Distributed Renewable Energy for Small/Island Developing States (SIDS)

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Aims of presentation

- To mobilise REFORM group colleagues to support practical engagement with SIDS to develop renewables resources and energy efficiency

- To address the context of REN-E in SIDS, in particular the major contribution of IRENA, the International Renewable Energy Agency

- To provide examples of the funding landscape for REN-E in SIDS and for collaborative projects, as well as successful projects

- To address the challenges of providing data for monitoring of SDG 7 (and hence the opportunity for research networks)

The Context 1: UN SIDS Partnerships

- Learning from the Sharp End of Environmental Uncertainty in SIDS (Small/Island Developing States): The 'Sharp End Partnership'
  http://www.sids2014.org/index.php?page=view&type=1006&nr=2705&menu=1507

- The Sustainable Development Knowledge Platform Strengthening the capacity in developing, monitoring and reviewing durable Partnerships for Small Island Developing States
  https://sustainabledevelopment.un.org/sids/partnerships2018

The Funding Opportunity Structure

- The Global Challenges Research Fund (GCRF) and UK Research and Innovation (UKRI):
  https://www.ukri.org/research/global-challenges-research-fund/:
  £1.5 billion over 5 years for research on development, led by universities in the 'South' with UK partner institutions responsible for budgetary management, interdisciplinary approach emphasized

- Green Climate Fund (two pots, one up to $50M, one up to $10M)
  e.g. $45 million for Barbados Water Sector Sustainability Project (incl. Ren-E) for Caribbean Community Climate Change Centre (Songdo, Republic of Korea, 1 March 2018) – The first Green Climate Fund (GCF) Board meeting of 2018 approved 23 projects, valued together at USD 1,093.5 million of GCF funding.

- GEF Small Grants ($50k)

- GIZ, JICA

- EU Horizon 2020

GCRF Networking Call
Deadline 11 October 2018

- As part of the Global Challenges Research Fund (GCRF), UK Research and Innovation **invites proposals for community building networks** focused around research challenges within the six strategic GCRF Challenge portfolios:

- Cities and Sustainable Infrastructure

- Education

- Food Systems

- Global Health

- Resilience to Environmental Shocks and Change

- Security Protracted Conflict, Refugee Crises and Forced Displacement

- Up to £150,000 is available per network, over a 2 year period. These funds are to support running costs, events and activities. The Network Director (Principal Investigator) for each Network must be an academic based at an eligible research organisation in a country on the OECD DAC list.

- More information is available here: https://www.ukri.org/research/global-challenges-research-fund/global-engagement-networks/

- For further information please email gcrf@rcuk.ac.uk, or contact Alexandra Spittle on 01793 444011.

The Cross-sectoral Contribution of Ren-E (IRENA.)

Figure 1.1 Meeting multiple Sustainable Development Goals through renewable energy

Interdisciplinary Policy Linkages

- One Health for People and Planet (https://www.interactioncouncil.org/our-work/meetings/high-level-expert-group-meetings/collaborative-action-one-health-people-and), Planetary Health Alliance (https://planetaryhealthalliance.org/)

- Commonwealth Curriculum Framework for the SDGs: lifelong, cross-sectoral (https://www.thecommonwealth-educationhub.net/wp-content/uploads/2018/04/CFSDG_UPDF-003.pdf)

- Commonwealth Blue Charter (ifco.online)

- The Water-Energy-Food nexus (https://www.water-energy-food.org/nexus-platform-the-water-energy-food-nexus/)

IRENA

"IRENA works on different fronts through various platforms, collaborations, capacity building activities and knowledge products to bring together different experiences and best practices; these relate to design and implementation of enabling policies, tailored financing schemes, and innovative business models and technology applications for stand-alone and mini-grid systems."

Note: graphics in this presentation are derived from IRENA publications.

The SIDS Lighthouse Initiative

Aims, by 2020:

- Develop Renewable Energy Roadmaps

- Mobilise USD 500 Million

- Deploy 120 MW of Renewable Energy

National Renewable Energy Roadmap for Islands (IRENA, February 2017)

- http://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/IRENA_island_roadmap_infographic_2017.pdf?la=en&hash=034A2869B9205533771E02C50E738530BDD77A25

Off-grid renewable energy solutions
(IRENA, July 2018)

- Electricity services for households, public services, commercial and industrial uses.

- Six-fold expansion worldwide of number of people served by off-grid renewables (133 million in 2016)

- Access to affordable, reliable, sustainable and modern energy at heart of Sustainable Development Goal 7 (SDG 7).

- Elements of universal electricity access: policies and regulations, delivery and financing models, institutional frameworks, capacity building, technology adaptation and cross sector-linkages.

IRENA: Enabling Environment for Scaling up Off-grid Solutions (IRENA, 2018. Off-grid Renewable Energy Solutions. Global and Regional Status and Trends, p 12)

Figure 8: **The enabling environment for scaling up off-grid solutions**

Policies and regulations

Capacity building

Accelerating off-grid renewable energy

Technology

Institutional frameworks

Cross sector-linkages

Delivery and financing models
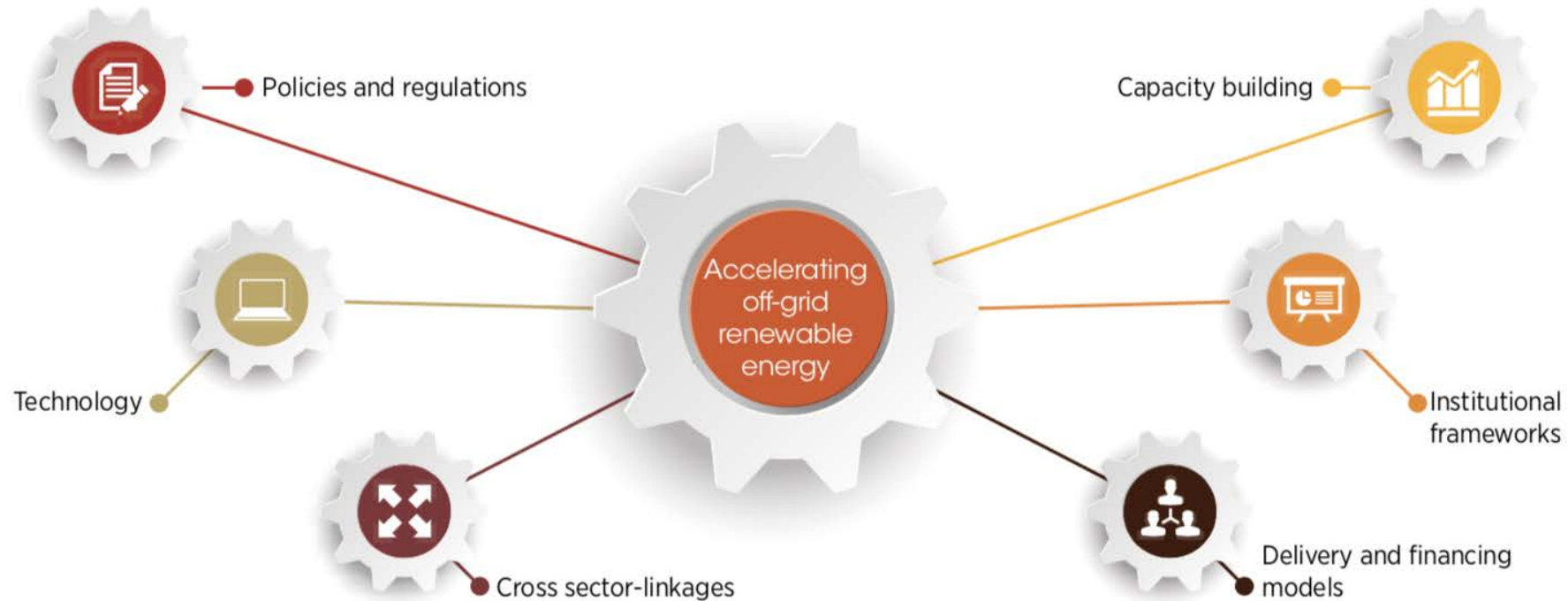
Source: IRENA, 2017b

Mini-grid Policy Development Cycle (IRENA:)

Figure 1.3 Policy development cycle for the mini-grid sector

STEP 5

Practical application of the policy and regulatory framework
- Adjustment of administrative procedures
- New mini-grids built and operated

STEP 4

Introduction/adjustment of policy and regulatory framework
- Electrification and renewable energy policy
- Rural electrification master plans
- Energy laws
- Regulation
- Support mechanisms

STEP 3

Identification of general and technology-specific policy and regulation for private mini-grids
- Solar DC
- Solar/solar-hybrid
- Hydropower (run-of-river)
- Biomass
- Wind/wind-hybrid

STEP 1

Analysis of existing constraints and conditions
- Electrification rate, renewable resources
- Current laws and regulation
- Rural community size, population density in villages, complexity of terrain
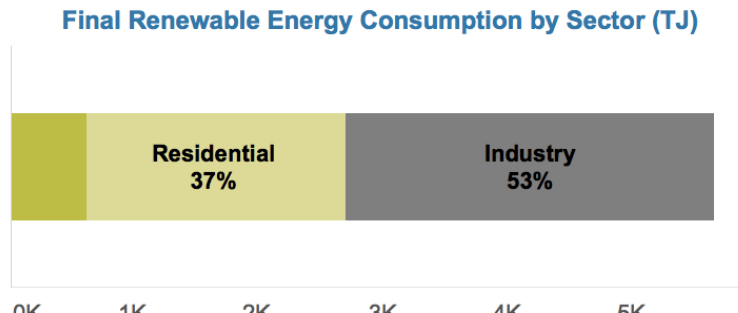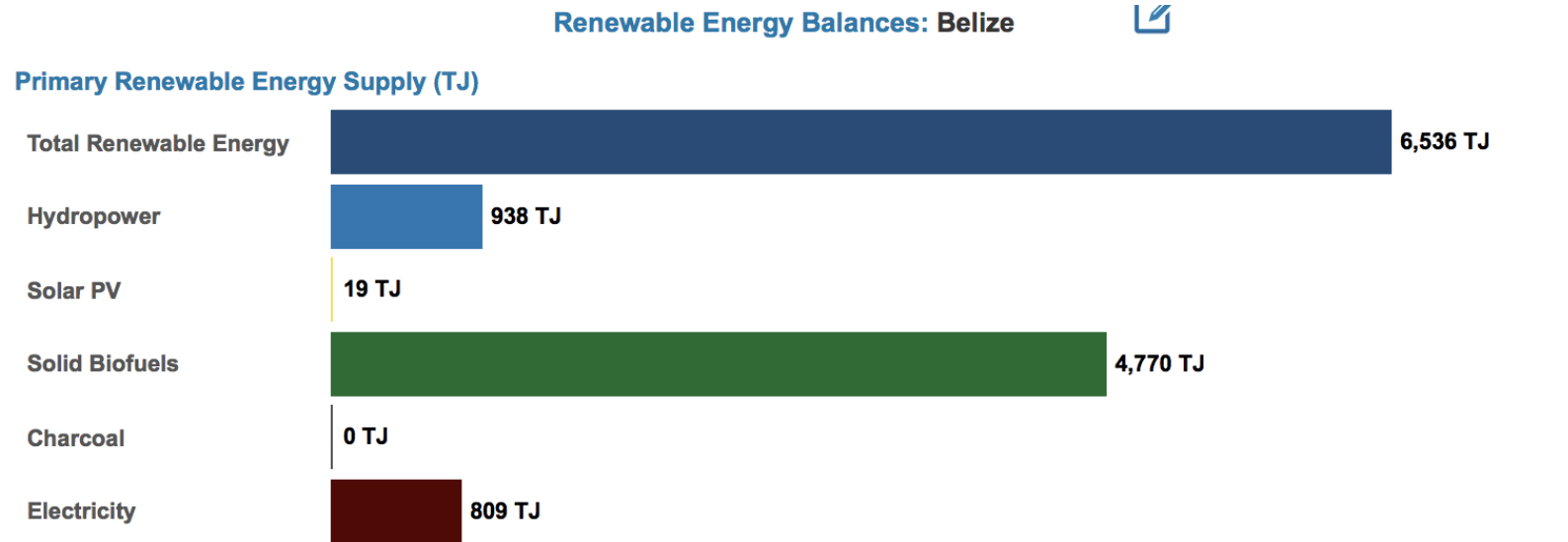- Private sector engagement in rural electrification

STEP 2

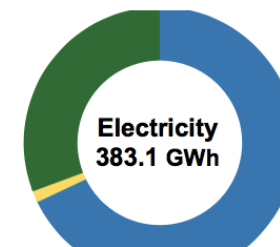Formulation of the role of mini-grids in rural electricity access
- Which tier of electricity service?
- Which technology or combination of technologies?
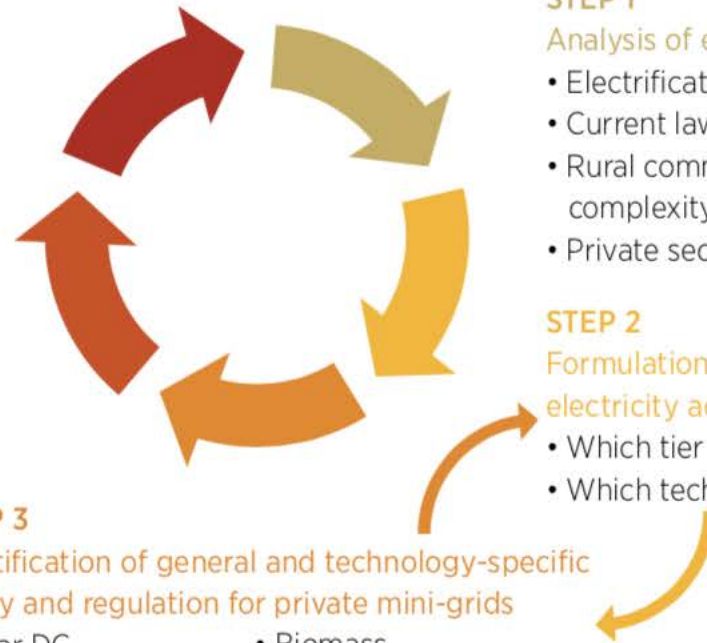
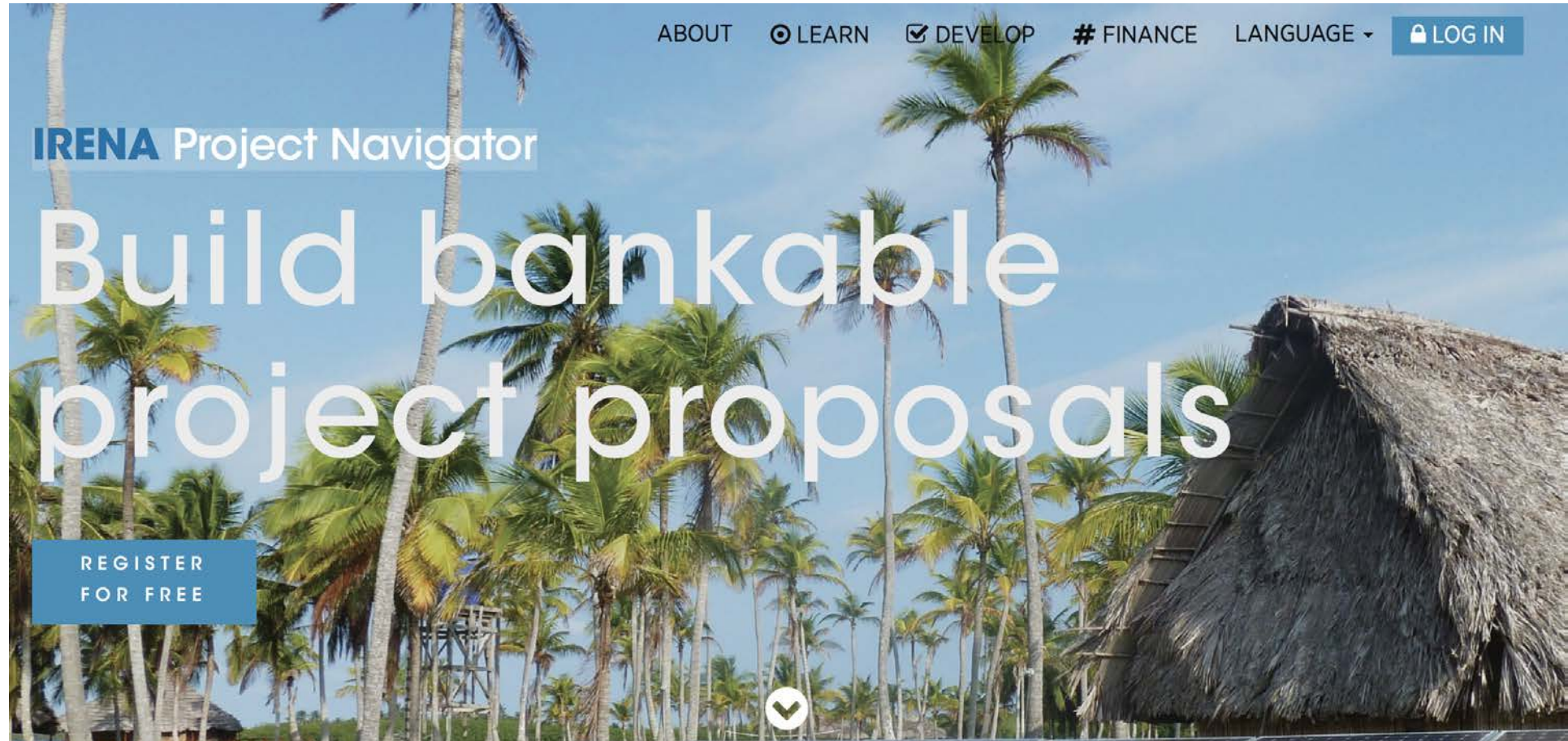# Example of IRENA renewable energy balance – Belize (IRENA:)

Renewable Energy Balances: Belize

Primary Renewable Energy Supply (TJ)

Total Renewable Energy	6,536 TJ
Hydropower	938 TJ
Solar PV	19 TJ
Solid Biofuels	4,770 TJ
Charcoal	0 TJ
Electricity	809 TJ

Final Renewable Energy Consumption by Sector (TJ)

Residential 37%   Industry 53%

0K   1K   2K   3K   4K   5K

Gross Renewable Electricity & Heat Production Technology Breakdown (2016)

Electricity 383.1 GWh

Toolkits

(IRENA:)

Accelerating Off-grid Renewable Energy: Key Findings and Recommendations from IOREC 2016

(IRENA: International Off-grid Renewable Energy Conference …)

"Technology and business innovation could cut the costs of renewable power generation for mini-grids by 60% in 20 years"

Eight priorities:

- Mainstreaming off-grid renewable energy in national rural electrification strategies;

- Creating an ecosystem to accelerate deployment;

- Designing dedicated policies and regulations;

- Unlocking capital for energy access;

- Identifying the right business models for deploying off-grid renewables;

- Innovating to improve accessibility, reliability and range of electricity services;

- Strengthening sustainable energy access and maximising benefits;

- Harnessing the cross-sector development impact of off-grid renewables.

Deployment Model for Solar DC Mini-grids (IRENA.)

Figure 2.2 Deployment model for solar DC mini-grids; tiers 1–3

Tier 0	**Tier 1**	**Tier 2**	**Tier 3**	Tier 4	Tier 5

Ownership
- Private, sometimes with a village ownership component, BOOM and BOM

Site selection
- Small villages with high population density
- Typically low income customers
- Clusters of villages to facilitate logistics
- Strong customer training component

Financing
- Mainly corporate finance, grants, possibly debt
- CAPEX subsidies to reduce tariffs

Technology
- Low cost PV-battery <5 kW
- Non main-grid compliant distribution networks - Flat rates, load limiters or pre-paid meters
- Highly efficient DC appliances

Operation & management
- Strong local presence of operator
- Low cost overhead structure
- Low cost logistics
- Intermittent operation with flat rates/load limiters, continuous operation with meters, mobile money

Tariff design and collection method
- Flat weekly or appliance-based tariffs
- Pre-payment meters or load limiters
- Pay-as-you-go

BOOM = build, own, operate, and maintain;
BOM = build, operate, and maintain;
CAPEX = capital expenditure.

What should we do to help scale up off-grid Ren-E for SIDS?

- Explore reasons for differential take-up: cross-national and local
- 'Adopt' three islands for a comparative energy governance analysis
- The islands lead on defining the problem, calling on us for input (GCRF model)
- Comparative analysis of donor support for SIDS renewables policy
- Renewables for One Planet Health, food security (refrigeration)
- Universal Health Care: health delivery in remote areas
- Water-Energy-Sanitation Nexus

What can the REFORM group contribute?

- Energy economics
- Accessing finance
- Skills development
- Data capacity for SDG7
- Integrated governance: horizontal (cross-sectoral), vertical (multi-level)
- Renewables in context:
  One Planet Health
  Green Urbanisation
  MOOCs, webinars

Wider Partnership Potential

- Sharp End network (incl. UNESCO, CAM, UWI, USP, UniSey)
- Commonwealth participant countries (GIZ, JICA funding in SIDS)
- Links to Commonwealth institutions: ACU: Association of Commonwealth Universities; COL: Commonwealth of Learning, IFCO (Informal Forum of Commonwealth Organisations): professional bodies (planners, engineers, medics, educationists)
- Caribbean Studies Association (CSA) (Colombia 2019, Guyana 2020)
- Links to regional institutions: CARICOM, 5Cs: Caribbean Community Climate Change Centre, CRFM: Caribbean Regional Fisheries Mechanism, SPREP: Secretariat of the Pacific Regional Environment Programme, Apia, Samoa
- Partnership with Salzburg Global Seminar

Invitation to participate

If you are interested in participating in a network to build renewable energy into policy and practice in SIDS, including contexts of application (health, sanitation, food security/refrigeration, transport, urban design etc.) please contact me at nsjwatts@gmail.com, including 'SIDS LEAPFROG' in the subject line. Let me know your preferred focus.

Thank you!