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## I. Introduction

1. As a contribution to the intersessional consultative process for the nineteenth session of the Commission on Sustainable Development (CSD), the Department of Economic and Social Affairs (DESA) and the Economic Commission for Latin America and the Caribbean (ECLAC) co-organized a Regional Senior Expert Group Meeting on the topic of Sustainable Development of Lithium Resources in Latin America: Emerging Issues and Opportunities, which was held at ECLAC Conference Centre in Santiago de Chile, Chile, 10-11 November 2010.
2. The meeting was attended by 55 experts, including experts from Argentina, the Plurinational State of Bolivia, Chile, Mexico and Peru, as well as experts from Germany, Japan, Republic of Korea and United States of America. In addition to representatives of Governments, the private sector, academia, NGOs, international resource persons, United Nations organizations and other development agencies also participated in the Meeting.
3. Lithium-based batteries and energy storage technologies play an increasingly important role in laptop computers, mobile phones and other battery-powered electronic appliances. With the growing interest in electric vehicles for more sustainable transport and mobility systems global demand for lithium is widely expected to continue to grow significantly, offering new opportunities for both developed and developing countries. Emerging lithium-based battery technologies may also gain importance in other applications.
4. Global demand for lithium has grown very rapidly. The countries of the Latin American region have the largest known resources of lithium. The world's largest producers of lithium in 2007 were Chile, Argentina, Australia, USA, China, and the Russian Federation. Large known resources of lithium are also located in other countries in Latin America, particularly in the Plurinational State of Bolivia, as well as in Asia and in sub-Saharan Africa. Exploration efforts are increasing worldwide to widen the sources of lithium.
5. Many governments of the Latin American region have expressed keen interest in further



of the Commission on Sustainable Development. He stressed the importance and the timeliness of the Senior Expert Group Meeting which would provide a relevant input, in particular with regard to the discussion on policy options for making transport systems more sustainable. Mr. Jang noted that the Republic of Korea became a member of ECLAC in 1997 and was supportive of exploring opportunities for enhancing regional and international cooperation.

### III. Proceedings of the Expert Group Meeting

12. Mr. Ralph Wahnschafft, Senior Economic Affairs Officer at the UN DESA Division for Sustainable Development, expressed the expectation of the co-organizers that meeting would enhance on-going efforts in the South American sub-region to develop lithium resources in a sustainable manner, and to encourage further development of lithium production along positive economic, social and environmental guidelines. He noted the specific objectives of the Senior Expert Group Meeting which was aimed to: (i) identify and discuss sustainable development issues in the extraction and industrial processing of lithium, including economic, social and environmental aspects; (ii) compile an independent assessment of the potentials and the benefits of expanded lithium mining and processing at existing and potential new sites, in particular in the countries of Latin America; (iii) consider the potential contribution to regional sustainable development and related policies that can enhance investment, employment and income generation, as well as benefit sharing; (iv) discuss opportunities for improving the sustainability of lithium production and use; (v) provide proposals for improved regulatory and legislative measures in the sub-region; (vi) create an expanded informal consultative network, bridging the gaps between policymaking, science, academia, and the private-sector; and (vii) identify possible future projects and partnerships for international cooperation.

13. Mr. Wahnschafft introduced the provisional programme which included a total of 21 presentations by experts, including introductory overviews, selected country reports, and technical presentations by the participating experts. He thanked the participating regional and international experts for their respective professional contributions to the programme.

14. The two day programme included expert presentations and discussions, including on the following topics: (i) assessment of national, regional and world market trends and analysis and projection of lithium demand and supply; (ii) assessment of current and future lithium application technologies (batteries, electronics, and other fields); (iii) lithium geological environment and resources (evaporites vs. pegmatites and other lithium bearing rocks); (iv) lithium mining, processing and ultimate upgrading; (v) presentations and discussions of reports by national experts (including Bolivia, Chile and Mexico); (vi) current legal environment (mining code, environment impact assessment, social considerations, mineral beneficiation, taxes) of the mining industry in countries involved in mineral exploitation, in particular in Latin America; (vii) infrastructure and natural resource requirements in lithium mining; (viii) elements of environmental impact assessment of lithium mining in the short and long term; (ix) local employment generation and regional social and economic development; (x) the long-term

potentials for recycling of materials); and (xi) perspectives for multi-stakeholder participation and benefit-sharing.

15. The programme comprised a sequence of 5 technical plenary sessions. Session I on assessment of global supply and demand for lithium carbonate from salt flats was chaired by Ms. Kathleen Abdalla, Chief, Emerging Issues Branch of UN DESA Division for Sustainable Development. Session II on country experiences, trends, issues and policies in production of lithium from salt flats was chaired by Mr Manlio Coviello, Chief, Natural Resources and Energy Unit and the Natural Resources and Infrastructure Division, ECLAC. Session III on enhancing sustainability in the production of lithium carbonate in Latin America was chaired by Mr. Eduardo Chaparro Avila, Economic Affa

21. In 2009, world market prices of lithium carbonate declined as a result of the global financial and economic crisis. However, it is widely projected that demand for and world market prices of lithium carbonate will continue to increase in future, together with growing demand for electronic appliances and electric cars, powered by rechargeable lithium-ion batteries.
22. Participants noted that large proven reserves of lithium carbonate exist and that lithium can be produced in sufficient quantities and at affordable prices for several decades to come.
23. Participants also noted that countries that produce lithium batteries need to further test and develop battery recycling technologies. Participants called for further research and for the establishment of product standardization and the required regulatory framework.
24. Production costs and retail prices of lithium-ion batteries for electric vehicles are still comparatively high. However, it was noted that

Andean salt flats. In many of the salt flats and the associated catchment basins surface and groundwater supplies are limited. Therefore, comprehensive studies of existing or anticipated environmental impacts are particularly essential. Most ecosystems in arid or semi-arid areas are highly vulnerable and can be affected even by minor changes in the quantity or quality of water supply.

29. The Meeting discussed the challenges of managing the local economic and social impacts of mining, including potassium and lithium mining. In their discussion participants emphasized the importance of benefit sharing and of involving local communities, including indigenous people, in the relevant decision-making processes.

30. Participants appreciated the sharing of information on initial experiences from Peru with implementing collaborative and participatory approaches to decision-making, including approached under the Extractive Industries Transparency Initiative (EITI).

31. Most of the existing potassium and lithium extraction sites in the Andean mountains have been established only relatively recently and production is projected to continue for many years to come. However, several participants observed that appropriate regulatory provisions are nevertheless needed to ensure the necessary financing of eventual post-mining site rehabilitation.

#### D. Perspectives for North-South, South-South and regional cooperation in lithium resource development

32. Participants discussed and identified a variety of opportunities for facilitating and improving the sharing of knowledge among research centres and relevant university and other academic institutes in the Latin American region.

33. It was also observed that due to the many site-specific variations appropriately adapted optimal technologies and processes need to be developed. Greater North-South and South-South technical and financial cooperation will be essential enhance the sustainable development of lithium resources in the Latin American region.

#### IV. Conclusions and recommendations

34. As a part of the concluding roundtable discussion the participants discussed and adopted a brief summary of conclusions and recommendations which are attached in the Annex to this report.



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## Annex

### Conclusions and Recommendations of the Senior Expert Group Meeting on Sustainable Development of Lithium Resources in Latin America: Emerging Issues and Opportunities

The *Senior Expert Group Meeting on Sustainable Development of Lithium Resources in Latin America: Emerging Issues and Opportunities* was co-organized by the United Nations Department of Economic and Social Affairs (DESA) and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and held at the ECLAC Raul Prebisch Hall in Santiago, Chile, on 10-11 November 2010.

The Meeting was attended by 55 experts of the Latin American region and other countries, including representatives of concerned national governments, private sectors, business associations, para-statal authorities, research institutes, academia, international organizations, as well as civil society groups.

The Meeting heard and discussed 21 expert presentations, including sectoral overviews assessing major issues and trends in the supply of and in the demand for lithium carbonate, in particular for electric mobility; country reports presented by experts from Argentina, the Plurinational State of Bolivia, Chile, Mexico; selected issue papers and presentations reflecting on perspectives for enhancing the sustainability in the production of lithium carbonate in Latin America, including through greater benefit sharing and empowering local socio-economic development; and national experiences, suggestions and proposals for enhancing national, regional and international cooperation in lithium resource development.

After discussion, participants took note of a number of general conclusion and recommendations, including the following:

1. Lithium can be extracted from various geological formations employing different types of processes. At the global level, there is a relative abundance of existing and potential future lithium supplies. However, optimal extraction processes and related costs can vary considerably between sites. Lithium carbonate production based on the extraction of lithium chloride brine from salt flats tends to be more economical and more environmentally benign than lithium extracted from pegmatite or other sources.
2. In 2009, sales and prices of lithium carbonate declined as a result of weak demand and the global financial and economic crises. However, in the intermediate and long term, global demand and prices for lithium are widely expected to continue to increase, creating new opportunities for investment in the expansion of lithium production capacities. Many of the speakers believe that the demand for lithium will at least double in the next ten years.

3. Several of the salt flats located in the Andean mountain region contain large amounts of lithium which can be extracted from brines in commercially viable and environmentally sound ways. Together, the countries of the “lithium triangle”, including Argentina, Bolivia and Chile, hold the world’s largest proven reserves of lithium.
4. It is widely projected that mobility and the number of motor vehicles will continue to increase worldwide, in particular in the developing countries. Many vehicle manufacturers have announced plans to produce hybrid and/or plug-in electric vehicles (HEVs and EVs) with lithium-ion batteries, and to significantly increase their market share in the future.
5. Given the large proven reserves of lithium resources in the Latin American region, there may no constraints in terms of resource potentials that could pose obstacles to the widely expected rapid expansion of lithium-ion battery based electric mobility, or to the continued and expanded use of lithium batteries in IT or other electronic products.
6. In spite of the above it is essential for long-term sustainable development that countries that produce lithium batteries also develop and test, plan for and introduce lithium battery recycling technologies. Initial efforts are under way to enhance necessary standardization and the required regulatory framework.
7. Efforts of successfully commercialize electric vehicles will depend, among other factors, on retail prices and on the relative costs for electric vehicle batteries, which thus far have remained relatively high. Participants noted that relative to the high costs of lithium-ion batteries, the costs of lithium carbonate and the costs of lithium contained in such batteries is actually very low (less than 5 per cent).
8. The countries of Latin America exercise their sovereign rights in natural resource development and are presently reviewing the applicable national legislation and investment promotion strategies with a view to enhance productivity, employment opportunities, incomes and export revenues from lithium mines for inclusive national socio-economic development.
9. Institutions and companies engaged in the commercial development and extraction of minerals from salt flats often simultaneously produce a variety of useful products, including potassium, lithium, as well as magnesium, nitrates, iodine, or other minerals. Co-production of various products offers essential opportunities for business, marketing and customer diversification.

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10. The extraction of lithium through evaporation of brines in salt flats can have significant impacts on the often delicate balance of limited fresh and/or ground water supplies. Comprehensive environmental impact assessment studies and monitoring is crucial to prevent, minimize and mitigate any negative impacts on the flora, fauna and ecosystems in the salars and the adjacent areas.
  11. There is a range of new lithium extraction technologies that could go beyond the use of solar energy for evaporation, evaporation itself and solar energy as such, and that could contribute to enhance lithium production in the future.
  12. Comprehensive periodical reporting by concerned companies and governments, including PAMCID 8, an essential precondition for effective information sharing, transparency and public participation in decision-making.
  13. Large-scale mining for world markets often relies on imported equipment and temporary migrants with the required skills, offering only very limited opportunities for sustained local value-added or socio-economic development. Greater efforts are needed in many regions to further enhance local benefit-sharing and the diversification of economic activities in local communities, including indigenous people.
  14. In order to avoid or reduce pot

*Development of Lithium Resources in Latin America*, and they expressed their appreciation of the generous technical and financial support of the Government of the Republic of Korea for this event.