The findings, synthesized from the expert input, highlight the critical need to adopt multidimensional metrics for measuring societal progress, tackling energy poverty, empowering local communities, implementing structural reforms to reduce greenhouse gas (GHG) emissions, and promoting workforce satisfaction and societal well-being. Drawing on the latest research (Braun et al., 2023; Koukoufikis et al., 2023; Wang and Chen, 2022) and the Austrian Armutskonferenz (Appel et al., 2023) and others, this integrated approach underscores the importance of aligning technical, economic, and social measures to achieve long-term sustainability. The discussion that follows, informed by both expert input and a broad review of existing literature, elaborates on how these challenges can be addressed and offers policy recommendations for a transformative shift toward more equitable and sustainable development pathways. Traditional economic indicators, such as gross domestic product (GDP), fail to capture the ecological degradation and social inequities embedded in economic systems. As an alternative, indices like the Genuine Progress Indicator (GPI) and the Social Progress Index (SPI) have been developed to provide a more comprehensive and transparent view of societal progress by considering factors like environmental depletion, inequality, and social well-being (Wang and Chen, 2022). Koukoufikis et al. (2023) emphasize the importance of transparency in the development and application of these metrics, ensuring alignment with societal values and fostering public trust. Adjusted GDP measures, which account for the economic costs of environmental degradation, help policymakers prioritize sustainability and equity over narrow growth objectives. Adopting such holistic metrics not only improves decision-making but also shifts societal priorities towards long-term ecological and social goals, contributing to more effective and equitable policy outcomes. Energy poverty remains a major barrier to inclusive development, disproportionately affecting vulnerable populations. Factors such as high energy costs, inefficient housing, and price volatility in liberalized markets exacerbate the issue, as seen in Austria's reliance on the "Merit-Order" system, which has led to severe price surges impacting low-income households (Braun et al., 2023). Policy measures must balance affordability with sustainability. Progressive energy tariffs, like those historically implemented in Italy, can help ensure equitable access to essential energy services while discouraging luxury consumption. The Austrian Armutskonferenz (Appel et al., 2023) advocates for guaranteed basic energy provision, in line with principles of energy justice. These measures must be paired with investments in energy efficiency and renewable energy systems to reduce long-term costs and emissions, offering a pathway to balance affordability with ecological sustainability. For the suggested promotion of solidarity-based energy communities, as a decentralized and participatory framework, offer promising solutions for addressing energy poverty, reducing emissions, and empowering local communities. Koukoufikis et al. (2023) note that these initiatives enable households, businesses, and municipalities to co-produce and manage renewable energy, reducing reliance on centralized fossil fuel systems. However, for energy communities to be successful, clear regulatory frameworks, streamlined administrative processes, and inclusive financing mechanisms must be established to ensure the active participation of low-income groups. In addition to addressing energy poverty, the renewable energy transition presents significant opportunities for workforce transformation. Training programs in sustainable energy systems are essential to equip workers with the skills necessary for a green economy, enhancing job satisfaction and career resilience. Furthermore, integrating energy literacy into education systems empowers citizens to make informed energy choices, as highlighted by Koukoufikis et al. (2023). These initiatives not only support individual well-being but also advance collective climate goals, creating a more

sustainable and equitable society. Substantial reductions in GHG emissions require systemic reforms across the energy, transportation, and industrial sectors. Fossil fuel dependence exacerbates climate change and weakens energy system resilience, as demonstrated by recent global energy crises. A transition to renewable energy, coupled with energy efficiency measures, can significantly reduce emissions while providing long-term cost savings. Transparent monitoring and reporting mechanisms are crucial to ensure accountability, as highlighted in IPAM findings. Policy interventions must address the socio-economic factors underlying emissions, such as energy pricing mechanisms that internalize environmental costs without exacerbating energy poverty. Investments in green infrastructure and public transportation offer additional opportunities to reduce emissions while fostering inclusive economic growth. The transition to sustainable energy systems also has broader implications for job satisfaction and societal well-being. Employment in the green economy often aligns with workers' values, contributing to higher levels of job satisfaction and professional fulfillment. Koukoufikis et al. (2023) emphasize that ensuring fair wages, safe working conditions, and opportunities for skill development are crucial to enhancing workforce engagement and productivity. Furthermore, the participatory nature of renewable energy systems strengthens community cohesion and resilience, as energy communities provide a platform for collective responsibility. By promoting local participation and ownership, these systems contribute not only to individual well-being but also to broader societal goals, fostering greater social capital and trust.

The Austrian Armutskonferenz (Appel et al., 2023) underscores the importance of socio-economic dimensions in ensuring that energy transitions are inclusive and equitable. By focusing on energy justice and integrating community-driven initiatives into policy design, sustainable energy transitions can address both social and environmental challenges in a way that benefits all members of society.

This integrated analysis of IPAM findings, supported by scientific literature, underscores the interconnectedness of environmental sustainability, social equity, and economic development. By adopting the policy recommendations derived from this study, policymakers can drive a transformative shift towards a more inclusive, resilient, and sustainable future. The findings highlight the need for collaborative approaches, the integration of multi-dimensional metrics, and inclusive policy design to create a just and sustainable energy transition.

4   Conclusion

This paper presents the results of the second phase of the Inequality and Poverty Assessment Model (IPAM), which focuses on validating and evaluating the outcomes of previous work packages, leading to the formulation of transition pathways for sustainable development. In this phase, the central topics from the project proposal and WP1 were aligned with specific SDGs, including Energy Poverty (SDG1), GHG Emissions (SDG13), GDP and Job Satisfaction (SDG8), as well as newly introduced dimensions such as Transparency (SDG16), Education (SDG4), and Community (SDG11/SDG10). These thematic areas were grouped into four key clusters: Energy Poverty & Community, GHG Emissions & Education, Job Satisfaction & Education, and GDP & Transparency.

The expert evaluation, guided by these clusters, aimed to both validate the findings from the participatory workshops and propose additional measures for addressing the identified challenges. Through a stakeholder analysis, experts from diverse groups were engaged, ensuring that the proposed measures were comprehensive and inclusive. The findings underscore the importance of integrating environmental, economic, and social dimensions in achieving the SDGs and offer actionable policy recommendations for each cluster. These include promoting energy justice through progressive energy tariffs, fostering energy efficiency in buildings, enhancing job satisfaction by

embedding sustainability in education and vocational training, and rethinking traditional economic metrics like GDP to reflect environmental and social costs.

While the proposed measures are promising, the evaluation also highlights significant conflict potentials, particularly in areas related to energy redistribution, financing energy-efficient renovations, and restructuring education to incorporate sustainability. Conflicts related to distribution, legal frameworks, and recognition are noted, which could hinder the successful implementation of these measures. Addressing these challenges will require careful, inclusive policy design, transparent communication, and targeted legal frameworks to ensure that all stakeholders— especially vulnerable groups—are equitably supported through the transition process. Ultimately, the paper demonstrates the value of participatory modeling in shaping evidence-based policy recommendations. The expert-driven insights and the validation of transition pathways provide a comprehensive approach to addressing systemic issues in sustainable development. By incorporating social, economic, and environmental considerations, the SDG Vision Path project offers a roadmap for achieving a just and sustainable transition that aligns with the SDGs. The findings highlight the necessity of stakeholder engagement and transparent policy-making, ensuring that the transition is not only effective but also inclusive, resilient, and adaptable to evolving challenges.

5 Acknowledgements

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