

How can international cooperation contribute to Sustainable Energy for All



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Energy Poverty in Africa

- Total population of SSA in 2013 around **900 Mio.**;
570 Mio. (63%) in rural areas;
330 Mio. (37%) in urban areas.
- **650 Mio. without access to electricity**
- **89% of rural households (500 Mio. People) in SSA**
and 46% of the urban and peri-urban households (
150 Mio.) are not connected to the grid

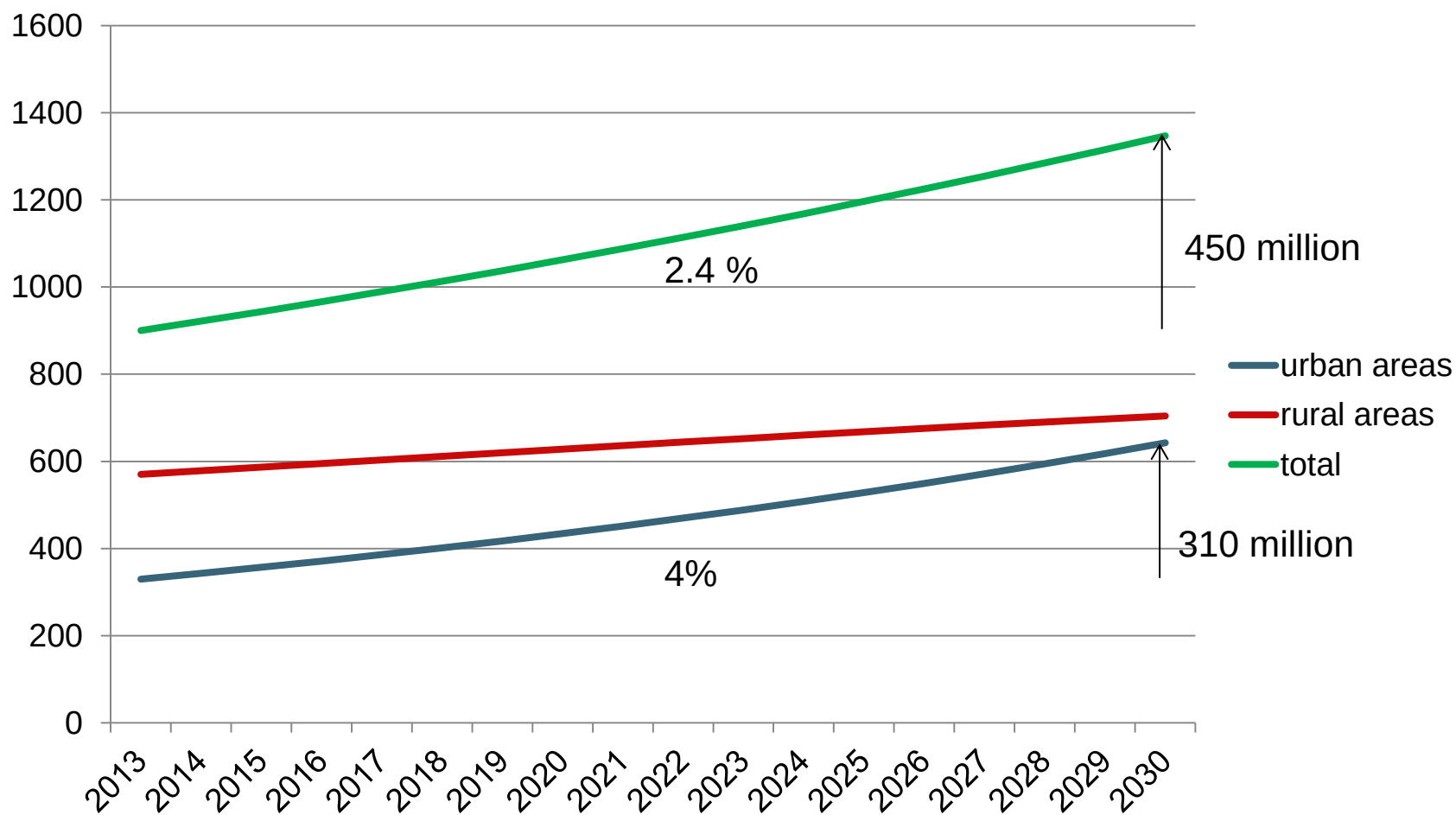
Ways to overcome energy poverty in Africa

3 Options

- Grid extension/densification
- Mini-grids (multi-user systems)
- household systems (one user systems)



Population growth in SSA



Energising Development – EnDev



EnDev provides:

- Energy for households
- Energy for social institutions
- Energy for enterprises

Predominantly in rural areas



Solar



Micro Hydro
Power



Biogas



Stoves



Grid
extension/
densification



Regional Distribution of EnDev Projects



Solar



Hydro



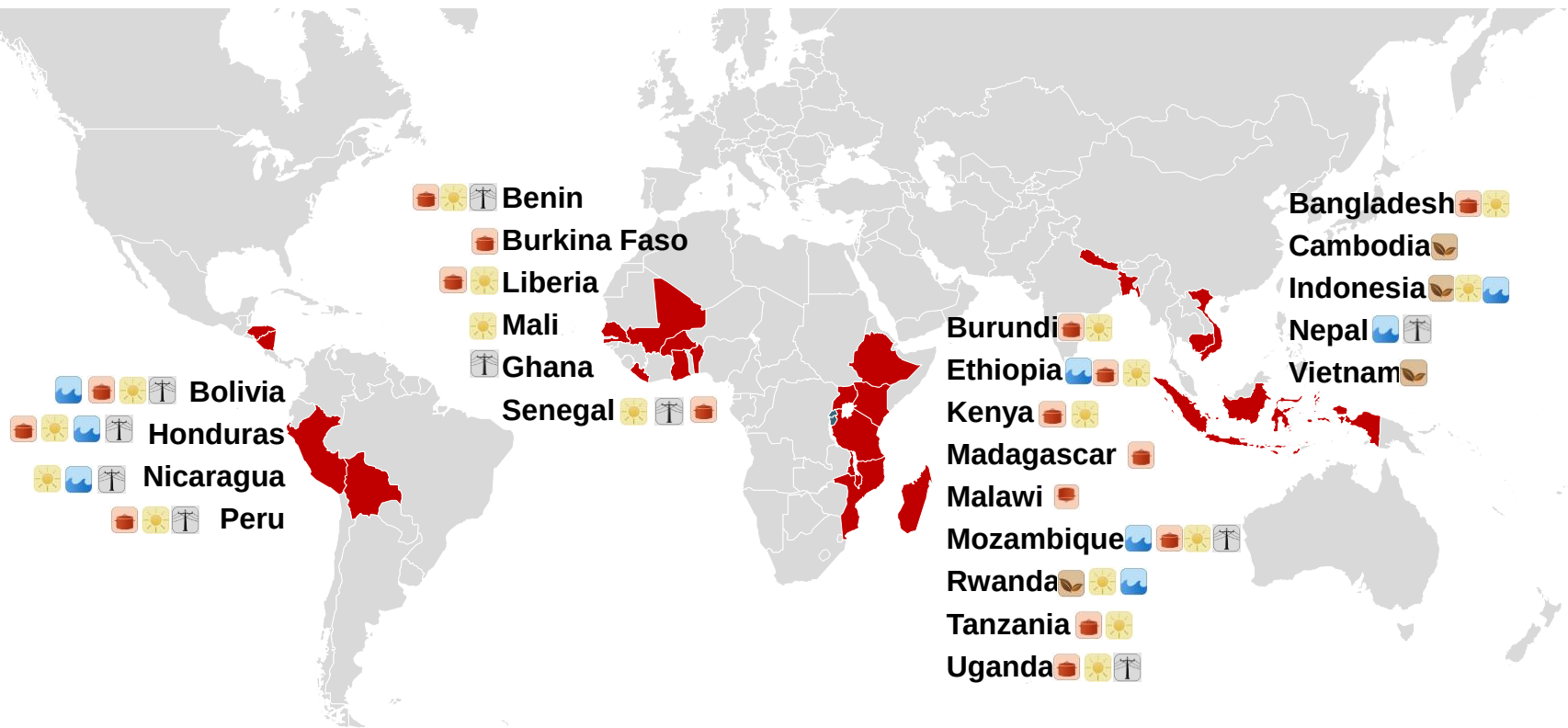
Biogas



Cooking energy



Grid extension/ densification



24 countries – 15 Africa, 5 Asia, 4 Latin America



EnDev grid extension/densification

Objectives

- a) extend the grid to villages
- b) connect almost 100% of the households to the grid
- c) connect social institutions and small enterprises to the grid

■ Approach:

- Support of **Geo-Information-Systems** for planning electrification power line routes and low tension distribution connections
- Introduction of **appropriate standards** (pole height, type of cable)
- Financial and technical **support of the utility** for grid extension (planning, tendering, procurement and intermediate storage of construction materials, supervision of construction work, quality control)
- Introduction of **pre-paid payments**
- communication with and **sensitisation of target group** (village electrification committees)
- Instalment payments of the connection fee



Lessons learnt

**Grid extension/densification is often the most cost efficient way for
small cities and large villages
but
not all households are connected**

■ Problems:

- Grid layout planning often done with old data;
- Mapping of distribution lines had to be checked on the ground
- Difficult and time-/resource-consuming tendering and procurement procedures
- Construction contracts take considerable time
- corruption
- Low quality of in-house-installations
- High number of secondary connections
- High level of technical and non-technical losses

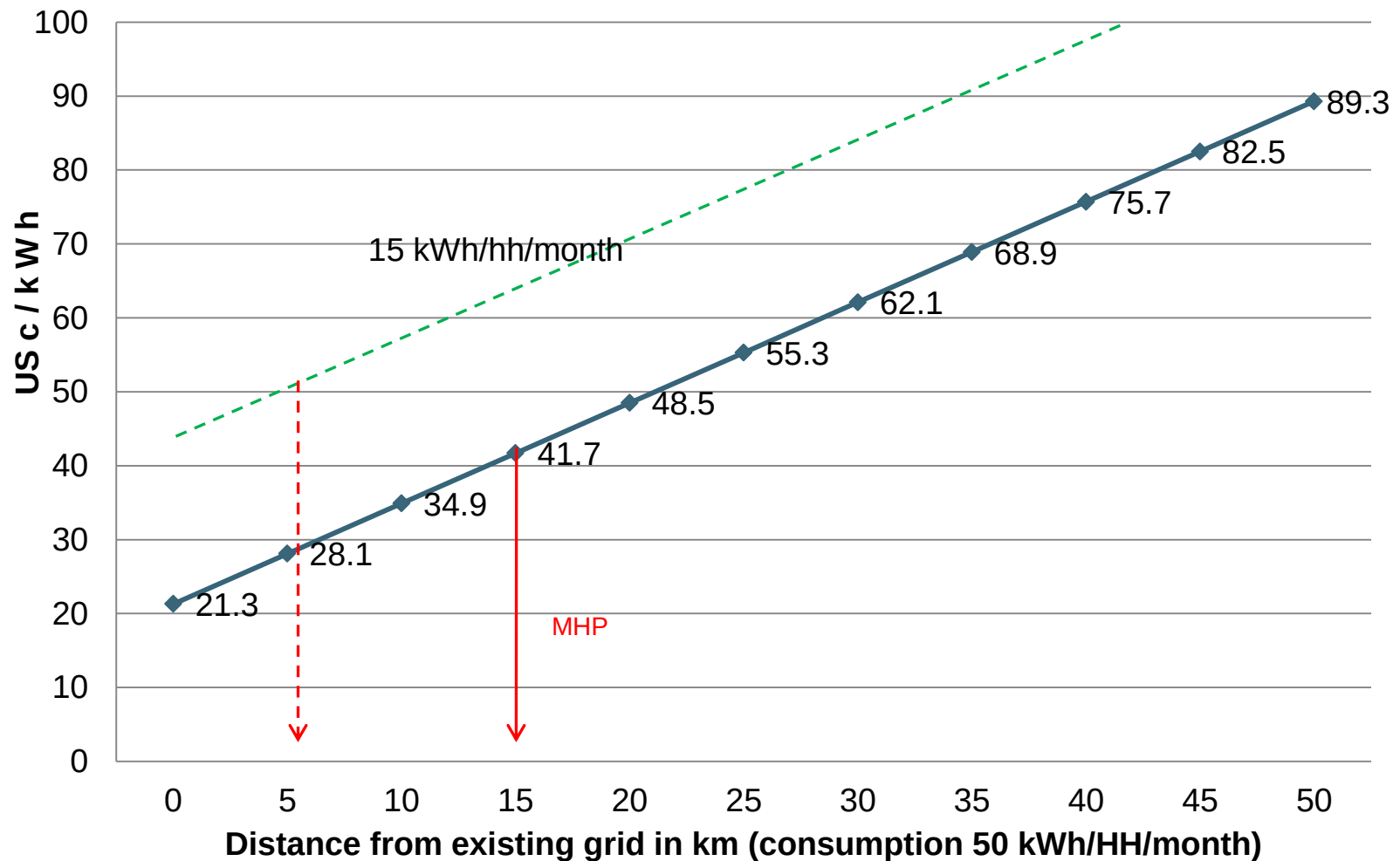
~ 20% of the rural population (150 million)

Grid extension is often not the solution for 550 million people in rural areas

- Initial investments are too high (400 - USD/person and up)
- Central power generation too low and underdeveloped grid infrastructure
- Installation of additional capacities takes years



Grid extension vs. off-grid solutions



What options are left?

Investments in

- village-grid installation
 - **Hydropower**
 - Diesel
 - **Solar (hybrid) systems**
- Household systems
 - **Solar Home Systems**
 - Rechargeable batteries
 - **PicoPV** or PicoHydropower



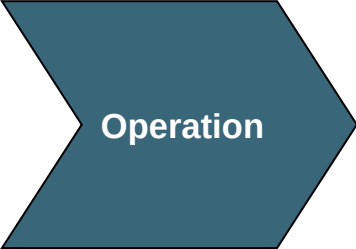
Opportunities of mini-grids based on renewable energies is growing

- **Technologies have matured**
- **Paradigm change:** grid-based rural electrification is often not realistic
- Strong and increasing **interest / push from private sector**
- **Benefits of renewable energy / hybrid mini-grids**

But challenges and barriers all along project development and operation



~ 30% of the rural population (225 million)



Operation

- Sufficient management and technical skills
- Sound owner – operator – client relationship
- Proper tariff setting
- High load factor (ABC business model)
- Adequate involvement of communities and local capacity
- Favourable political frame conditions (regulation etc.)

Two major problems

- Tariff setting cannot easily be balanced regarding affordability of electricity tariff, different demand levels, socio-economic factors, investment reserves
- No financial reserves in case of complications and backlashes

~ 30% of the rural population (225 million)

Off-grid products

PV market is developing in almost all regions in Africa

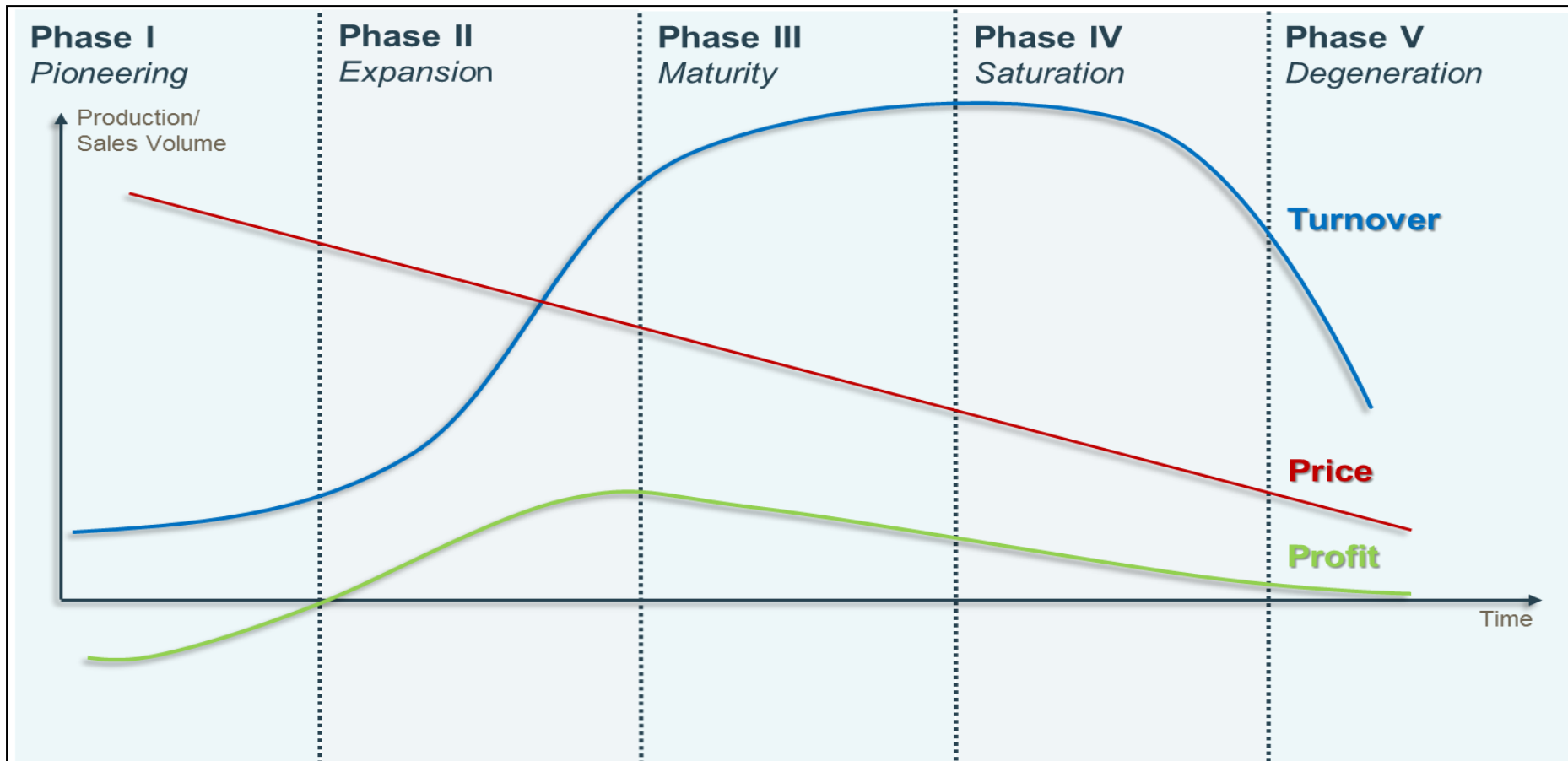
	Investment	Monthly cost
Simple PV lantern:	15 €	0,62 €
Pico PV system ¹ :	100 €	2,24 €
20 W system:	250 €	5,41 €
50 W system:	500 €	10,82 €
100 W system:	1000 €	21,65 €

Monthly outlays for energy sources (candles, kerosene etc.), which could be substituted by PV: **5 € - 10 €**

¹= 300 lm light + plug for radio and mobile phone



Pro-Poor Market Development



How can we develop a dynamic, self-sustainable pro poor market for household products (SHS, PicoPV)?

Supply side

- Reduction of costs for imports and transportation
- Support local assembling,
- Improve skills and competence of local entrepreneur (technical, business, marketing etc.)
- Support for the development of rural distribution chains
- development of new products and product accessories
- Working capital for importers and retailers

Consumer side, consumer protection

- Increased awareness about disadvantage of old technology and advantages of new technology
- Knowledge on quality standards
- Encourage after sales service
- Ensure warranty system
- Micro-finance for consumers

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550 million
- Mini-grids (multi-user
systems)
225 Million
- household systems (one
user systems)
225 million





Thank you for your attention

On behalf of
BMZ  Federal Ministry
 for Economic Cooperation
 and Development

 Ministry of Foreign Affairs of the
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